S5. Assessment of eReefs biogeochemical simulation against observations

Jennifer Skerratt and Mark Baird

[Supplementary Material for Geoscientific Model Development: CSIRO Environmental Modelling Suite (EMS): Scientific description of the optical and biogeochemical models (vB3p0)]

Model version: gbr4_H2p0_B3p0_Cq2b_Dcrt

Model run period: 1 Dec 2010 to 1 Nov 2018

- **Includes comparison with version B2p0 where applicable**

For more details of Methods see:

Skerratt J.H., M. Mongin, K. A. Wild-Allen, M. E. Baird, B. J. Robson, B. Schaffelke, M. Soja-Wozniak, N Margvelashvili, C. H. Davies, A. J. Richardson, A. D. L. Steven (2019) Simulated nutrient and plankton dynamics in the Great Barrier Reef (2011-2016). J. Mar. Sys. 192, 51-74.

Document versions

Thursday, 3 January 2019 version

- Includes observation updates to MMP Turbidity and MMP chlorophyll mooring obs to November 2018: p111 to 125
- Includes the new MMP sites which have decreased the metrics for both Turbidity and Fluorescence. The metrics are better if we leave summer of 2011 in.
- Simulated turbidity has zeros (night-time) removed in the model run. p 118 to 125.
- Simulated Fluorescence is not as good as simulated Chl *a* against MMP mooring obs however obs are modified fluorescence based on Chl *a*
- Turbidity is presented at full extent of NTU and again with NTU under 20 (p119 and 125)
- The QC of the new set of MMP data remains excellent but doesn't appear as stringently QC'd as in the past with blanks and some unrealistic data.

Friday, 4 January 2019 version

- Scatter plots of fluorescence against Chl *a* for all MMP moorings and combined scatterplot at end

Tuesday, 19 February 2019 version

- Added parameter file for H3 version

Wednesday, 20 February 2019 version

- Added satellite photos depth of MMP and LTR sites and glossary

Tuesday, 26 March 2019 version

- Added correct NRS nutrient metrics and graphs with extended observational time series and NRS alkalinity extension of observed dates and inclusion of North Stradbroke island (GBRNSI)

Acknowledgement of data sources:

We thank Britta Schaffelke and her colleagues in the Marine Monitoring Program for their commitment to obtaining the observations that enabled the model evaluation. We also acknowledge the use of data from the AIMS Long Term Monitoring Program, Australia's Integrated Marine Observing System, and The Future Reef 2.0 Program funded by GBRF, Rio Tinto and CSIRO. We greatly appreciate Cedric Robillot for his leadership of the eReefs Project.

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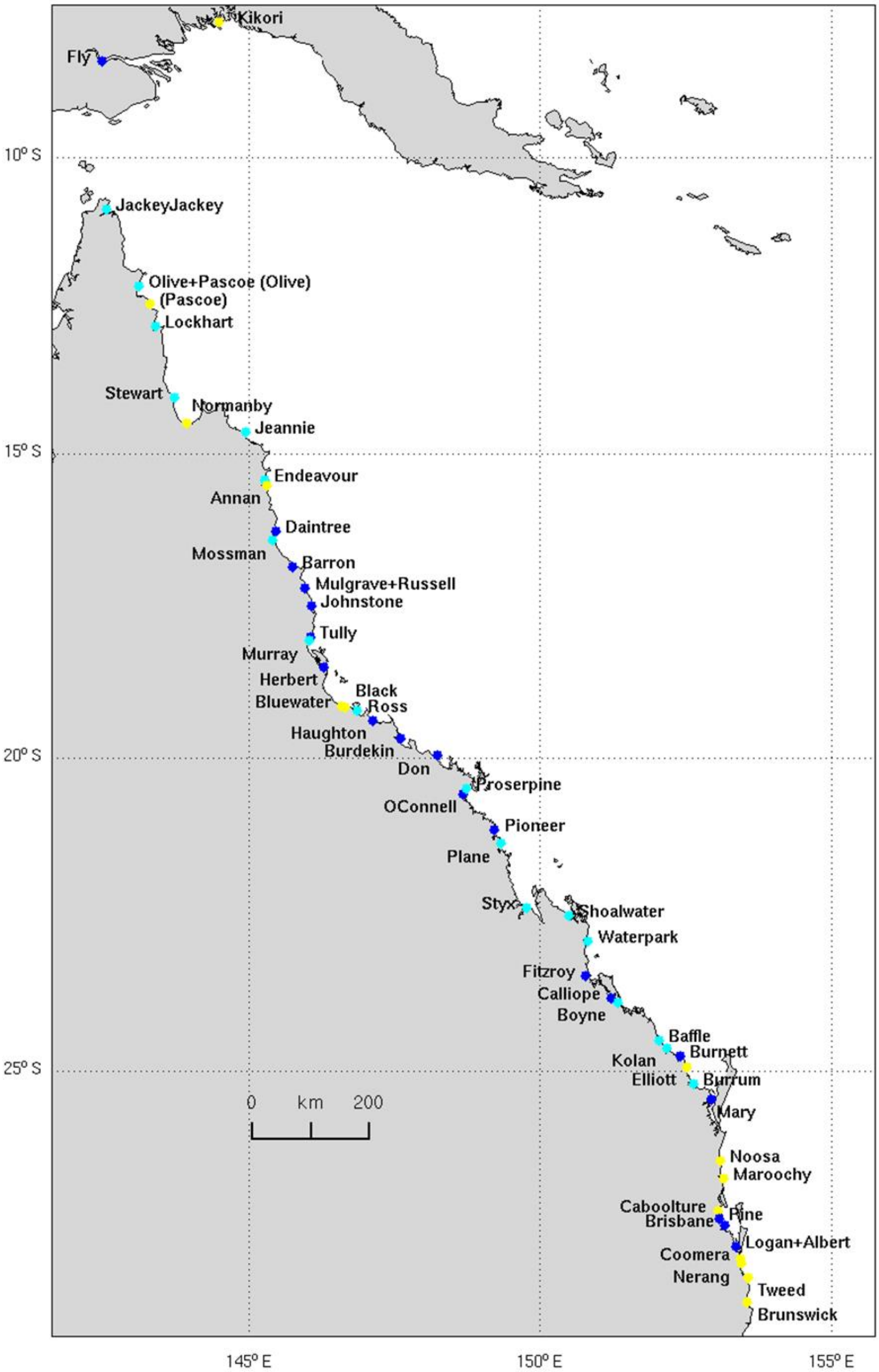
1. Map: River and catchments in eReef model



●Rivers and catchment model with hydro flow catchment loads B2p0 and B3p0
● Extra rivers in B3p0 where catchment in as point source loads
● Rivers in hydrodynamic model, some without flow, no catchment model data.

Figure 1 Map of Queensland rivers included in eReef model versions B2p0 and B3p0. Includes extra rivers for B3p0 in light blue

2. Map: AIMS and IMOS NRS sites used in eReef model

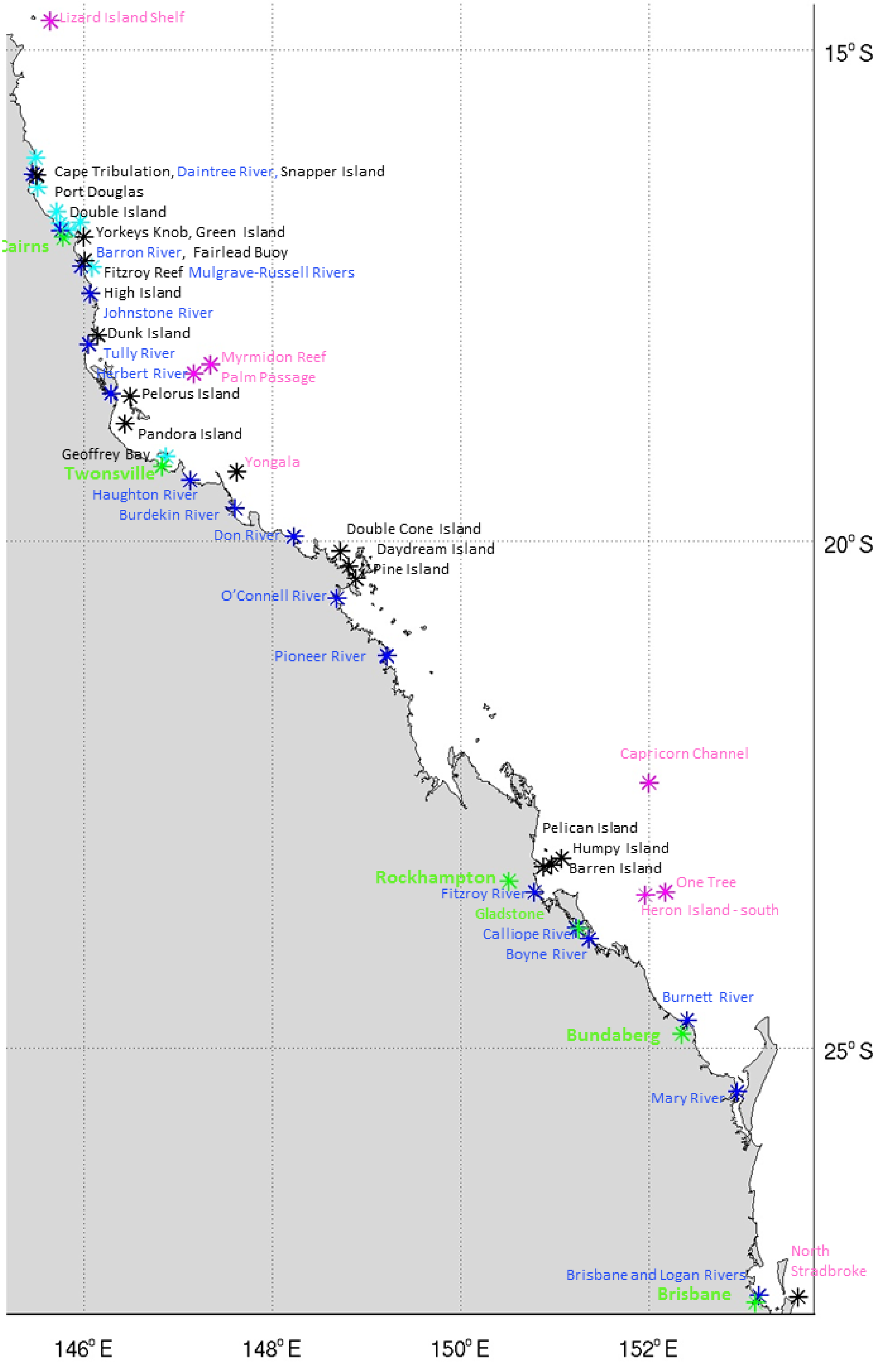
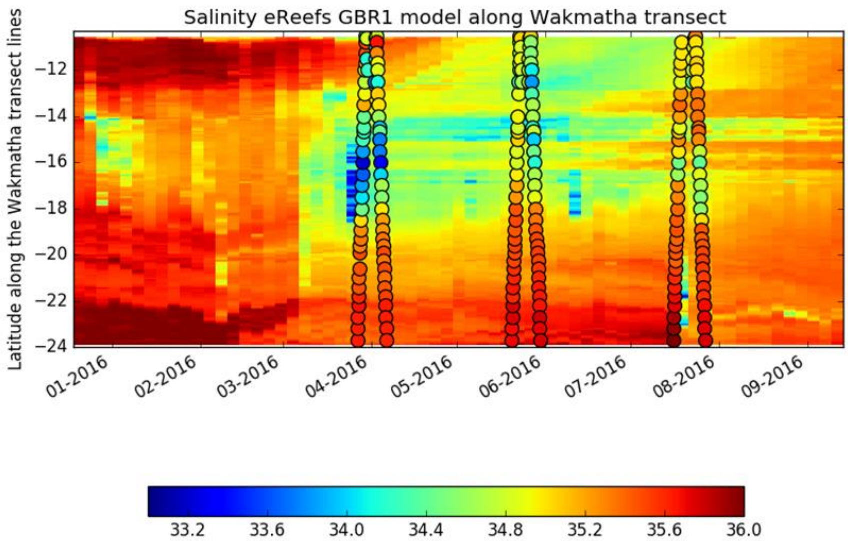
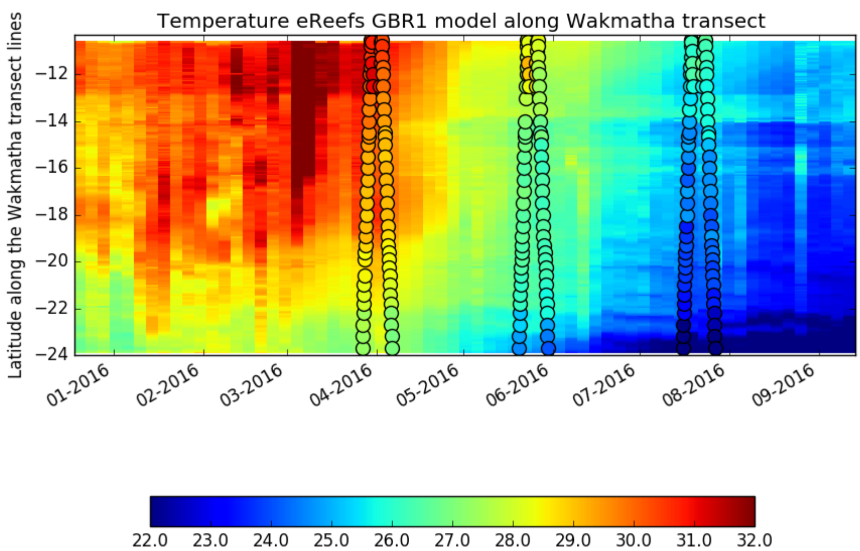


Figure 2 Map of observational sites in this report (black and pink), rivers (blue) and major towns (Green)

3. Map Wakmatha transect for carbon chemistry

Figure shows Wakmatha transect and temp and salinity comparison with GBR1 (see page 180 Wakmatha transect line for carbon chemistry assessment of Wakmatha transect line)





4. eReefs biogeochemical model schematic

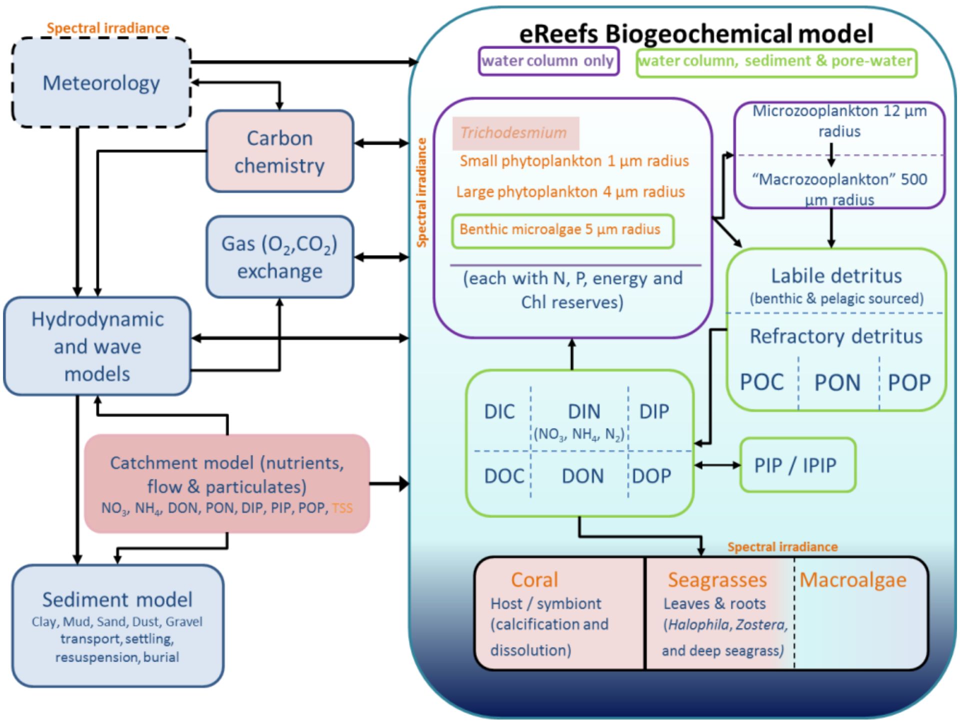


Figure 3.The eReefs modelling system, showing the linkages between hydrodynamic, wave, sediment and the optical and biogeochemical models, as well as the individual linkages within the biogeochemical model. The optically-active components are identified with orange font.

5. Model skill metrics description

To evaluate model skill, we consider; bias, the root mean square (RMS) error, the mean absolute error (MAE). and the modified Willmott index or 'd2' (Willmott et al., 1985). The Willmott index uses the sum of absolute values.

Model bias assesses whether the simulated variables are under- or over-predicting observed values. The RMS error is a measure of the absolute magnitude of the "error"/square deviation averaged over the time-series. An RMS or MAE of 0 indicates a perfect fit.

The Willmott index of agreement is designed to quantify errors that are unevenly distributed in time or space and reduce the influence of errors during periods of large observed mean or variance. The Willmott index is the ratio of the mean absolute error and the mean absolute deviation about the observed mean and varies between 0 and 1. A value of 1 indicates a perfect match (x = y), and 0 indicates no agreement.

$$\text{Willmott} = 1 - [\sum | x - y |) / [\sum | x - \bar{y} |) + (| y - \bar{y} |)]$$

where x and y are vectors or arrays of time series data (x =observed, y = modelled).

A Willmott index above 0.7 is regularly obtained for high resolution models with high spatial and temporal observations for physical parameters such as salinity and temperature. In most cases for the eReefs model the salinity and temperature index was ≥ 0.8 when compared with observations (Appendix 1 of Herzfeld et al., 2016).

6. Abbreviations

AIMS	Australian Institute of Marine Science
AODN	Australian Ocean Data Network
B2p0	B2p0: biogeochemical model version 2.0
B3p0	B3p0: biogeochemical model version 3.0
CDOM	colour dissolved organic matter
Chl a	chlorophyll a
CTD	Conductivity Temperature Depth profiler
d2	Statistical metric, aka Willmott index (see page 27)
DIN	dissolved inorganic nitrogen
DIN	Dissolved inorganic nitrogen (NH3 plus NOx)
DIP	dissolved inorganic phosphorus
DOC	dissolved organic carbon
DON	dissolved organic nitrogen
DOP	dissolved organic phosphorus
ENSO	El Niño-Southern Oscillation
GBR	Great Barrier Reef
gbr4_H2p0_B3p0_Cb	gbr4 : model grid with approximate 4 km grid resolution, H2p0: hydrodynamic model version 2.0, B3p0: biogeochemical model version 3.0, Cb: catchment model baseline version using empirical SOURCE Catchments
GBRMP	Great Barrier Reef Marine Park
GBRMPA	Great Barrier Reef Marine Park Authority
GBRWHA	Great Barrier Reef World Heritage Area
IMOS	Integrated Marine and Observing System
Kd(PAR)	light attenuation coefficient
LTM	AIMS long term monitoring site
mae	mean absolute error
mape	mean absolute percentage error
MMP	AIMS Marine Monitoring Program
MODIS	Moderate Resolution Imaging Spectroradiometer
NH3	ammonia
NOx	nitrate plus nitrite
NRS	IMOS National reference station within the model grid these are Yongala (GBRYON) and North Stradbroke Island (GBRNSI)
NSI	North Stradbroke Island
NTU	Nephelometric Turbidity Unit
PON	particulate organic nitrogen
POP	particulate organic phosphorus
QA/QC	quality assurance/quality control
rms	root mean square
secchi	measurement of water transparency (depth in m)
TSS	total suspended solids
Willmott	statistical metric (see page 27)

7. Parameter tables for gbr4_H2p0_B3p0_Cb

The following 4 pages give the parameters used in the model gbr4_H2p0_B3p0_Cb.

Parameter description	Symbol	Units	Value	Reference
Phytoplankton				
Chl-specific scattering coefficient. for microalgae	bphy	m^{-1} (mg Chl a $m^{-3})^{-1}$	0.2	Typical microalgae value, Kirk (1994)
Natural (linear) mortality rate, large phytoplankton	PhyL_mL	d^{-1}	0.1	Not attributed
Natural (linear) mortality rate in sediment, large phytoplankton	PhyL_mL_sed	d^{-1}	10	Not attributed
Natural (linear) mortality rate, small phytoplankton	PhyS_mL	d^{-1}	0.1	Not attributed
Natural (linear) mortality rate in sediment, small phytoplankton	PhyS_mL_sed	d^{-1}	1	Not attributed
Respiration as a fraction of umax	Plank_resp	none	0.025	Not attributed
Radius of the large phytoplankton cells	PLrad	m	0.000004	Not attributed
Maximum growth rate of PL at Tref	PLumax	d^{-1}	1.4	CSIRO Parameter Library
Ratio of xanthophyll to chl a of PL	PLxan2chl	mg mg^{-1}	0.81	CSIRO Parameter Library
Radius of the small phytoplankton cells	PSrad	m	0.000001	Not attributed
Maximum growth rate of PS at Tref	PSumax	d^{-1}	1.6	CSIRO Parameter Library
Ratio of xanthophyll to chl a of PS	PSxan2chl	mg mg^{-1}	0.51	CSIRO Parameter Library
Trichodesmium				
DIN conc below which *Trichodesmium* N fixes	DINcrit	mg N m^{-3}	10	Lower end of Robson et al., (2013) 4-20 mg N m^{-3}
Maximum density of *Trichodesmium*	p_max	kg m^{-3}	1050	Not attributed
Minimum density of *Trichodesmium*	p_min	kg m^{-3}	900	Not attributed
Radius of *Trichodesmium* colonies	Tricho_colrad	m	0.000005	Not attributed
Critical *Trichodesmium* above which quadratic mortality applies	Tricho_crit	mg N m^{-3}	0.0002	Not used in code
Linear mortality for *Trichodesmium* in sediment	Tricho_mL	d^{-1}	0.1	Not attributed
Quadratic mortality for *Trichodesmium* due to phages in water column	Tricho_mQ	d^{-1} (mg N $m^{-3})^{-1}$	0.1	At steady-state, indep. of temp, Tricho_N ~ Tricho_umax / Tricho_mQ = 0.27 / 0.405 = 0.7 mg N m^{-3} ~ 0.1 mg Chl m^{-3}
Trichodesmium grazing preference	Tricho_pref	none	0	Not attributed
Radius of *Trichodesmium* colonies	Tricho_rad	m	0.000005	Not attributed
Sherwood number for the *Trichodesmium* dimensionless	Tricho_Sh	none	1	Not attributed
Maximum growth rate of *Trichodesmium* at Tref	Tricho_umax	d^{-1}	0.2	Robson et al., 2013 + Parameter library
Ratio of xanthophyll to chl a of *Trichodesmium*	Trichoxan2chl	mg mg^{-1}	0.5	Subramaniam et al. 1999. LO 44:618-627
Microphytobenthos				
Respiration as a fraction of umax	Benth_resp	none	0.025	Not attributed
Radius of the MPB cells	MBrad	m	0.00001	Not attributed
Maximum growth rate of MB at Tref	MBumax	d^{-1}	0.839	CSIRO Parameter Library
Ratio of xanthophyll to chl a of MPB	MBxan2chl	mg mg^{-1}	0.81	Not attributed
Natural (quadratic) mortality rate, microphytobenthos, applied in sediment	MPB_mQ	d^{-1} (mg N $m^{-3})^{-1}$	0.0001	SS argument

Parameter description	Symbol	Units	Value	Reference

Zooplankton

Growth efficiency, large zooplankton	ZL_E	none	0.426	CSIRO Parameter Library, [0.341 (0.017900) Baird and Suthers, 2007 from Hansen et al (1997) LO 42: 687-704]
Fraction of growth inefficiency lost to detritus, large zooplankton	ZL_FDG	none	0.5	Not attributed
Fraction of mortality lost to detritus, large zooplankton	ZL_FDM	none	1	Not attributed
Natural (quadratic) mortality rate, large zooplankton	ZL_mQ	d^{-1} (mg N m^{-3})$^{-1}$	0.012	Not attributed
Diel vertical migration rate of ZL	ZLdvmrate	m d^{-1}	0	Not attributed
Grazing technique of large zooplankton	ZLmeth	none	rect	Not attributed
Light at which the	ZLpar	mol photons m^{-2} s^{-1}	1.00E-12	Not attributed
Radius of the large zooplankton cells	ZLrad	m	0.00032	Not attributed
Swimming velocity for large zooplankton	ZLswim	m s^{-1}	0.003	Not attributed
Maximum growth rate of ZL at Tref	ZLumax	d^{-1}	1.33	Not attributed
Growth efficiency, small zooplankton	ZS_E	none	0.462	CSIRO Parameter Library [0.3080000 (0.026600) Baird and Suthers, 2007 from Hansen et al (1997) LO 42: 687-704]
Fraction of growth inefficiency lost to detritus, small zooplankton	ZS_FDG	none	0.5	Not attributed
Fraction of mortality lost to detritus, small zooplankton	ZS_FDM	none	1	Not attributed
Natural (quadratic) mortality rate, small zooplankton	ZS_mQ	d^{-1} (mg N m^{-3})$^{-1}$	0.02	Not attributed
Grazing technique of small zooplankton	ZSmeth	none	rect	Not attributed
Radius of the small zooplankton cells	ZSrad	m	0.000005	Not attributed
Swimming velocity for small zooplankton	ZSswim	m s^{-1}	0.0002	Not attributed
Maximum growth rate of ZS at Tref	ZSumax	d^{-1}	4	Not attributed

Coral

Quadratic mortality rate of coral polyp	CHmort	(g N m^{-3})$^{-1}$ d^{-1}	0.01	Not attributed
Nitrogen-specific area of coral polyp density	CHpolypden	m2 g N^{-1}	2	Not attributed
Fraction of Host death translocated.	CHremin	-	0.5	Not attributed
Max. growth rate of Coral at Tref	CHumax	d^{-1}	0.05	Not attributed
Linear mortality rate of Zooxanthellae	CSmort	d^{-1}	0.04	Not attributed
Radius of the Zooxanthellae	CSrad	m	0.000005	Not attributed
Fraction of Zooxanthellae growth to Host.	CStoCHfrac	-	0.9	Gustafsson et al. (2013) Ecol. Mod. 250: 183-194
Max. growth rate of Zooxanthellae at Tref	CSumax	d^{-1}	0.4	Not attributed
Maximum daytime net coral calcification	k_day_coral	mmol C m^{-2} s^{-1}	0.0132	Anthony et al. (2013), Biogeosciences 10:4897-4909, Fig 5A: 50, 50, 35 55 mmol m^{-2} h^{-1} for Acropora aspera n=4
Grid scale to reef scale ratio	CHarea	m m^{-1}	0.1	Not attributed
Maximum night time net coral calcification	k_night_coral	mmol C m^{-2} s^{-1}	0.0069	Anthony et al. (2013), Biogeosciences 10:4897-4909, Fig 5A: 20, 30, 20, 30 mmol m^{-2} h^{-1} for Acropora aspera n=4
Rate coefficient for plankton uptake by corals	Splank	m d^{-1}	3	Ribes (2003), PARAMETER library analysis;Ribes and Atkinson (2007) Coral Reefs 26: 413-421

Parameter description	Symbol	Units	Value	Reference
Seagrass and Macroalgae				
Half-saturation of SG N uptake in SED	SG_KN	mg N m^{-3}	420	Lee and Dunton (1999) 1204-1215. Table 3 Zostera

Parameter description	Symbol	Units	Value	Reference
Half-saturation of SG P uptake in SED	SG_KP	mg P m^{-3}	96	Gras et al. (2003) Aquatic Botany 76:299-315. Thalassia testudinum.
Natural (linear) mortality rate, seagrass	SG_mL	d^{-1}	0.03	Fourquean et al.(2003) Chem. Ecol. 19: 373-390.Thalassia leaves with one component decay
Critical shear stress for SG loss	SG_tau_critical	N m^{-2}	1	NESP project
Time-scale for critical shear stress for SG loss	SG_tau_efold	s	43200	NESP project
Half-saturation of SGD N uptake in SED	SGD_KN	mg N m^{-3}	420	Not attributed
Half-saturation of SGD P uptake in SED	SGD_KP	mg P m^{-3}	96	Not attributed
Natural (linear) mortality rate, aboveground SGD	SGD_mL	d^{-1}	0.06	NESP project
Critical shear stress for SGD loss	SGD_tau_critical	N m^{-2}	1	NESP project
Time-scale for critical shear stress for SGD loss	SGD_tau_efold	s	43200	NESP project
Fraction (target) of SGD biomass below-ground	SGDfrac	-	0.25	Duarte (1999) Aquatic Biol. 65: 159-174, Halophila ovalis.
Nitrogen-specific leaf area of SGD	SGDleafden	m^2 g N^{-1}	1.9	Halophila ovalis: leaf dimensions from Vermaat et al. (1995)
Compensation irradiance for Halophila	SGDmlr	mol m^{-2}	1.5	NESP project
Sine of nadir Deep Segrass canopy bending angle	SGDorient	-	1	No source
Natural (linear) mortality rate, belowground SGD	SGDROOT_mL	d^{-1}	0.004	NESP project
Maximum depth for Halophila roots	SGDrootdepth	m	-0.05	NESP project
Halophila seed biomass as fraction of 63 % cover	SGDseedfrac	-	0.01	Not attributed
Time scale for seagrass translocation	SGDtransrate	d^{-1}	0.0333	Loosely based on Zostera marine Kaldy et al., 2013 MEPS 487:27-39
Maximum growth rate of SGD at Tref	SGDumax	d^{-1}	0.4	x2 nighttime, x2 for roots.
Fraction (target) of SG biomass below-ground	SGfrac	-	0.75	Babcock (2015) Zostera capricornii
Half-saturation of SGH N uptake in SED	SGH_KN	mg N m^{-3}	420	Not attributed
Half-saturation of SGH P uptake in SED	SGH_KP	mg P m^{-3}	96	Not attributed
Natural (linear) mortality rate, seagrassH	SGH_mL	d^{-1}	0.06	Fourquean et al.(2003) Chem. Ecol. 19: 373-390.Thalassia leaves with one component decay
Critical shear stress for SGH loss	SGH_tau_critical	N m^{-2}	1	NESP project
Time-scale for critical shear stress for SGH loss	SGH_tau_efold	s	43200	NESP project
Fraction (target) of SGH biomass below-ground	SGHfrac	-	0.5	Babcock 2015, Halophila ovalis
Nitrogen-specific area of seagrass leaf	SGHleafden	m2 g N^{-1}	1.9	Halophila ovalis: leaf dimensions from Vermaat et al. (1995)
Compensation irradiance for SG	SGHmlr	mol m^{-2}	2	Not attributed
Sine of nadir Halophila canopy bending angle	SGHorient	-	1	No source
Natural (linear) mortality rate, seagrassH	SGHROOT_mL	d^{-1}	0.004	Fourquean et al. (2003) Chem. Ecol. 19: 373-390. Thalassia roots with one component decay
Maximum depth for Halophila roots	SGHrootdepth	m	-0.08	Roberts (1993) Aust. J. Mar. Fresh. Res. 44:85-100.
Halophila seed biomass as fraction of 63 % cover	SGHseedfrac	-	0.01	Not attributed
Time scale for seagrass translocation	SGHtransrate	d^{-1}	0.0333	Loosely based on Zostera marine Kaldy et al., 2013 MEPS 487:27-39
Maximum growth rate of SGH at Tref	SGHumax	d^{-1}	0.4	x2 night-time, x2 for roots.
Nitrogen-specific area of seagrass leaf	SGleafden	m2 g N^{-1}	1.5	Zostera capricornia: leaf dimensions Kemp et al (1987) Mar Ecol. Prog. Ser. 41:79-86.
Compensation irradiance for SG	SGmlr	mol m^{-2}	4.5	Not attributed
SGorient	SGorient		0.5	Not attributed
Natural (linear) mortality rate, seagrass	SGROOT_mL	d^{-1}	0.004	Fourquean et al. (2003) Chem. Ecol. 19: 373-390. Thalassia roots with one component decay
Maximum depth for Zostera roots	SGrootdepth	m	-0.15	Roberts (1993) Aust. J. Mar. Fresh. Res. 44:85-100.
Seagrass seed biomass as fraction of 63 % cover	SGseedfrac	-	0.01	No source
Time scale for seagrass translocation	SGtransrate	d^{-1}	0.0333	Loosely based on Zostera marine Kaldy et al., 2013 MEPS 487:27-39
Maximum growth rate of SG at Tref	SGumax	d^{-1}	0.4	x2 nighttime, x2 for roots.
Natural (linear) mortality rate, macroalgae	MA_mL	d^{-1}	0.01	Not attributed
Nitrogen-specific area of macroalgae leaf	MAleafden	m^2 g N^{-1}	1	Not attributed
Maximum growth rate of MA at Tref	MAumax	d^{-1}	1	Not attributed

Parameter description	Symbol	Units	Value	Reference

Biogeochemistry

Reference temperature	Tref	Deg C	20	CSIRO Parameter Library
Temperature coefficient for rate parameters	Q10	none	2	CSIRO Parameter Library
Nominal rate of TKE dissipation in water column	TKEeps	$m^2\ s^{-3}$	0.000001	Not attributed
Atmospheric CO2	xco2_in_air_dum	ppmv	396.48	Mean 2013 at Mauna Loa: htttrp://co2now.org/current-co2/co2-now/
Wavelengths of light	Light_lambda	nm	Various*	Approx. 20 nm resolution with 10 nm about 440 nm. PAR (400-700) is integral of bands 2-22 (290 310 330 350 370 390 410 430 440 450 470 490 510 530 550 570 590 610 630 650 670 690 710 800)*
Nominal N:Chl a ratio in phytoplankton by weight	NtoCHL	$g\ N\ (g\ Chl\ a)^{-1}$	7	Represents a C:Chl ratio of 39.25, Baird et al. (2013) Limnol. Oceanogr. 58: 1215-1226.
Concentration of dissolved N2	N2	$mg\ N\ m^{-3}$	2000	Robson et al. (2013)
Fraction of labile detritus converted to refractory detritus	F_LD_RD	none	0.19	Not attributed
Fraction of labile detritus converted to dissolved organic matter	F_LD_DOM	none	0.1	Not attributed
fraction of refractory detritus that breaks down to DOM	F_RD_DOM	none	0.05	Not attributed
Breakdown rate of labile detritus at 106:16:1	r_DetPL	d^{-1}	0.04	Not attributed
Breakdown rate of labile detritus at 550:30:1	r_DetBL	d^{-1}	0.001	Not attributed
Breakdown rate of refractory detritus	r_RD	d^{-1}	0.001	Not attributed
Breakdown rate of dissolved organic matter	r_DOM	d^{-1}	0.0001	Achieves approx. SS of global ocean at 20 C.
Oxygen half-saturation for aerobic respiration	KO_aer	$mg\ O\ m^{-3}$	256	Not attributed
Maximal nitrification rate in water column	r_nit_wc	d^{-1}	0.1	Not attributed
Maximal nitrification rate in water sediment	r_nit_sed	d^{-1}	20	Not attributed
Oxygen half-saturation for nitrification	KO_nit	$mg\ O\ m^{-3}$	500	Not attributed
Rate at which P reaches adsorbed/desorbed equilibrium	Pads_r	d^{-1}	0.04	Not attributed
Freundlich Isothermic Const P adsorption to TSS in water column	Pads_Kwc	$mg\ P\ kg\ TSS^{-1}$	30	Not attributed
Freundlich Isothermic Const P adsorption to TSS in sediment	Pads_Ksed	$mg\ P\ kg\ TSS^{-1}$	74	Not attributed
Oxygen half-saturation for P adsorption	Pads_KO	$mg\ O\ m^{-3}$	2000	Not attributed
Exponent for Freundlich Isotherm	Pads_exp	none	1	Not attributed
Maximum denitrification rate	r_den	d^{-1}	0.8	Not attributed
Oxygen half-inhibition of denitrification rate	KO_den	$mg\ O\ m^{-3}$	10000	Not attributed
Rate of conversion of PIP to immobilised PIP	r_immob_PIP	d^{-1}	0.0012	Not attributed
Sediment-water diffusion coefficient	EpiDiffCoeff	$m^2\ s^{-1}$	3.00E-07	Not attributed
Thickness of diffusive layer	EpiDiffDz	m	0.0065	Not attributed
age tracer growth rate per day	ageing_decay	d^{-1}	1	Not attributed
age tracer decay rate per day outside source	anti_ageing_decay	d^{-1}	0.1	Not attributed
net dissolution rate of sediment without coral	dissCaCO3_sed	$mmol\ C\ m^{-2}\ s^{-1}$	0.001	Anthony et al. (2013), Biogeosciences 10:4897-4909, Fig 5E: -1 2 3 6 mmol $m^{-2}\ h^{-1}$
DOC-specific absorption of CDOM at 443 nm	acdom443star	$m^2\ mg\ C^{-1}$	0.00013	Not attributed
Minimum carbon to chlorophyll ratio	C2Chlmin	wt/wt	20	Not attributed
swr scaling factor	SWRscale	none	1	Not attributed
Bleaching ROS threshold	ROSthreshold	-	5.00E-04	Not attributed
increased breakdown fraction DetrP to DOP	r_RD_NtoP	-	2	Not attributed
increased breakdown fraction DOMP to DIP	r_DOM_NtoP	-	1.5	Not attributed

8. Site and model grid depth of the MMP and NRS sites

MMP and NRS Sites	GBR4 grid depth (m)	Site depth (m)
Barren Island	24	15 - 19
Daydream Island	17	23 - 25
Double Cone Island	17	23 - 31
Dunk Island	9	9 - 10
Fitzroy Island	27	15 - 17
Geoffrey Bay	10	9 - 10
High Island	18	22 - 25
Humpy Island	13	12 - 19
North Stradbroke Island (NSI)	66	65 - 67
Pandora Island	17	13 - 14
Pelican Island	4	9 - 10
Pelorus Island	25	25 - 31
Pine Island	18	20 - 25
Russell Island	20	22 - 24
Snapper Island	22	8 - 11
Yongala	29	26 - 27

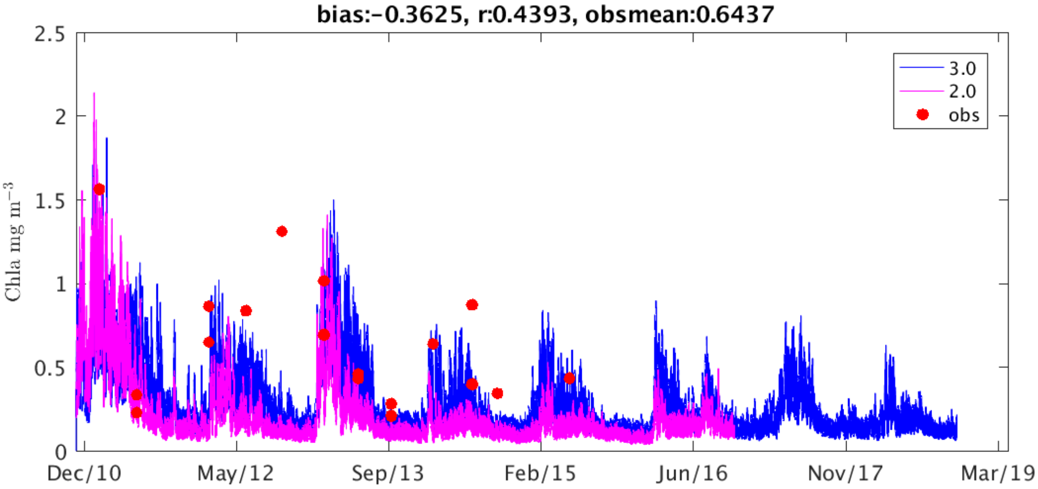
9. Site and depths for additional triannual sites or depths

AIMS additional Triannual Water Quality sites	Sampling Depths (m)		
Cape Tribulation	10		
Snapper Island	10		
Port Douglas	0	15	
Double Island	0	18	
Green Island	0	18	36
Yorkeys Knob	0	8	
Fairlead Buoy	0		
Fitzroy Reef	0	15	
High Island	0	10	20
Russell Island	0	10	20
Dunk Island	5		
Pelorus Island	0	14	28
Double Cone Island	10	23	
Daydream Island	10	23	
Pine Island	0	20	
Barren Island	10		
Humpy Island	0	10	

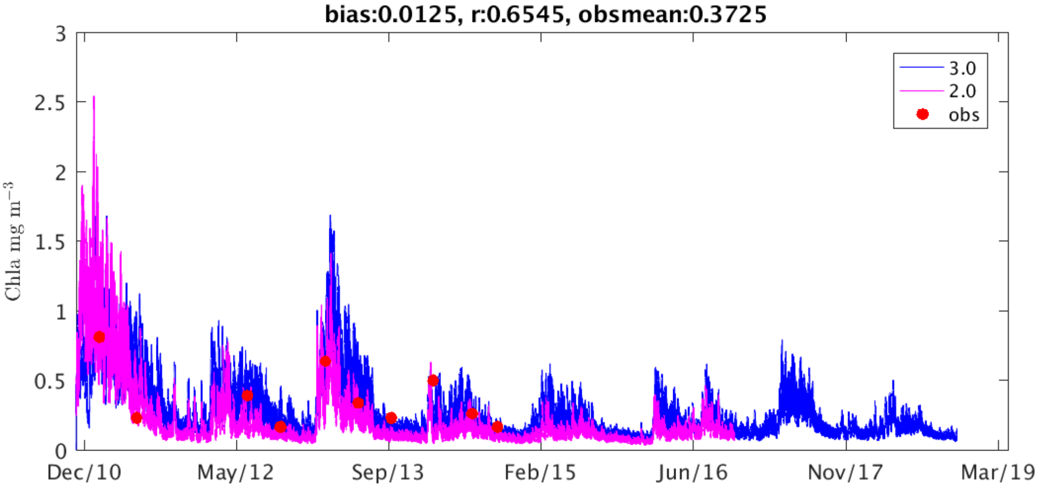
10. Simulated Chl *a* assessment against AIMS Long Term Monitoring

Figure 4 Metrics for Long Term Monitoring sites Chlorophyll assessment against observations for model version 3p0 and 2p0 d2 = Willmott index see Statistical metric page 27.mae:mean absolute error, rms root mean square

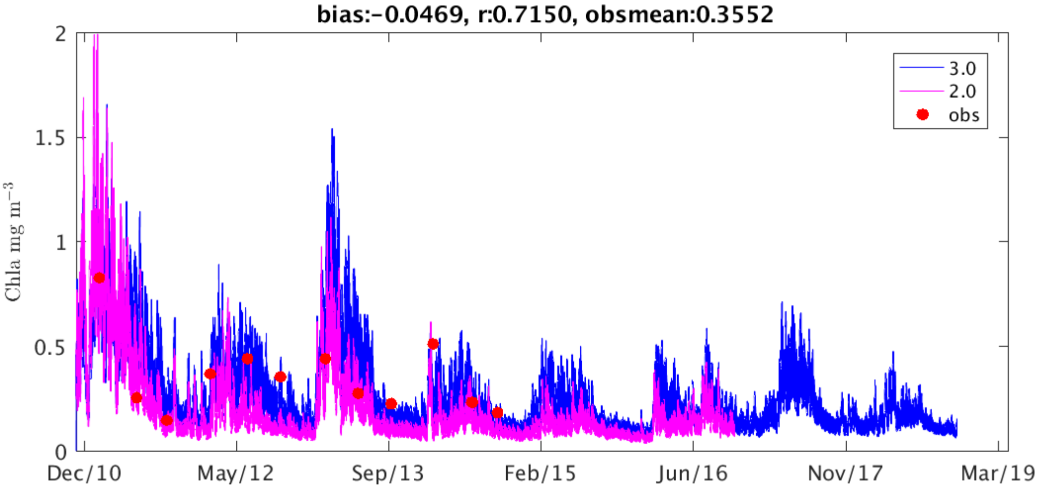
Pelican_5m 3.0 d2:0.49, mape:57.4, rms:0.4306
bias:-0.2007, r:0.2329, obsmean:0.6437
Pelican_5m 2.0 d2:0.54, mape:56.6, rms:0.4907
bias:-0.3625, r:0.4393, obsmean:0.6437



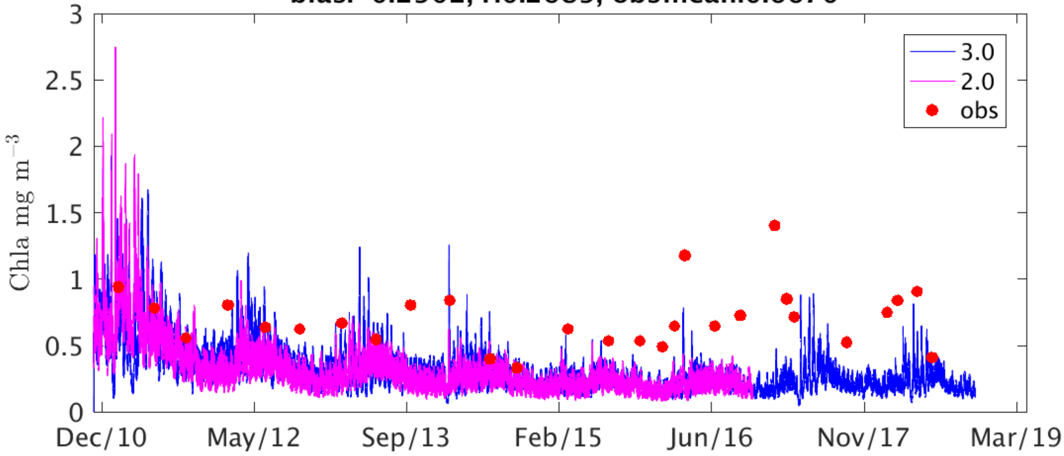
Humpy873_10m 3.0 d2:0.63, mape:86.7, rms:0.3797
bias:0.1801, r:0.5769, obsmean:0.3725
Humpy873_10m 2.0 d2:0.70, mape:55.6, rms:0.3449
bias:0.0125, r:0.6545, obsmean:0.3725



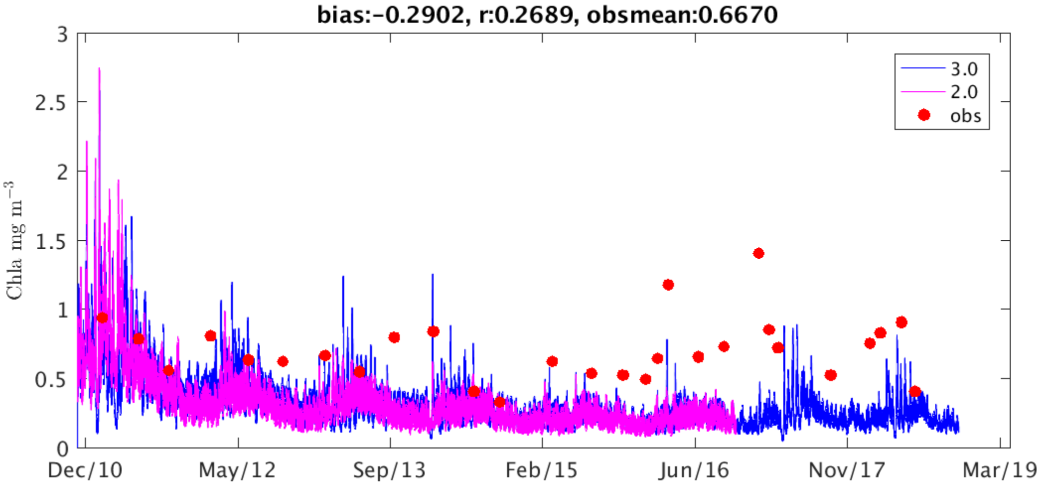
Humpy873_0m 3.0 d2:0.70, mape:58.6, rms:0.2604
bias:0.1022, r:0.6019, obsmean:0.3552
Humpy873_0m 2.0 d2:0.77, mape:49.0, rms:0.2437
bias:-0.0469, r:0.7150, obsmean:0.3552



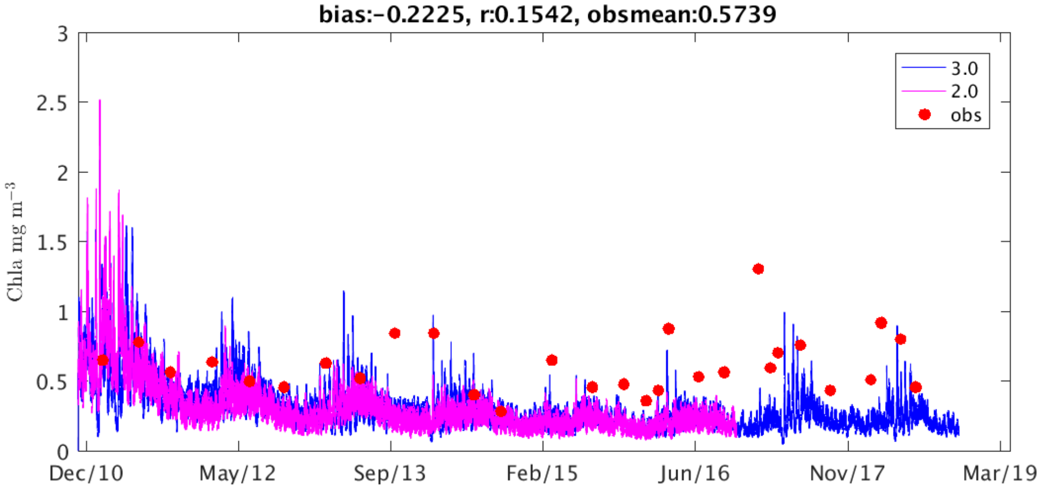
Pine329_20m 3.0 d2:0.43, mape:47.1, rms:0.4310
bias:-0.3495, r:0.1346, obsmean:0.7053
Pine329_20m 2.0 d2:0.46, mape:46.7, rms:0.3931
bias:-0.2902, r:0.2689, obsmean:0.6670

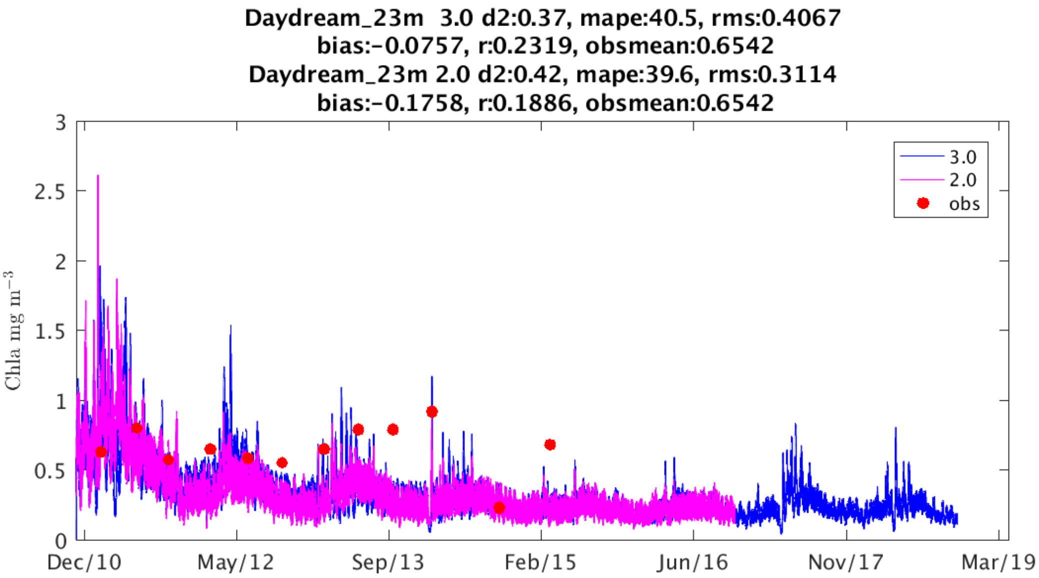


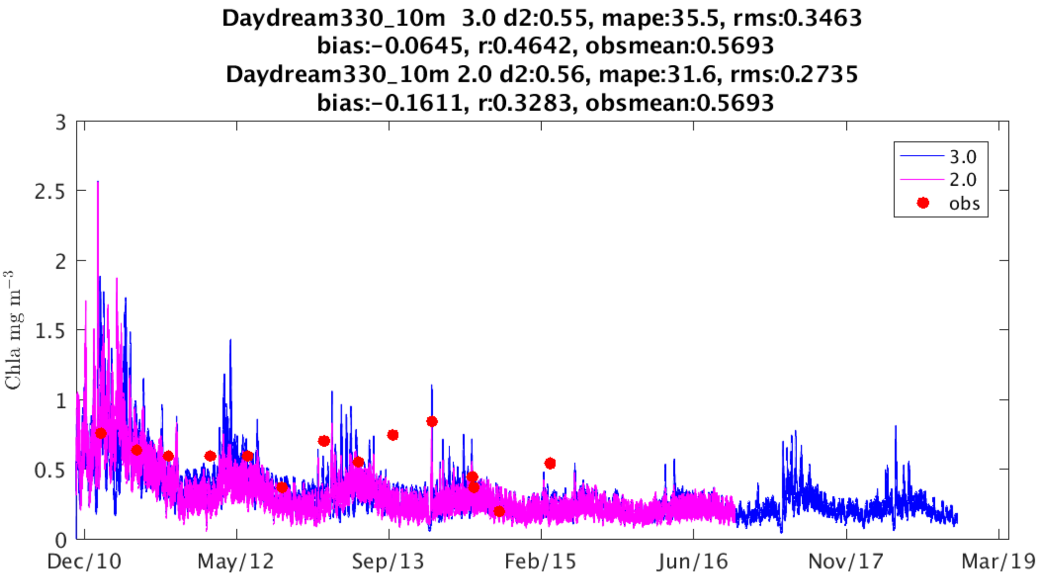
Pine329_20m 3.0 d2:0.43, mape:47.1, rms:0.4310
bias:-0.3495, r:0.1346, obsmean:0.7053
Pine329_20m 2.0 d2:0.46, mape:46.7, rms:0.3931
bias:-0.2902, r:0.2689, obsmean:0.6670

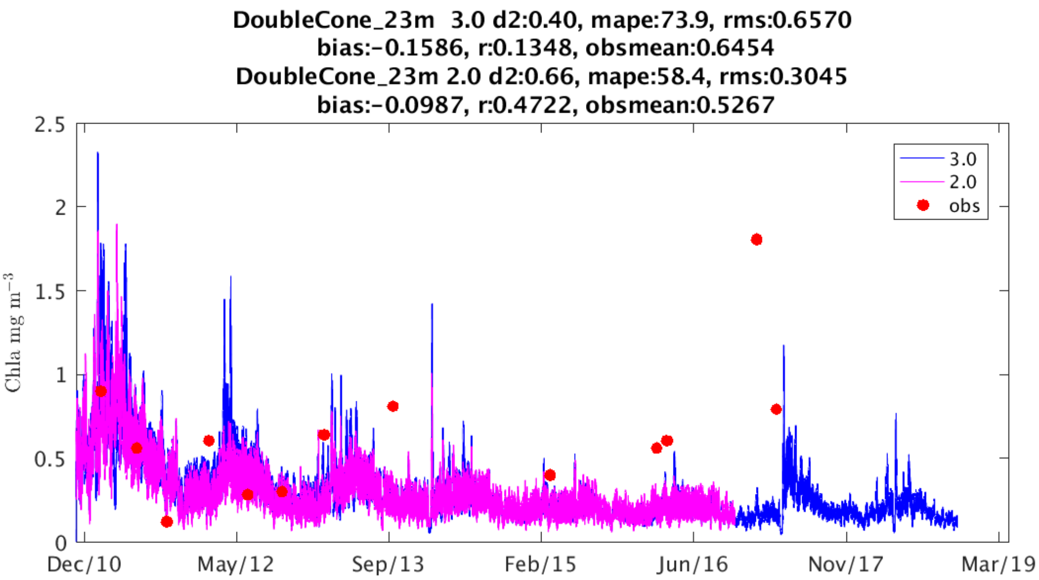


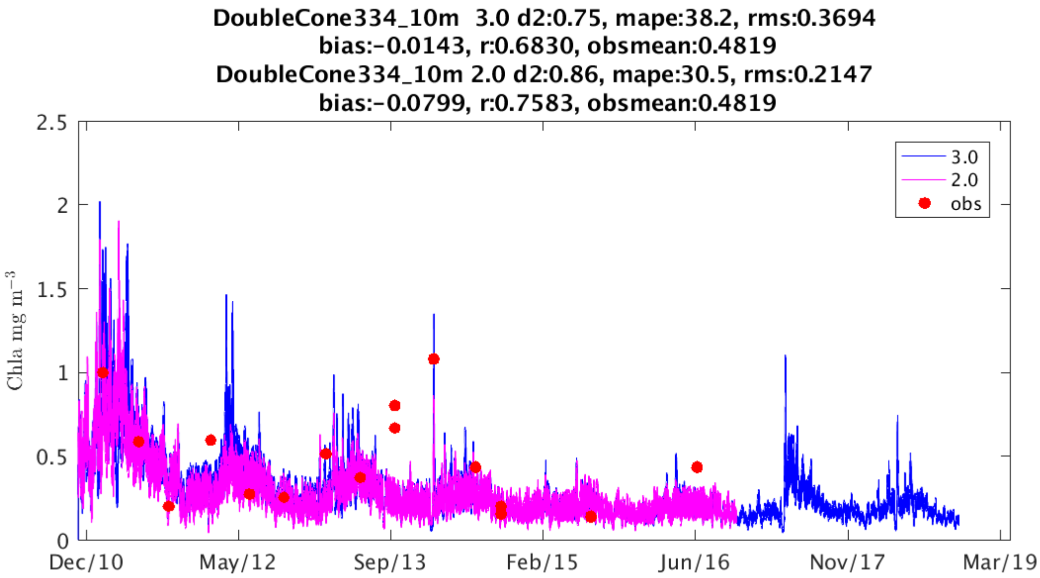
Pine329_0m 3.0 d2:0.43, mape:44.9, rms:0.3781
bias:-0.2824, r:0.0450, obsmean:0.6195
Pine329_0m 2.0 d2:0.45, mape:43.6, rms:0.3312
bias:-0.2225, r:0.1542, obsmean:0.5739

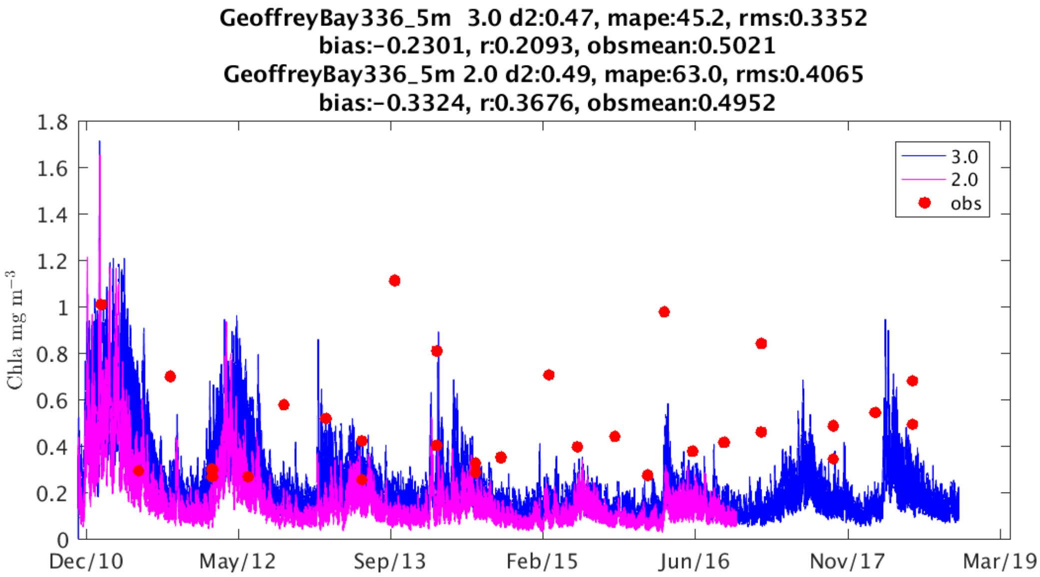


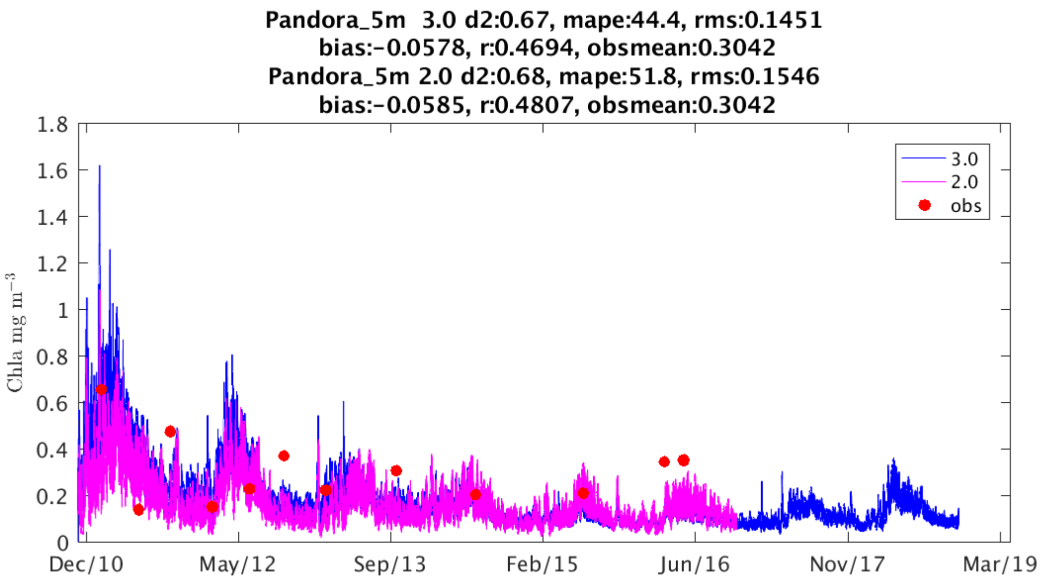

Daydream_23m 3.0 d2:0.37, mape:40.5, rms:0.4067
bias:-0.0757, r:0.2319, obsmean:0.6542
Daydream_23m 2.0 d2:0.42, mape:39.6, rms:0.3114
bias:-0.1758, r:0.1886, obsmean:0.6542
Chla mg m⁻³
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

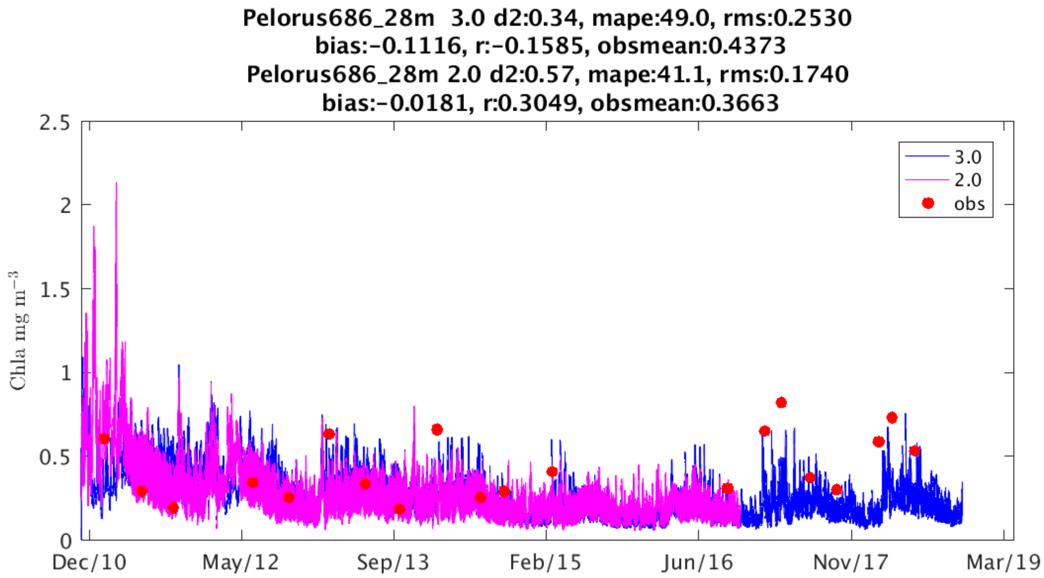

Daydream330_10m 3.0 d2:0.55, mape:35.5, rms:0.3463
bias:-0.0645, r:0.4642, obsmean:0.5693
Daydream330_10m 2.0 d2:0.56, mape:31.6, rms:0.2735
bias:-0.1611, r:0.3283, obsmean:0.5693
Chla mg m⁻³
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

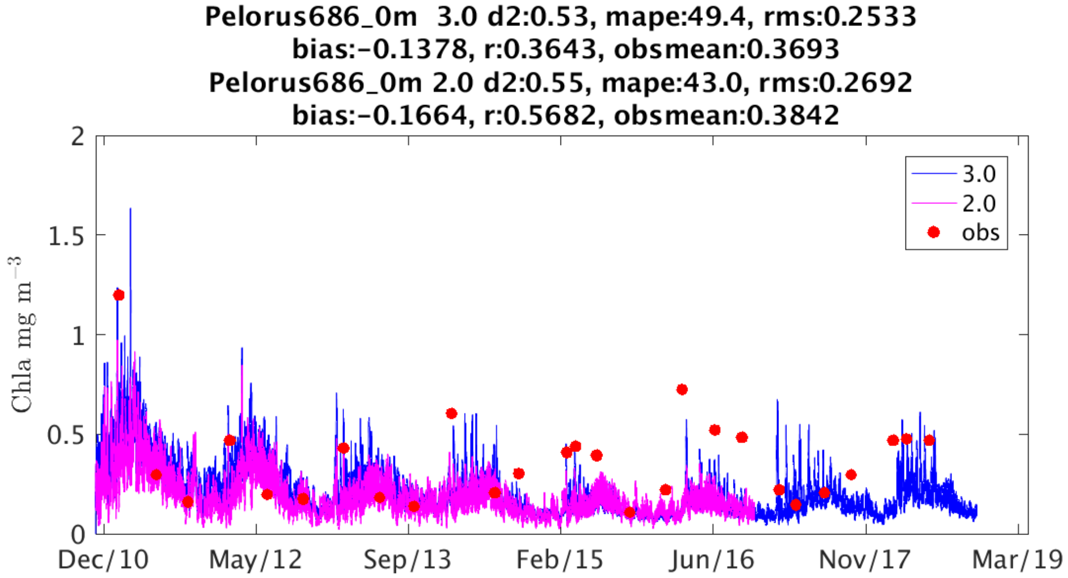

DoubleCone_23m 3.0 d2:0.40, mape:73.9, rms:0.6570
bias:-0.1586, r:0.1348, obsmean:0.6454
DoubleCone_23m 2.0 d2:0.66, mape:58.4, rms:0.3045
bias:-0.0987, r:0.4722, obsmean:0.5267
Chla mg m⁻³
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

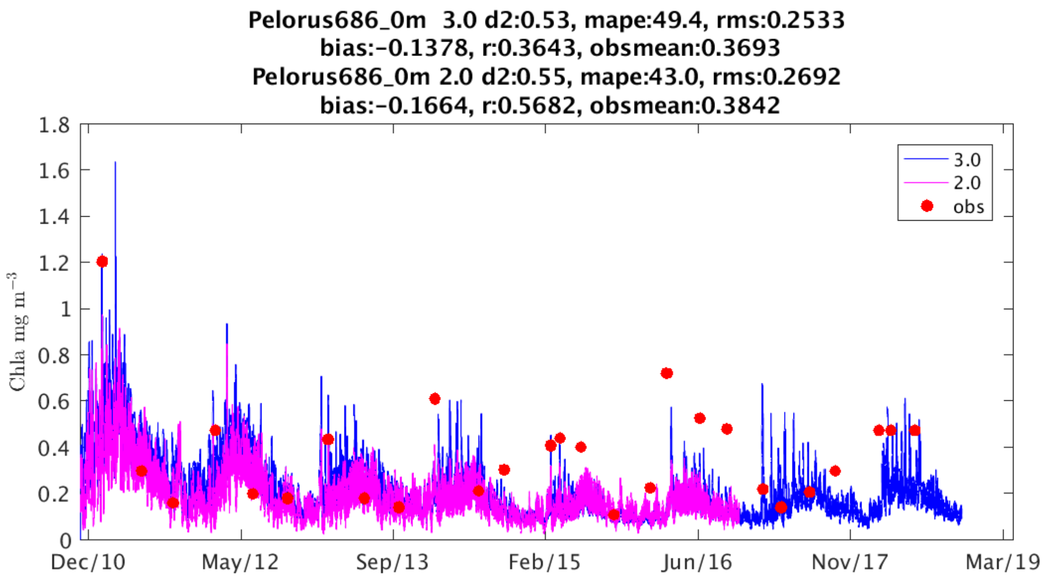

DoubleCone334_10m 3.0 d2:0.75, mape:38.2, rms:0.3694
bias:-0.0143, r:0.6830, obsmean:0.4819
DoubleCone334_10m 2.0 d2:0.86, mape:30.5, rms:0.2147
bias:-0.0799, r:0.7583, obsmean:0.4819
Chla mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


GeoffreyBay336_5m 3.0 d2:0.47, mape:45.2, rms:0.3352
bias:-0.2301, r:0.2093, obsmean:0.5021
GeoffreyBay336_5m 2.0 d2:0.49, mape:63.0, rms:0.4065
bias:-0.3324, r:0.3676, obsmean:0.4952
Chla mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

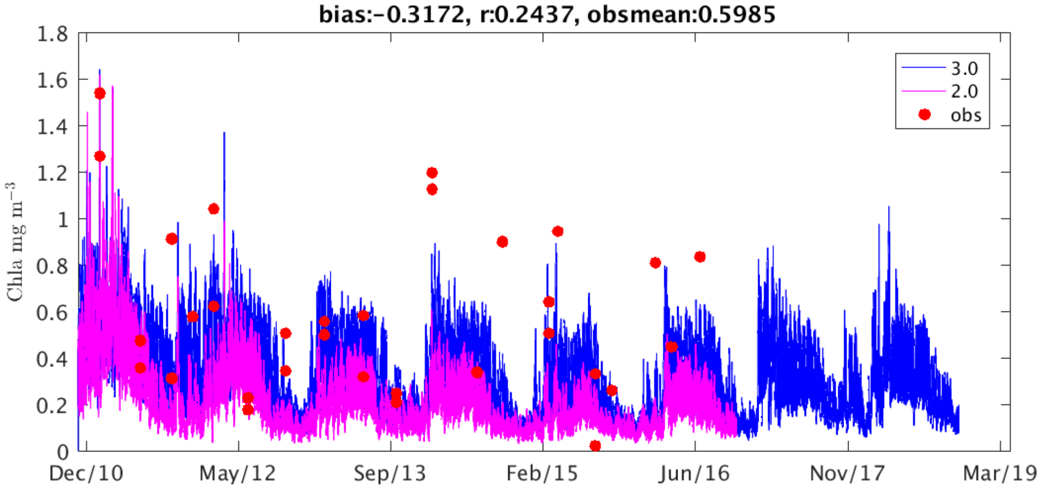

Pandora_5m 3.0 d2:0.67, mape:44.4, rms:0.1451
bias:-0.0578, r:0.4694, obsmean:0.3042
Pandora_5m 2.0 d2:0.68, mape:51.8, rms:0.1546
bias:-0.0585, r:0.4807, obsmean:0.3042
Chla mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


Pelorus686_28m 3.0 d2:0.34, mape:49.0, rms:0.2530
bias:-0.1116, r:-0.1585, obsmean:0.4373
Pelorus686_28m 2.0 d2:0.57, mape:41.1, rms:0.1740
bias:-0.0181, r:0.3049, obsmean:0.3663
Chla mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

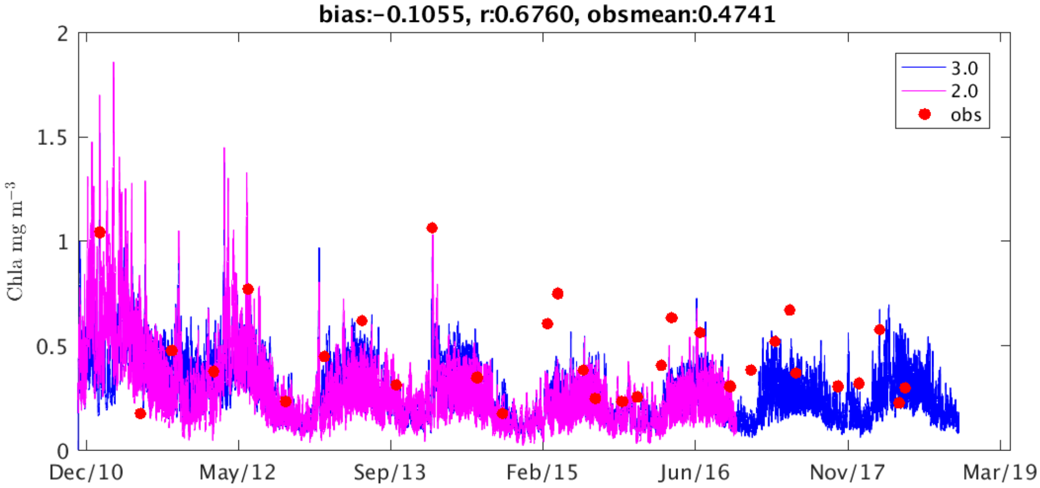

Pelorus686_0m 3.0 d2:0.53, mape:49.4, rms:0.2533
bias:-0.1378, r:0.3643, obsmean:0.3693
Pelorus686_0m 2.0 d2:0.55, mape:43.0, rms:0.2692
bias:-0.1664, r:0.5682, obsmean:0.3842
Chla mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


Pelorus686_0m 3.0 d2:0.53, mape:49.4, rms:0.2533
bias:-0.1378, r:0.3643, obsmean:0.3693
Pelorus686_0m 2.0 d2:0.55, mape:43.0, rms:0.2692
bias:-0.1664, r:0.5682, obsmean:0.3842
Chla mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

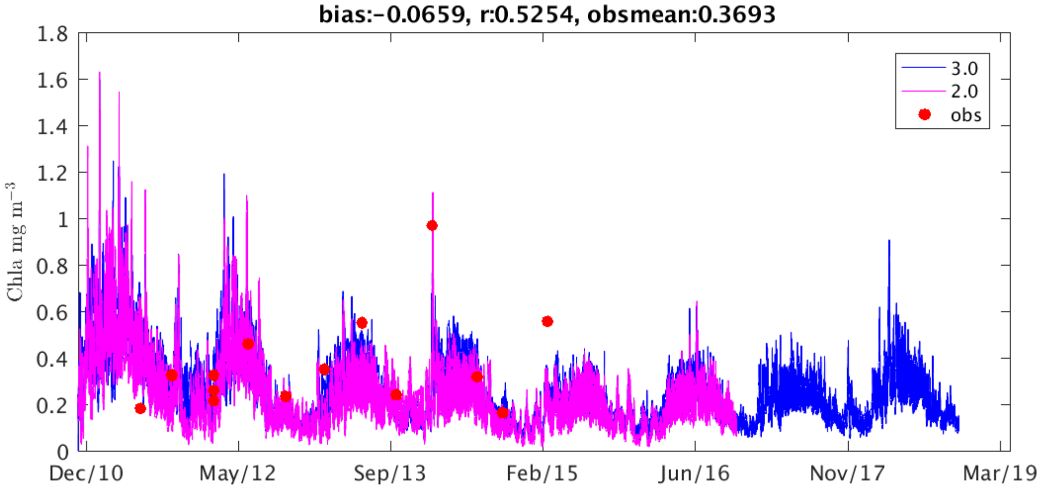
Dunk859_5m 3.0 d2:0.39, mape:104.4, rms:0.4133
bias:-0.1841, r:0.0841, obsmean:0.5985
Dunk859_5m 2.0 d2:0.46, mape:82.8, rms:0.4714
bias:-0.3172, r:0.2437, obsmean:0.5985

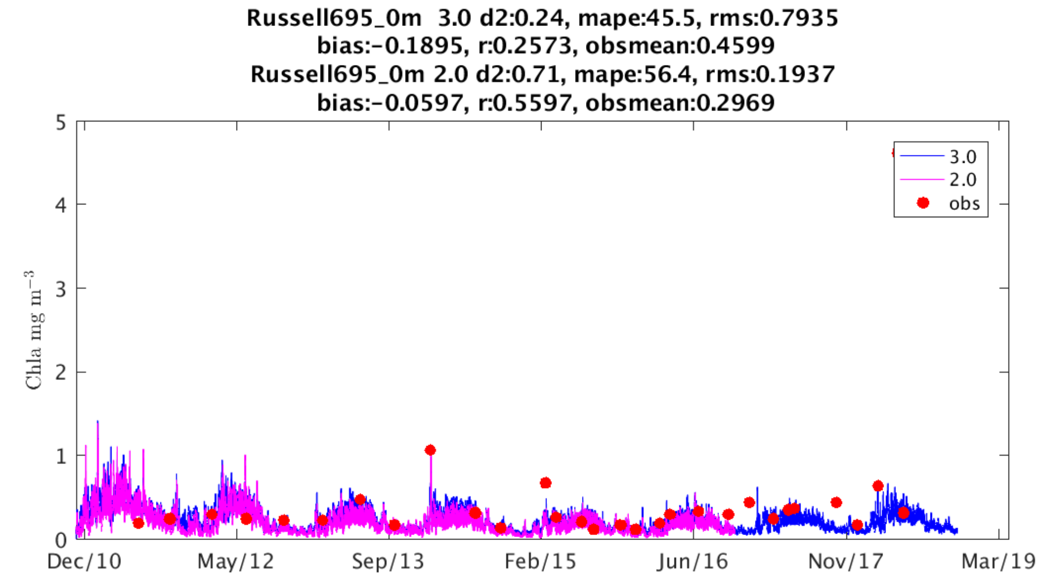


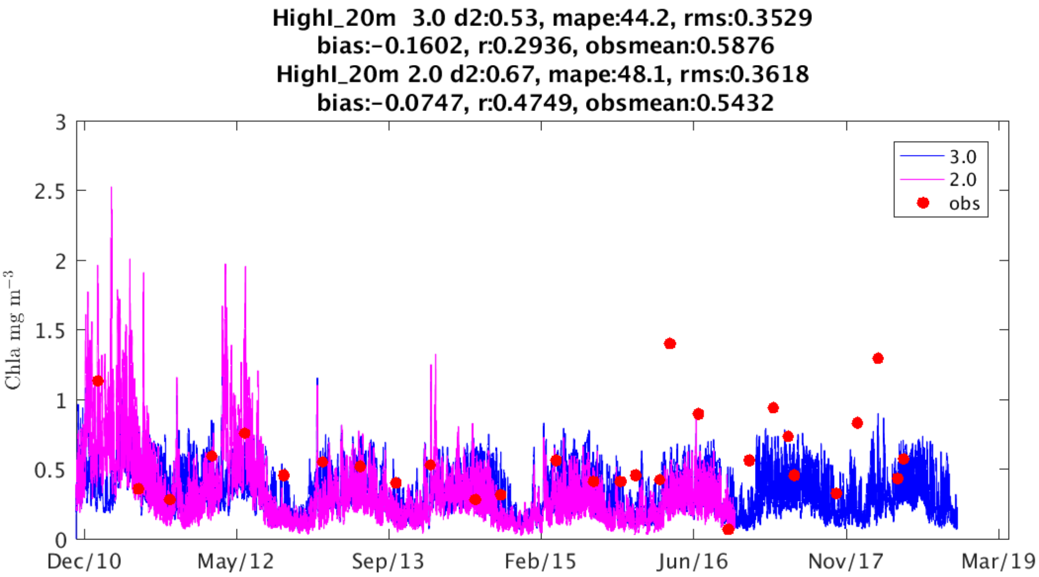
Russell695_20m 3.0 d2:0.78, mape:43.3, rms:0.1924
bias:-0.0913, r:0.6808, obsmean:0.4548
Russell695_20m 2.0 d2:0.79, mape:49.3, rms:0.2258
bias:-0.1055, r:0.6760, obsmean:0.4741

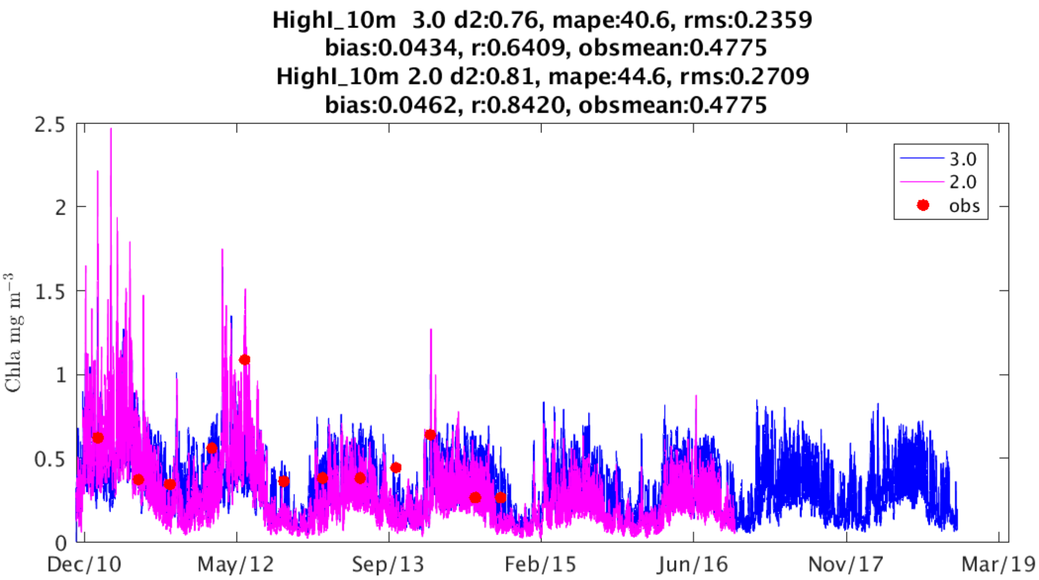


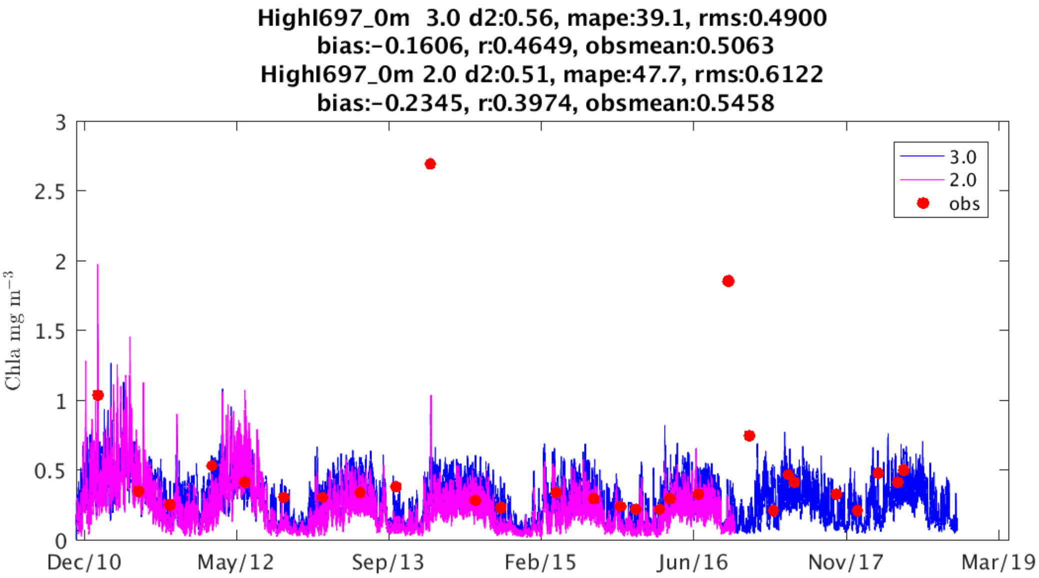
Russell695_10m 3.0 d2:0.81, mape:43.1, rms:0.1847
bias:0.0116, r:0.6360, obsmean:0.3693
Russell695_10m 2.0 d2:0.72, mape:53.6, rms:0.2122
bias:-0.0659, r:0.5254, obsmean:0.3693

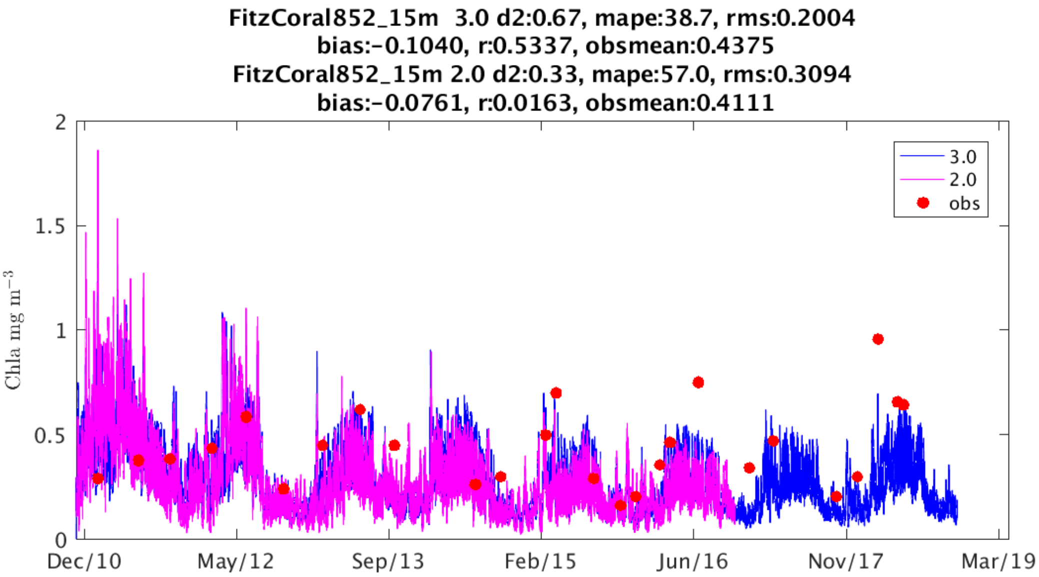


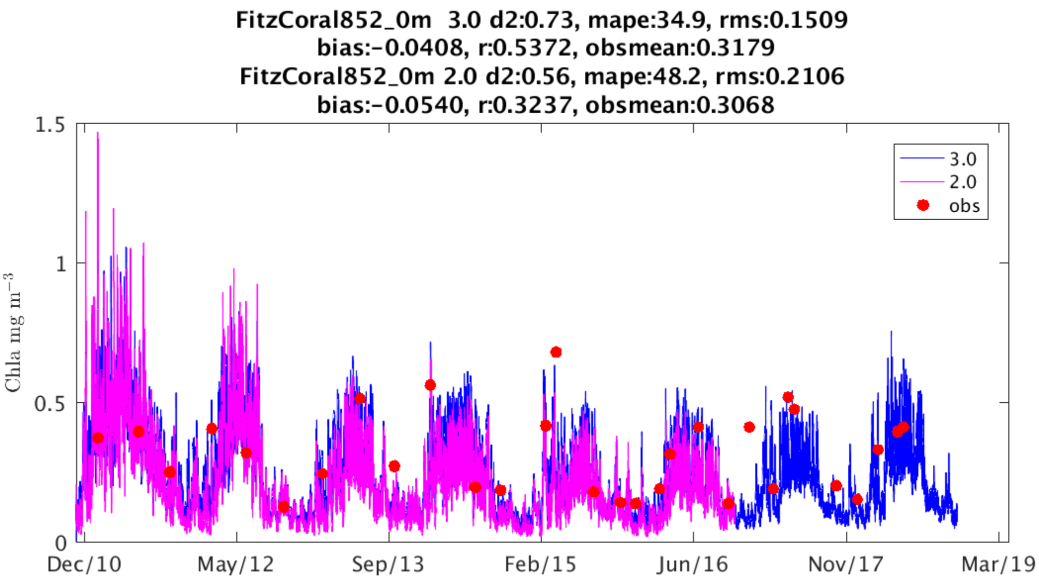

Russell695_0m 3.0 d2:0.24, mape:45.5, rms:0.7935
bias:-0.1895, r:0.2573, obsmean:0.4599
Russell695_0m 2.0 d2:0.71, mape:56.4, rms:0.1937
bias:-0.0597, r:0.5597, obsmean:0.2969
Chla mg m^-3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

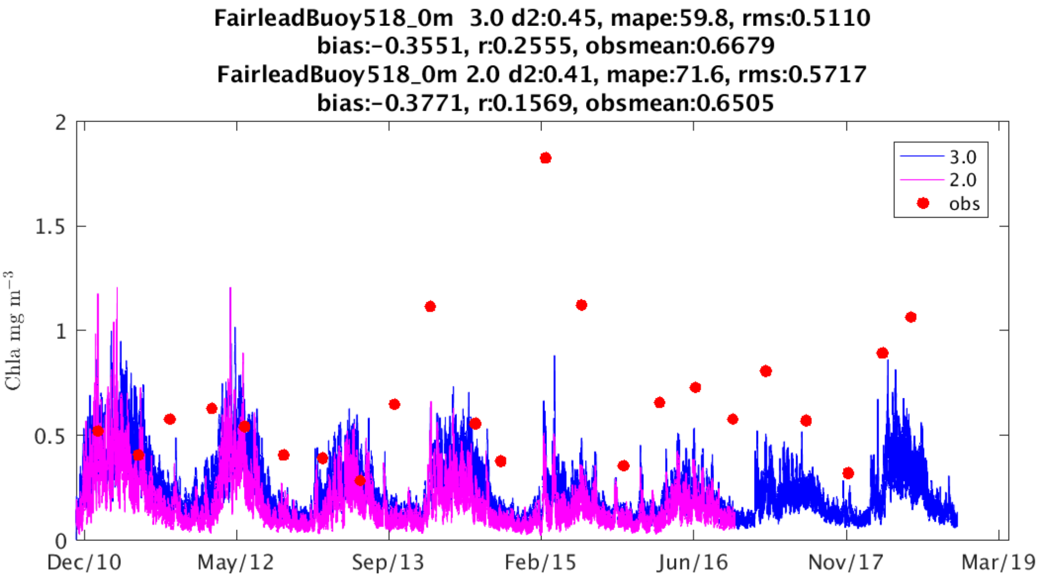

HighI_20m 3.0 d2:0.53, mape:44.2, rms:0.3529
bias:-0.1602, r:0.2936, obsmean:0.5876
HighI_20m 2.0 d2:0.67, mape:48.1, rms:0.3618
bias:-0.0747, r:0.4749, obsmean:0.5432
Chla mg m^-3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

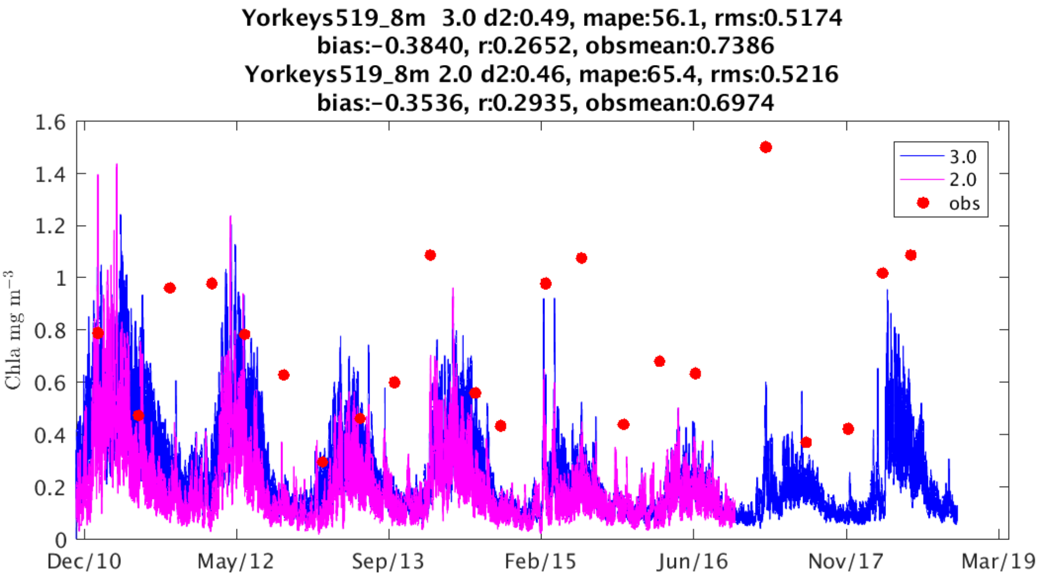

HighI_10m 3.0 d2:0.76, mape:40.6, rms:0.2359
bias:0.0434, r:0.6409, obsmean:0.4775
HighI_10m 2.0 d2:0.81, mape:44.6, rms:0.2709
bias:0.0462, r:0.8420, obsmean:0.4775
Chla mg m^-3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

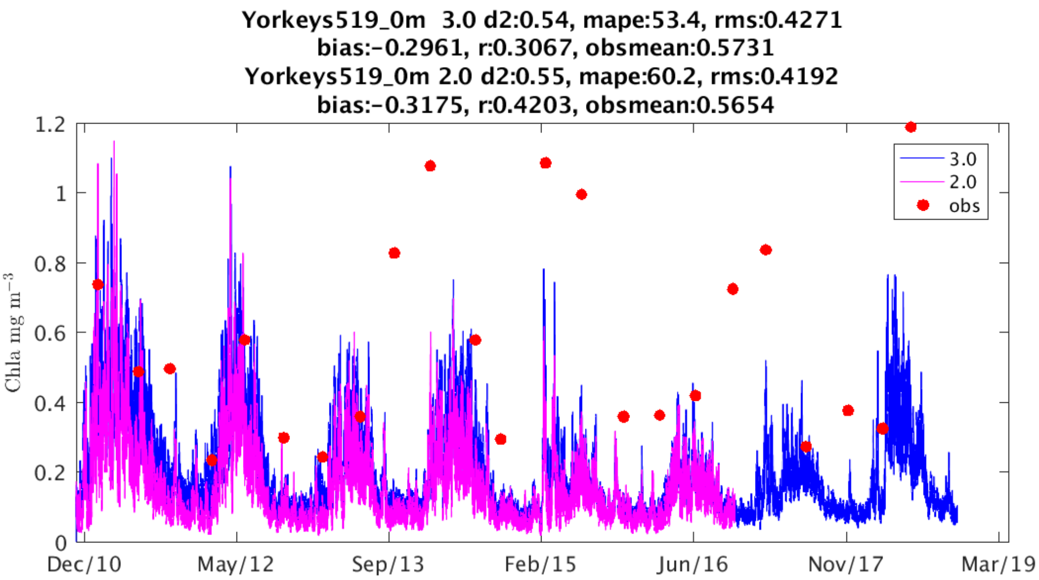

HighI697_0m 3.0 d2:0.56, mape:39.1, rms:0.4900
bias:-0.1606, r:0.4649, obsmean:0.5063
HighI697_0m 2.0 d2:0.51, mape:47.7, rms:0.6122
bias:-0.2345, r:0.3974, obsmean:0.5458
Chla mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

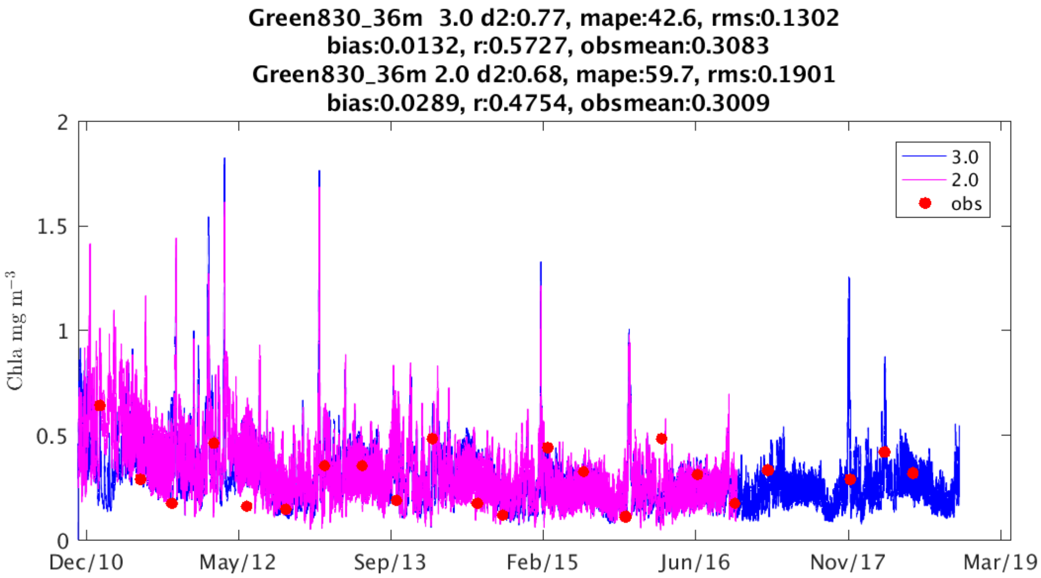

FitzCoral852_15m 3.0 d2:0.67, mape:38.7, rms:0.2004
bias:-0.1040, r:0.5337, obsmean:0.4375
FitzCoral852_15m 2.0 d2:0.33, mape:57.0, rms:0.3094
bias:-0.0761, r:0.0163, obsmean:0.4111
Chla mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

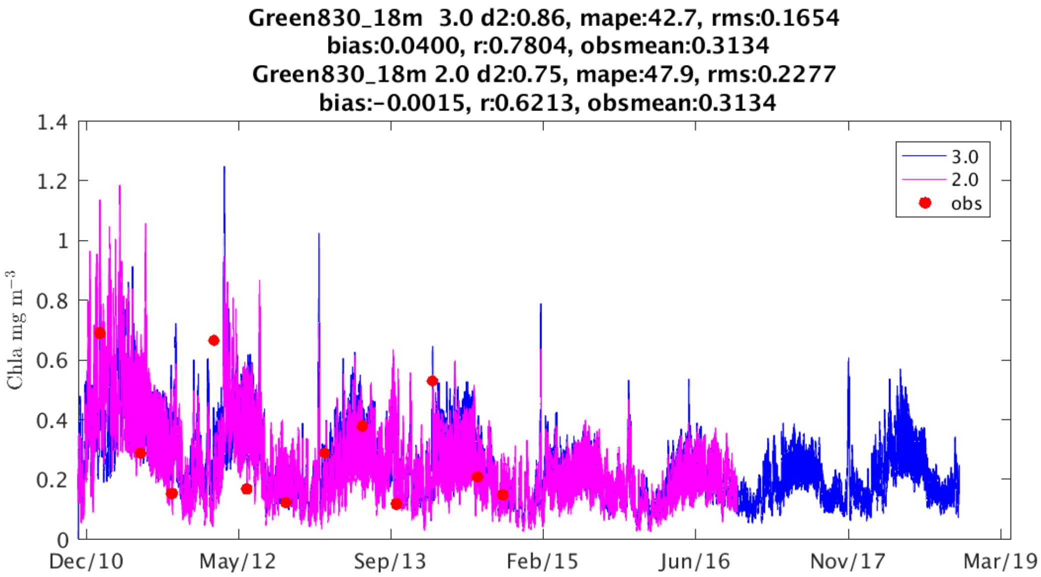

FitzCoral852_0m 3.0 d2:0.73, mape:34.9, rms:0.1509
bias:-0.0408, r:0.5372, obsmean:0.3179
FitzCoral852_0m 2.0 d2:0.56, mape:48.2, rms:0.2106
bias:-0.0540, r:0.3237, obsmean:0.3068
Chla mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

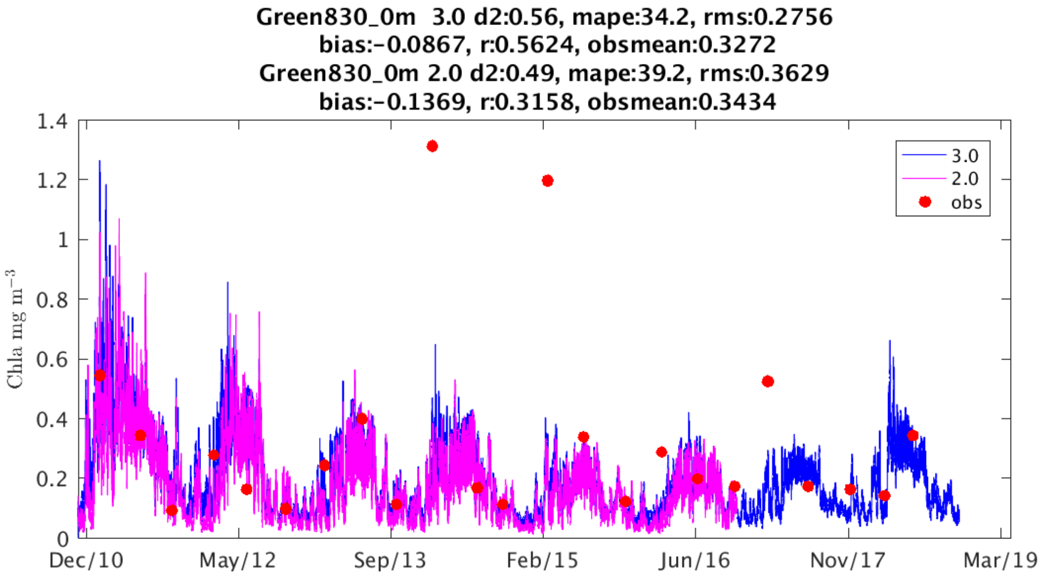

FairleadBuoy518_0m 3.0 d2:0.45, mape:59.8, rms:0.5110
bias:−0.3551, r:0.2555, obsmean:0.6679
FairleadBuoy518_0m 2.0 d2:0.41, mape:71.6, rms:0.5717
bias:−0.3771, r:0.1569, obsmean:0.6505
Chla mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

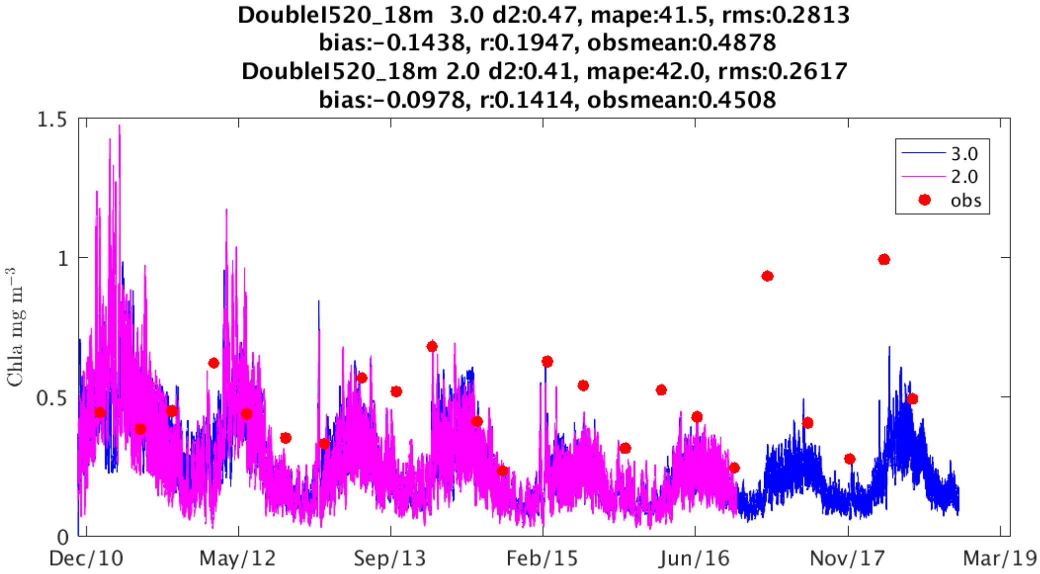

Yorkeys519_8m 3.0 d2:0.49, mape:56.1, rms:0.5174
bias:−0.3840, r:0.2652, obsmean:0.7386
Yorkeys519_8m 2.0 d2:0.46, mape:65.4, rms:0.5216
bias:−0.3536, r:0.2935, obsmean:0.6974
Chla mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

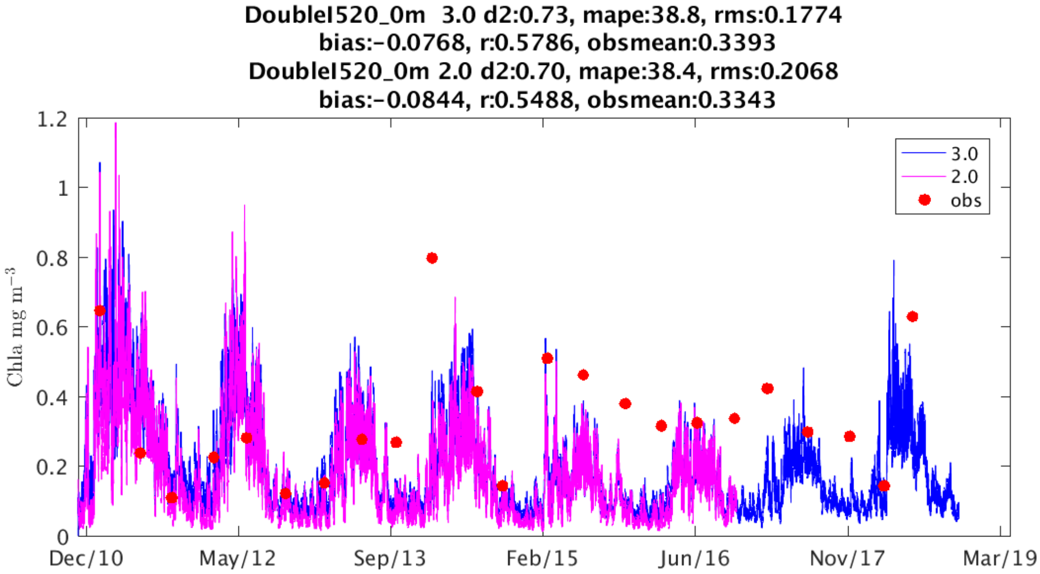

Yorkeys519_0m 3.0 d2:0.54, mape:53.4, rms:0.4271
bias:−0.2961, r:0.3067, obsmean:0.5731
Yorkeys519_0m 2.0 d2:0.55, mape:60.2, rms:0.4192
bias:−0.3175, r:0.4203, obsmean:0.5654
Chla mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

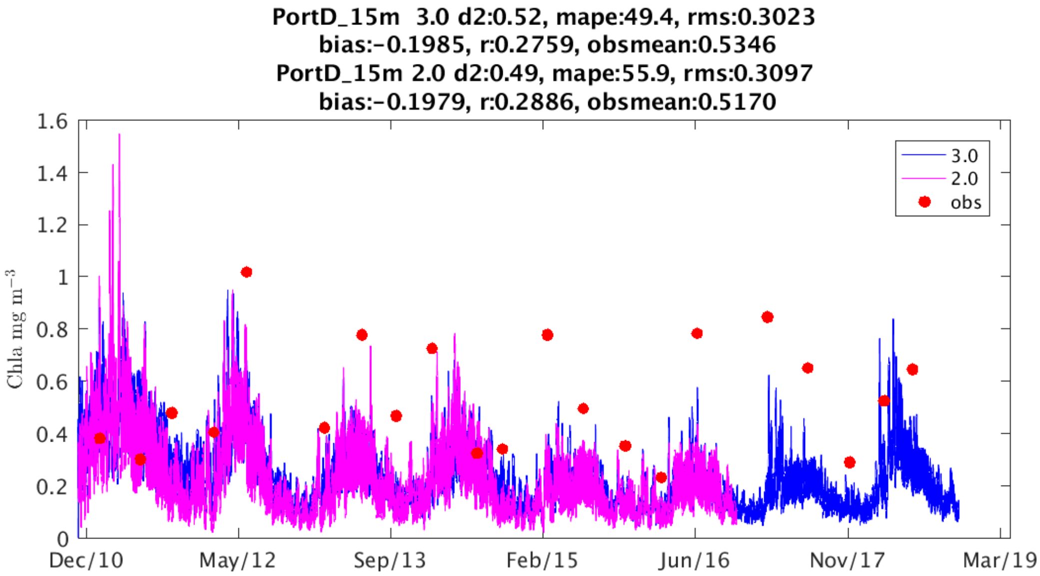

Green830_36m 3.0 d2:0.77, mape:42.6, rms:0.1302
bias:0.0132, r:0.5727, obsmean:0.3083
Green830_36m 2.0 d2:0.68, mape:59.7, rms:0.1901
bias:0.0289, r:0.4754, obsmean:0.3009
Chla mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


Green830_18m 3.0 d2:0.86, mape:42.7, rms:0.1654
bias:0.0400, r:0.7804, obsmean:0.3134
Green830_18m 2.0 d2:0.75, mape:47.9, rms:0.2277
bias:-0.0015, r:0.6213, obsmean:0.3134
Chla mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

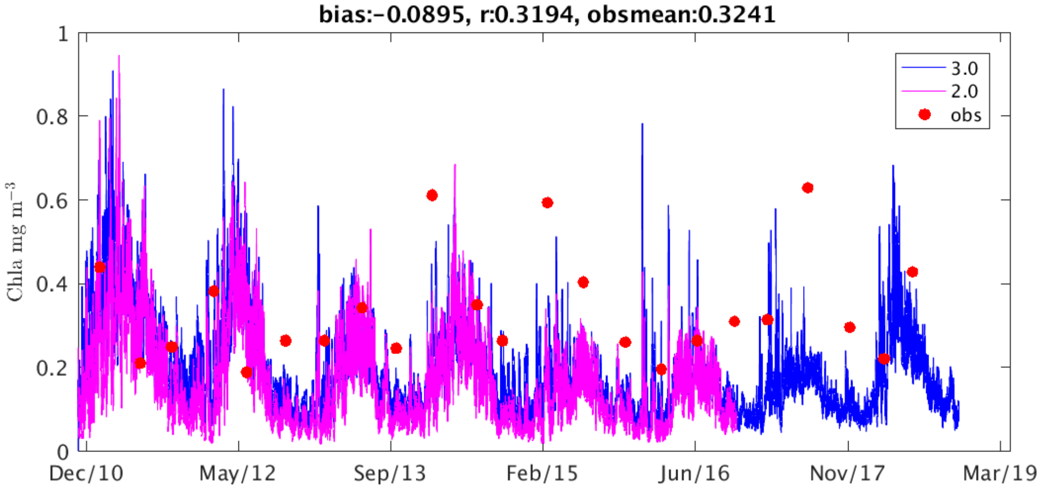

Green830_0m 3.0 d2:0.56, mape:34.2, rms:0.2756
bias:-0.0867, r:0.5624, obsmean:0.3272
Green830_0m 2.0 d2:0.49, mape:39.2, rms:0.3629
bias:-0.1369, r:0.3158, obsmean:0.3434
Chla mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


DoubleI520_18m 3.0 d2:0.47, mape:41.5, rms:0.2813
bias:−0.1438, r:0.1947, obsmean:0.4878
DoubleI520_18m 2.0 d2:0.41, mape:42.0, rms:0.2617
bias:−0.0978, r:0.1414, obsmean:0.4508
Chla mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

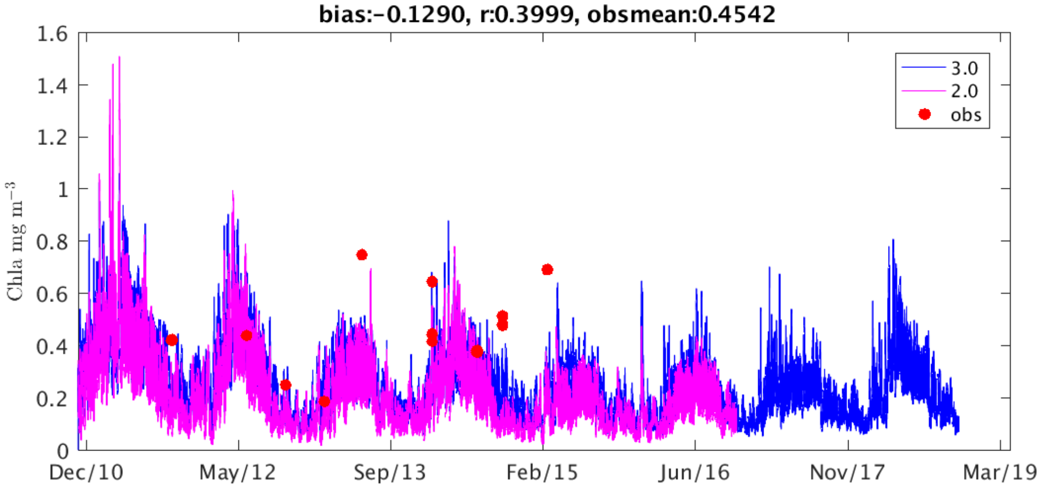

DoubleI520_0m 3.0 d2:0.73, mape:38.8, rms:0.1774
bias:−0.0768, r:0.5786, obsmean:0.3393
DoubleI520_0m 2.0 d2:0.70, mape:38.4, rms:0.2068
bias:−0.0844, r:0.5488, obsmean:0.3343
Chla mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


PortD_15m 3.0 d2:0.52, mape:49.4, rms:0.3023
bias:−0.1985, r:0.2759, obsmean:0.5346
PortD_15m 2.0 d2:0.49, mape:55.9, rms:0.3097
bias:−0.1979, r:0.2886, obsmean:0.5170
Chla mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

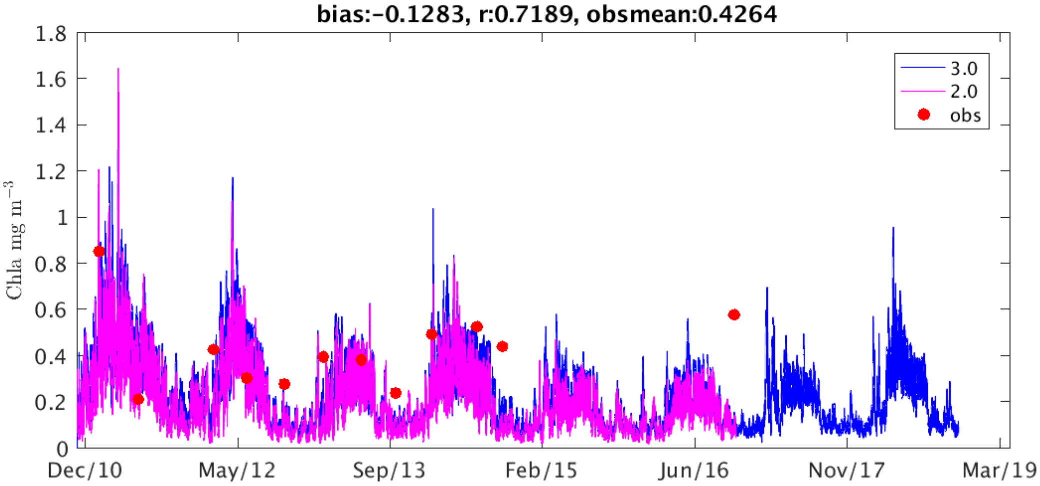
PortD_0m 3.0 d2:0.46, mape:48.8, rms:0.1924
bias:-0.0837, r:0.1316, obsmean:0.3356
PortD_0m 2.0 d2:0.50, mape:55.0, rms:0.2010
bias:-0.0895, r:0.3194, obsmean:0.3241



Snap_10m 3.0 d2:0.65, mape:26.6, rms:0.1679
bias:-0.0996, r:0.5499, obsmean:0.4542
Snap_10m 2.0 d2:0.56, mape:35.5, rms:0.2152
bias:-0.1290, r:0.3999, obsmean:0.4542



CapeTrib356_10m 3.0 d2:0.76, mape:44.0, rms:0.1922
bias:-0.0840, r:0.6408, obsmean:0.4264
CapeTrib356_10m 2.0 d2:0.75, mape:46.9, rms:0.2214
bias:-0.1283, r:0.7189, obsmean:0.4264



11. Simulated Secchi depth assessment against AIMS Long Term Monitoring

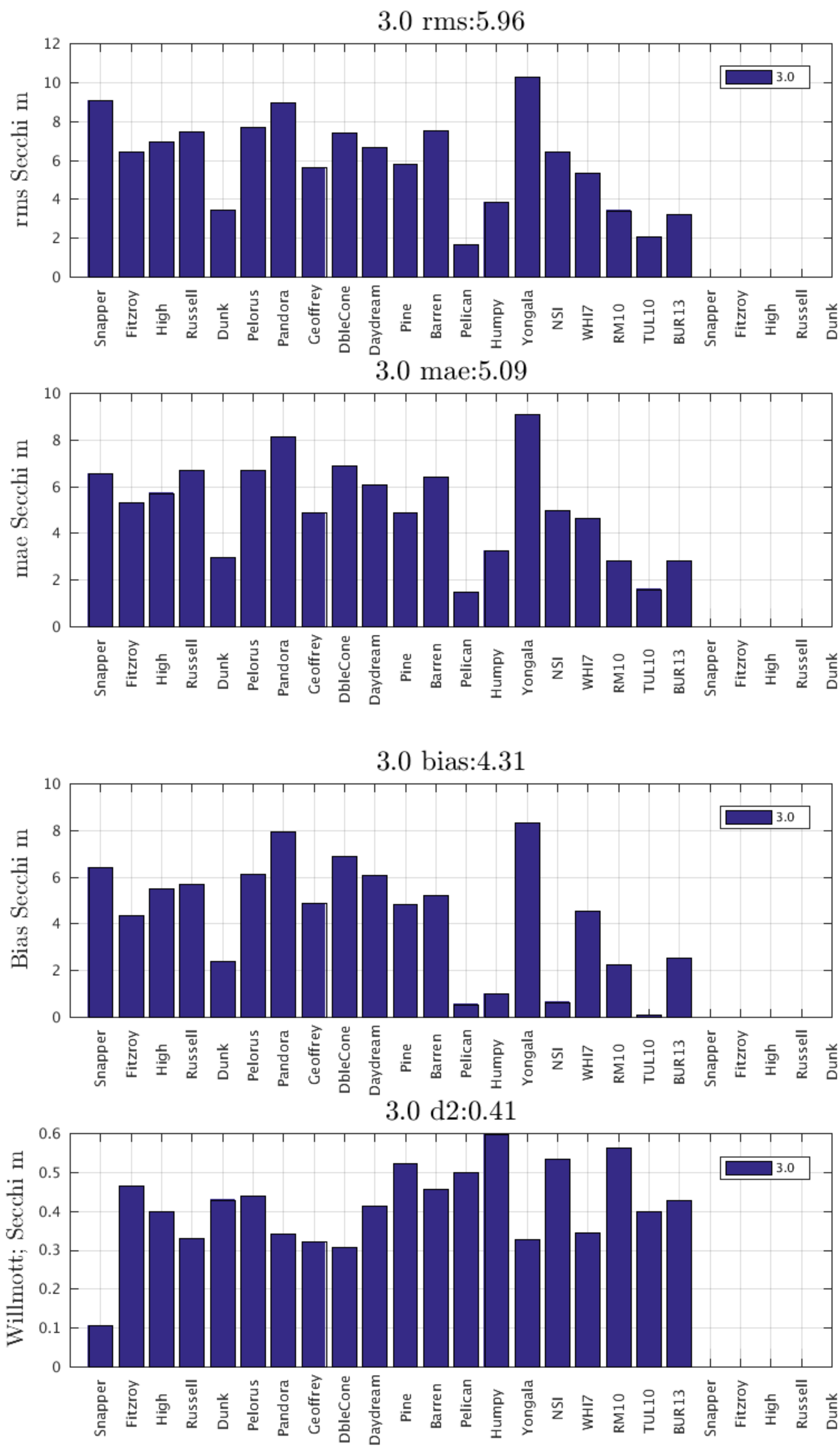
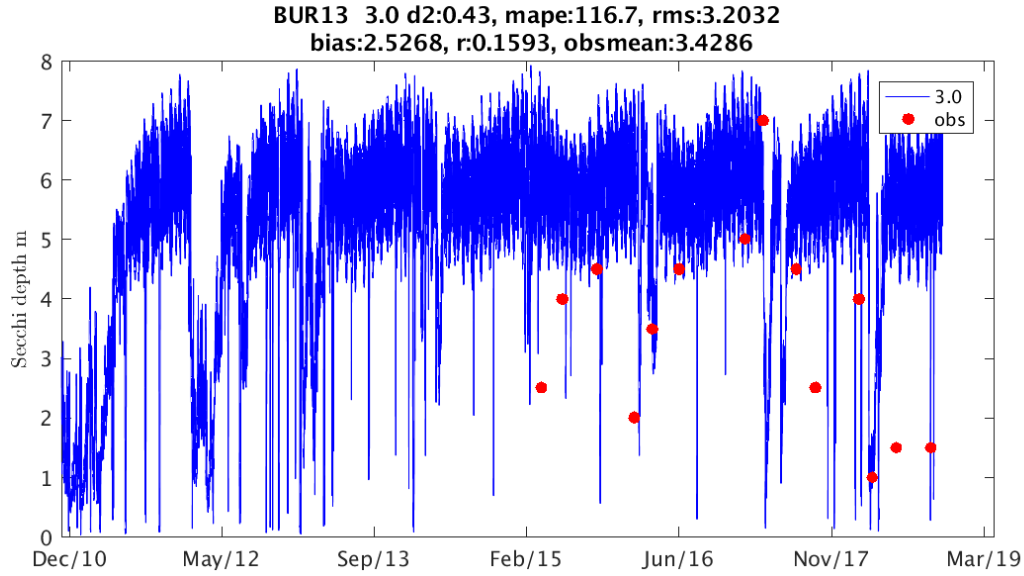
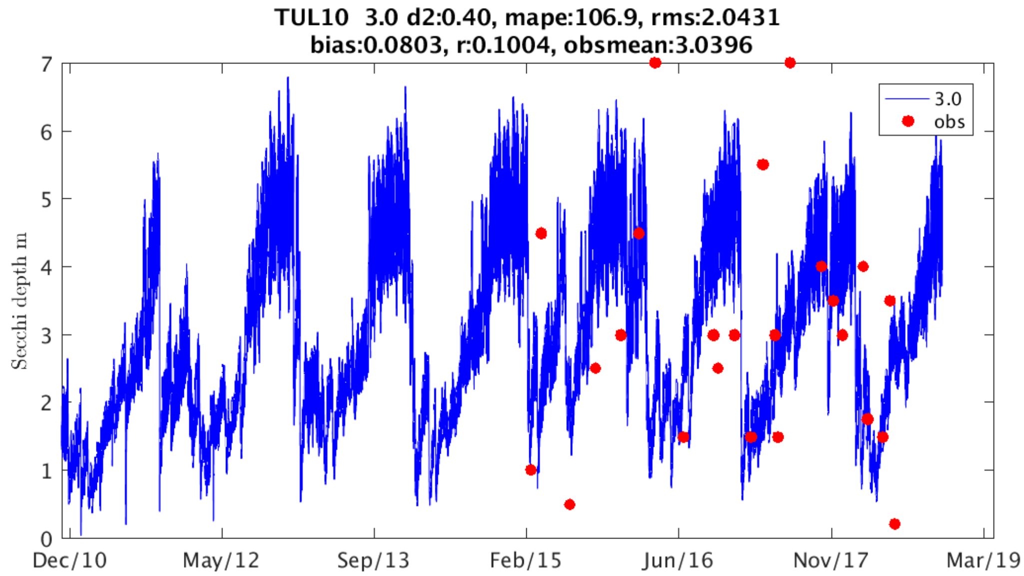
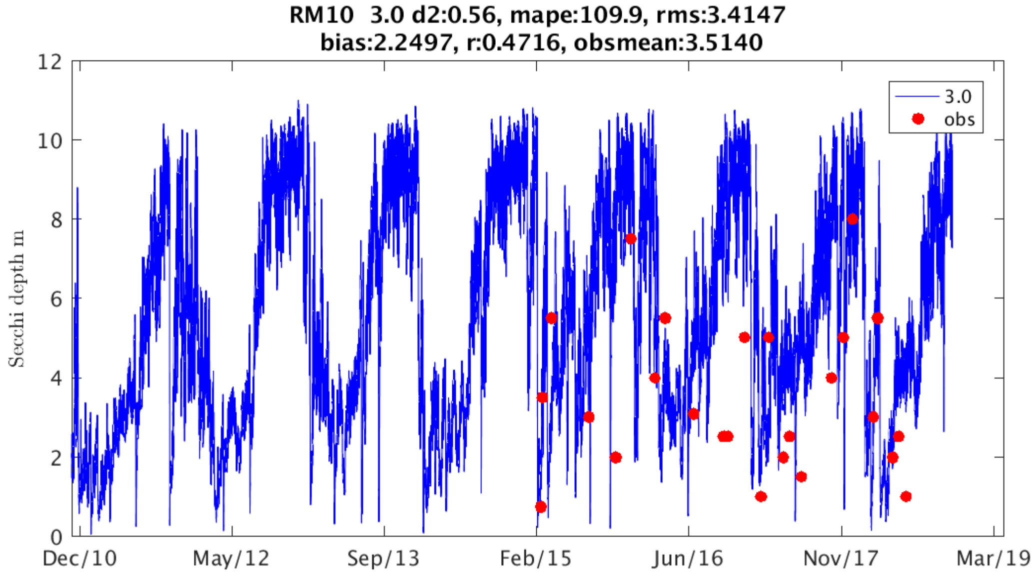
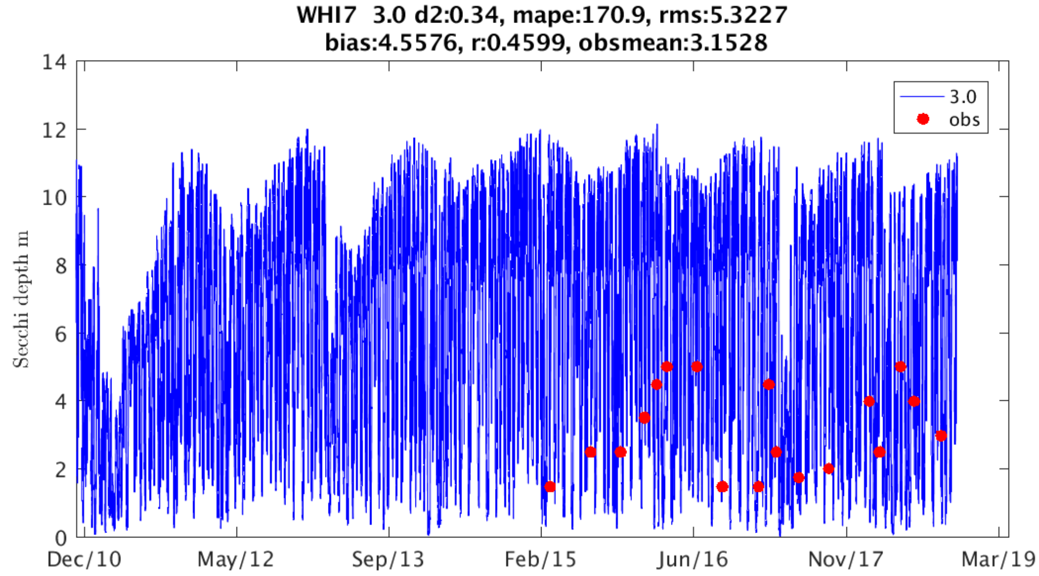


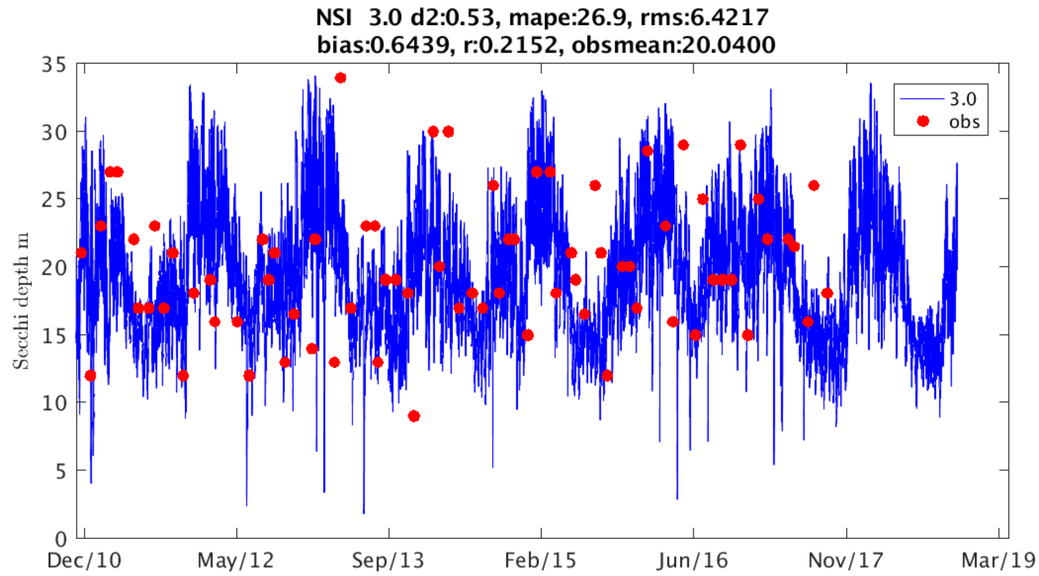
Figure 5 Metrics for Long Term Monitoring sites Secchi depth assessment against observations for model version 3p0, d2 = Willmott index see Statistical metric page 27.mae:mean absolute error, rms root mean square

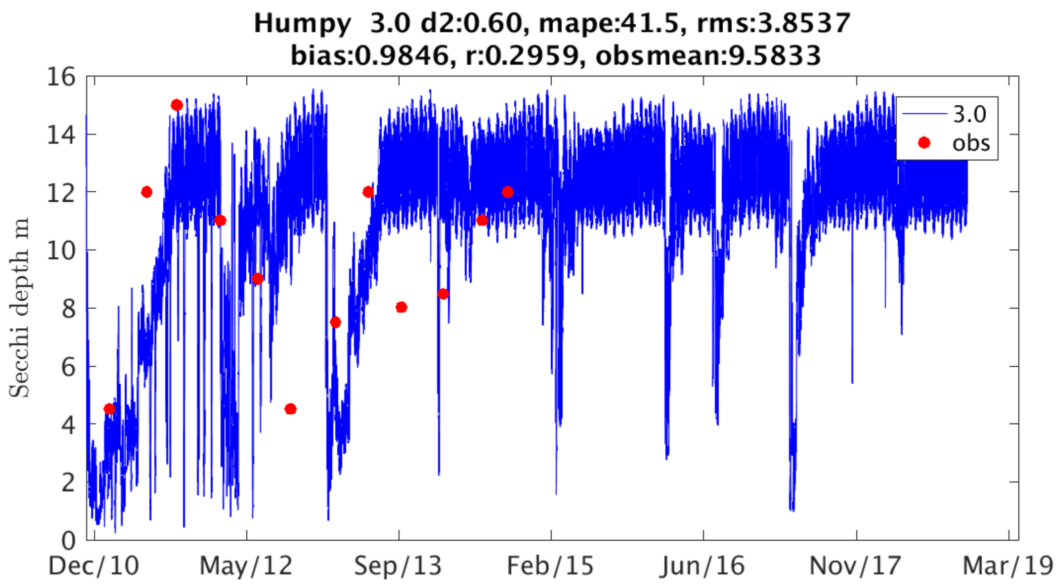

BUR13 3.0 d2:0.43, mape:116.7, rms:3.2032
bias:2.5268, r:0.1593, obsmean:3.4286
Secchi depth m
3.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

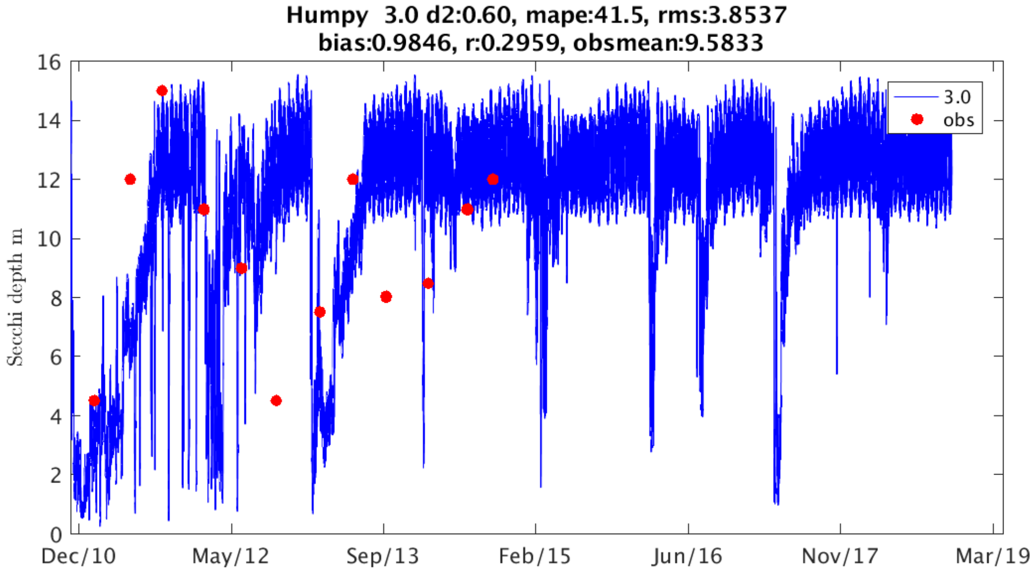

TUL10 3.0 d2:0.40, mape:106.9, rms:2.0431
bias:0.0803, r:0.1004, obsmean:3.0396
Secchi depth m
3.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

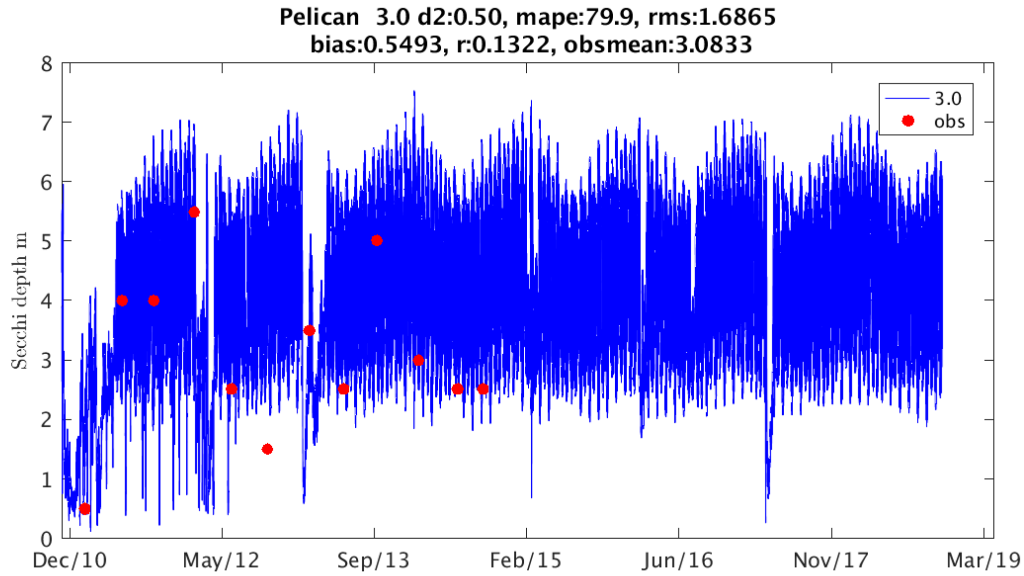

RM10 3.0 d2:0.56, mape:109.9, rms:3.4147
bias:2.2497, r:0.4716, obsmean:3.5140
Secchi depth m
3.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

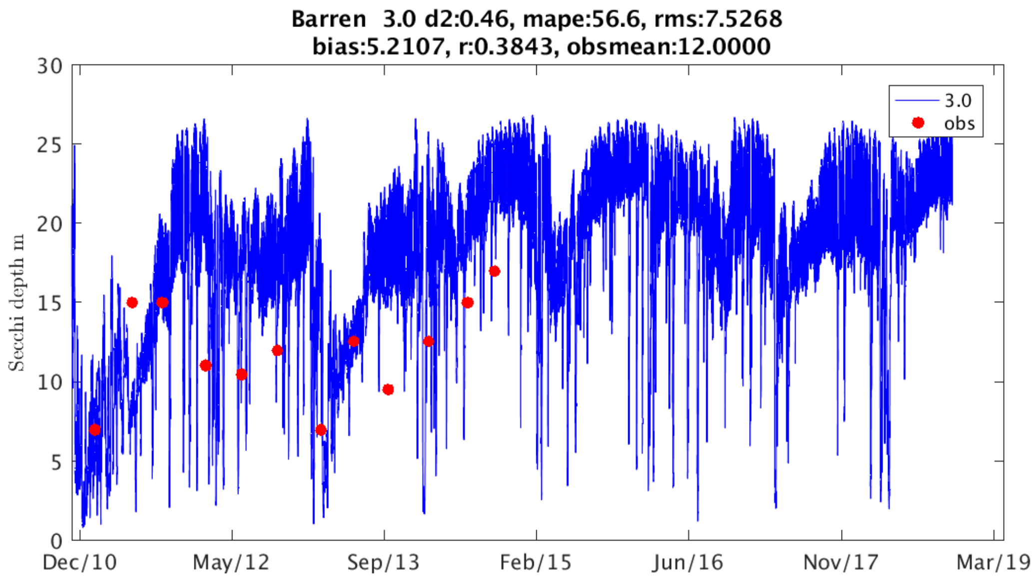

WHI7 3.0 d2:0.34, mape:170.9, rms:5.3227
bias:4.5576, r:0.4599, obsmean:3.1528
Secchi depth m
3.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

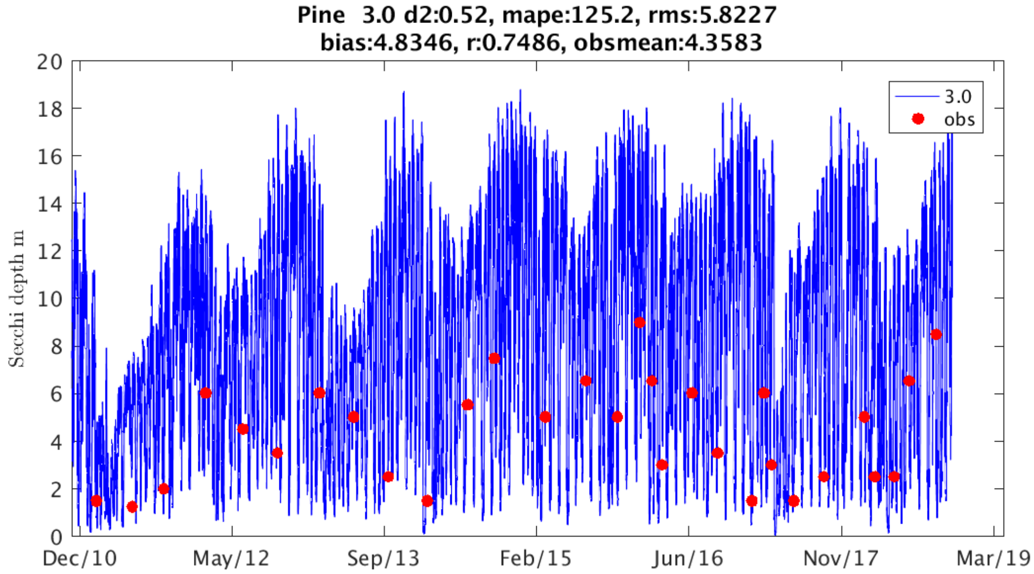

NSI 3.0 d2:0.53, mape:26.9, rms:6.4217
bias:0.6439, r:0.2152, obsmean:20.0400
Secchi depth m
3.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

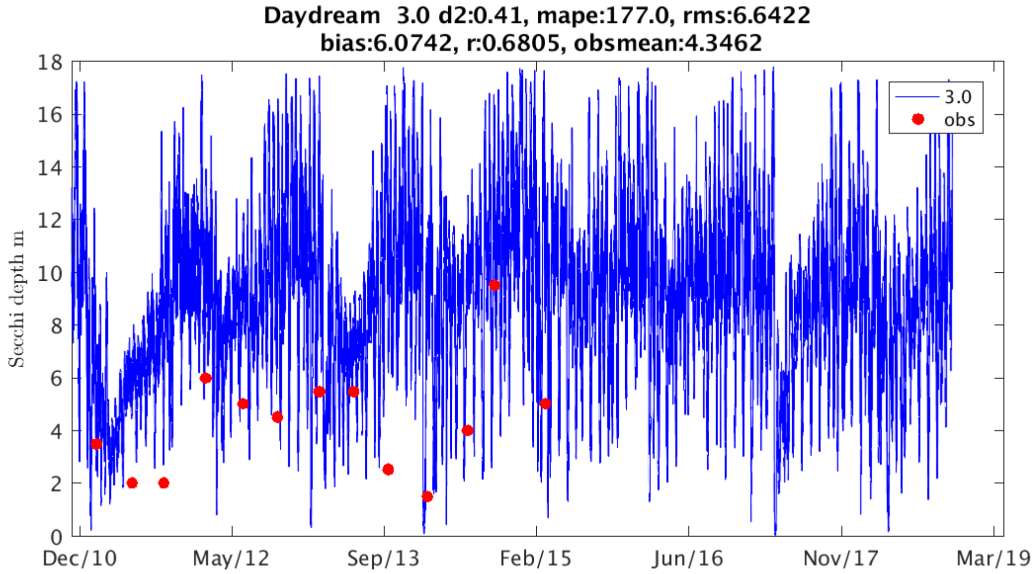

Humpy 3.0 d2:0.60, mape:41.5, rms:3.8537
bias:0.9846, r:0.2959, obsmean:9.5833
Secchi depth m
3.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

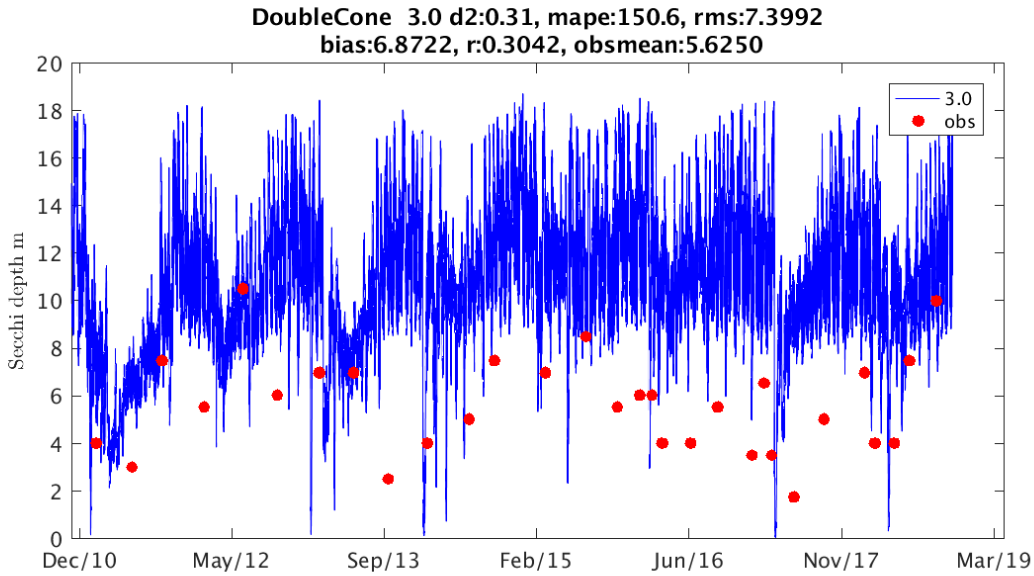

Humpy 3.0 d2:0.60, mape:41.5, rms:3.8537
bias:0.9846, r:0.2959, obsmean:9.5833
Secchi depth m
3.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


Pelican 3.0 d2:0.50, mape:79.9, rms:1.6865
bias:0.5493, r:0.1322, obsmean:3.0833
Secchi depth m
3.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

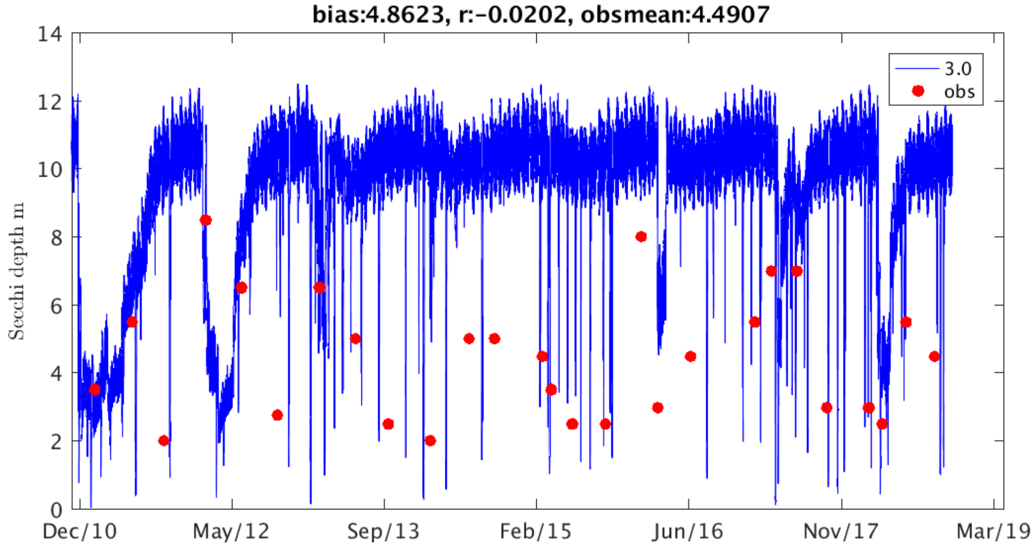

Barren 3.0 d2:0.46, mape:56.6, rms:7.5268
bias:5.2107, r:0.3843, obsmean:12.0000
Secchi depth m
3.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


Pine 3.0 d2:0.52, mape:125.2, rms:5.8227
bias:4.8346, r:0.7486, obsmean:4.3583
Secchi depth m
3.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

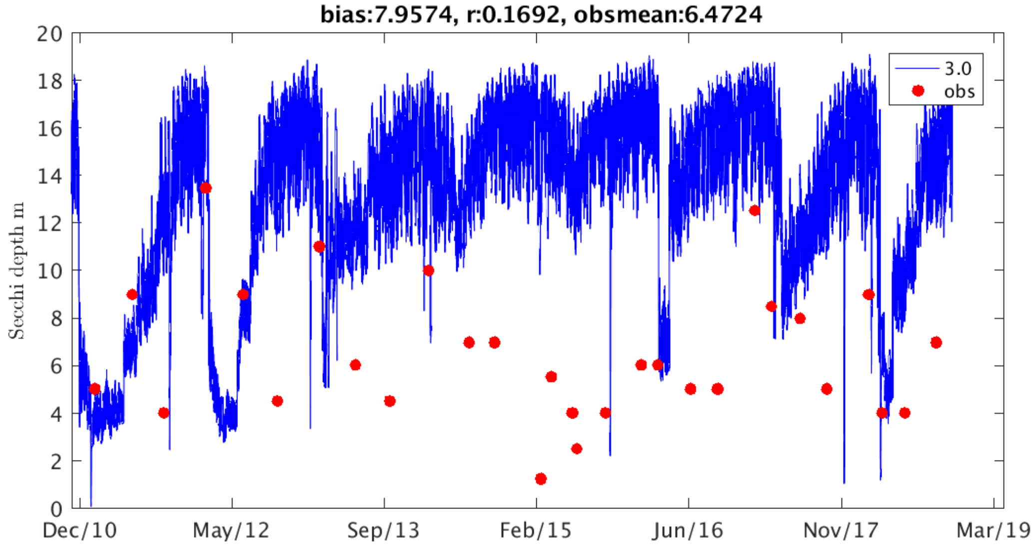

Daydream 3.0 d2:0.41, mape:177.0, rms:6.6422
bias:6.0742, r:0.6805, obsmean:4.3462
Secchi depth m
3.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


DoubleCone 3.0 d2:0.31, mape:150.6, rms:7.3992
bias:6.8722, r:0.3042, obsmean:5.6250
Secchi depth m
3.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

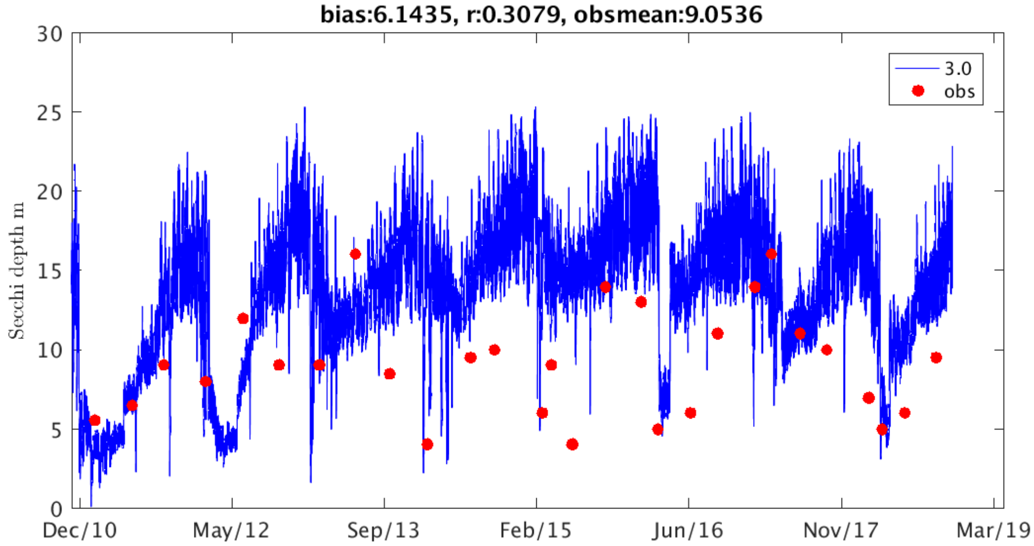
GeoffreyBay 3.0 d2:0.32, mape:149.3, rms:5.6285
bias:4.8623, r:-0.0202, obsmean:4.4907

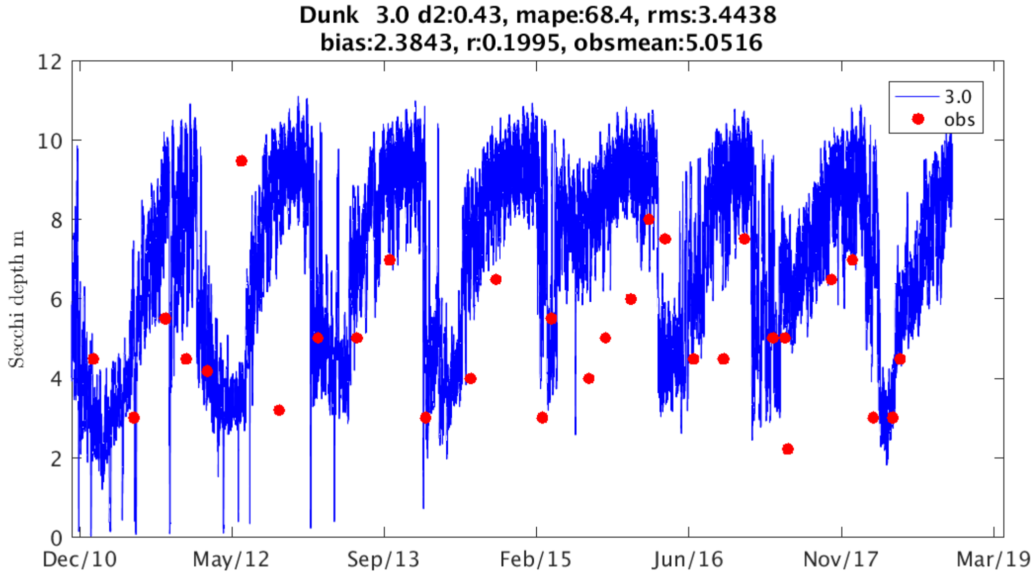


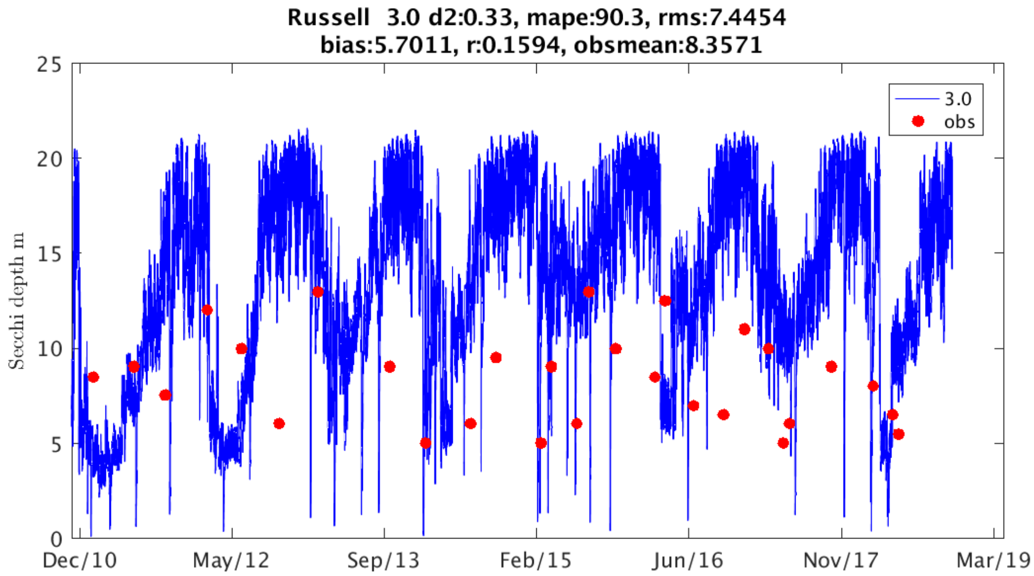
Pandora 3.0 d2:0.34, mape:186.3, rms:8.9670
bias:7.9574, r:0.1692, obsmean:6.4724

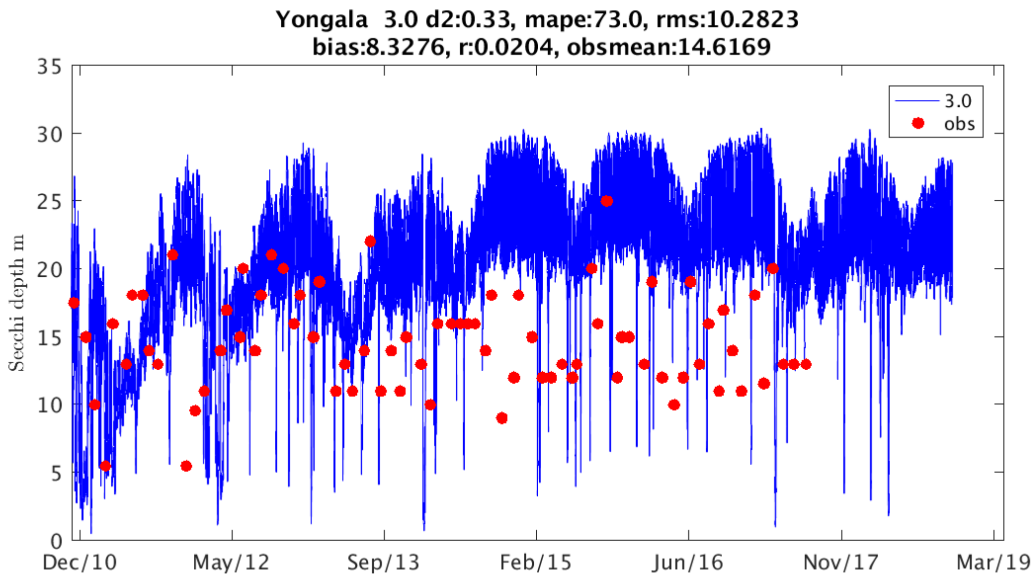


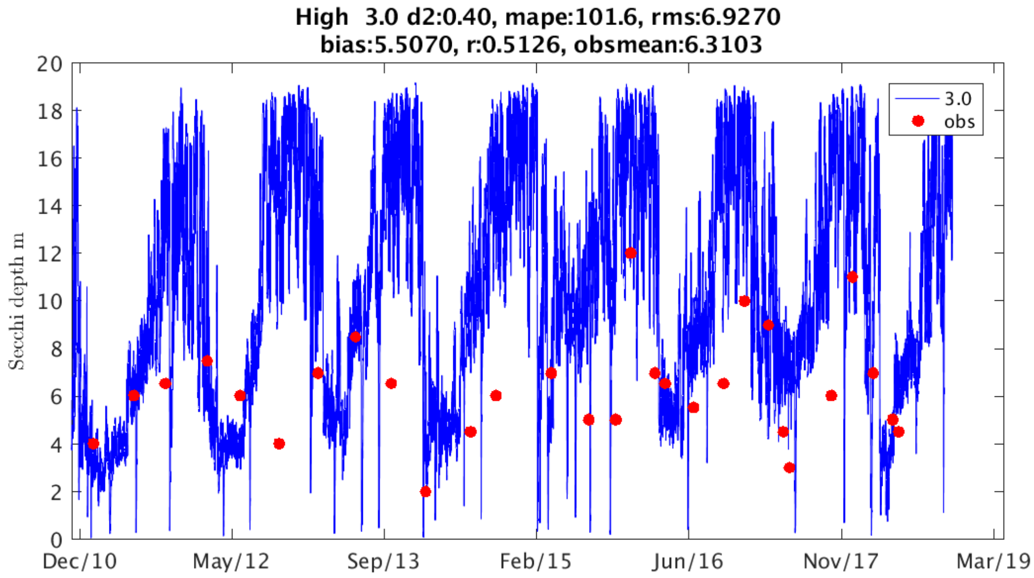
Pelorus 3.0 d2:0.44, mape:93.7, rms:7.7045
bias:6.1435, r:0.3079, obsmean:9.0536

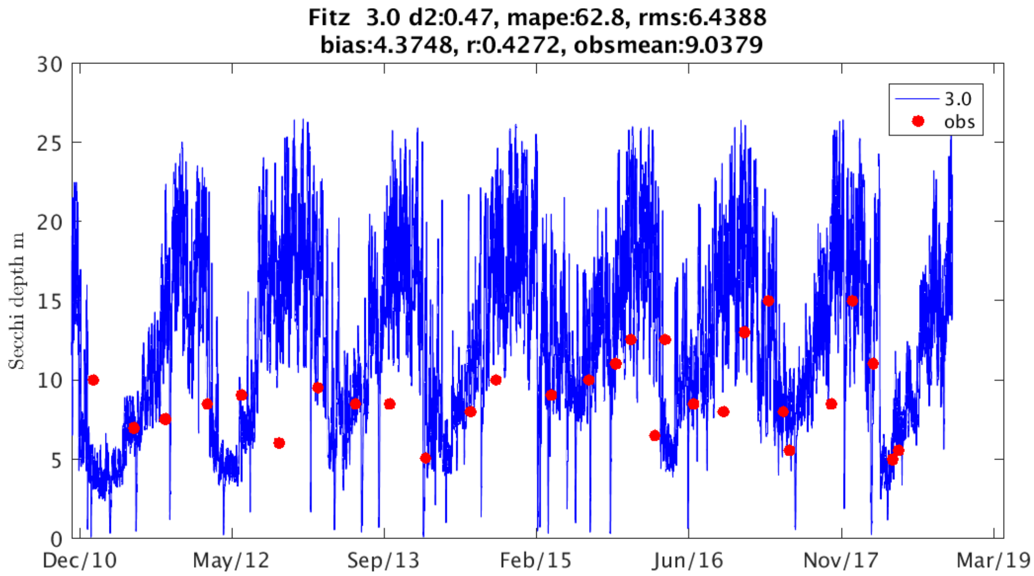



Dunk 3.0 d2:0.43, mape:68.4, rms:3.4438
bias:2.3843, r:0.1995, obsmean:5.0516
Secchi depth m
3.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


Russell 3.0 d2:0.33, mape:90.3, rms:7.4454
bias:5.7011, r:0.1594, obsmean:8.3571
Secchi depth m
3.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


Yongala 3.0 d2:0.33, mape:73.0, rms:10.2823
bias:8.3276, r:0.0204, obsmean:14.6169
Secchi depth m
3.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


High 3.0 d2:0.40, mape:101.6, rms:6.9270
bias:5.5070, r:0.5126, obsmean:6.3103
Secchi depth m
3.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


Fitz 3.0 d2:0.47, mape:62.8, rms:6.4388
bias:4.3748, r:0.4272, obsmean:9.0379
Secchi depth m
3.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

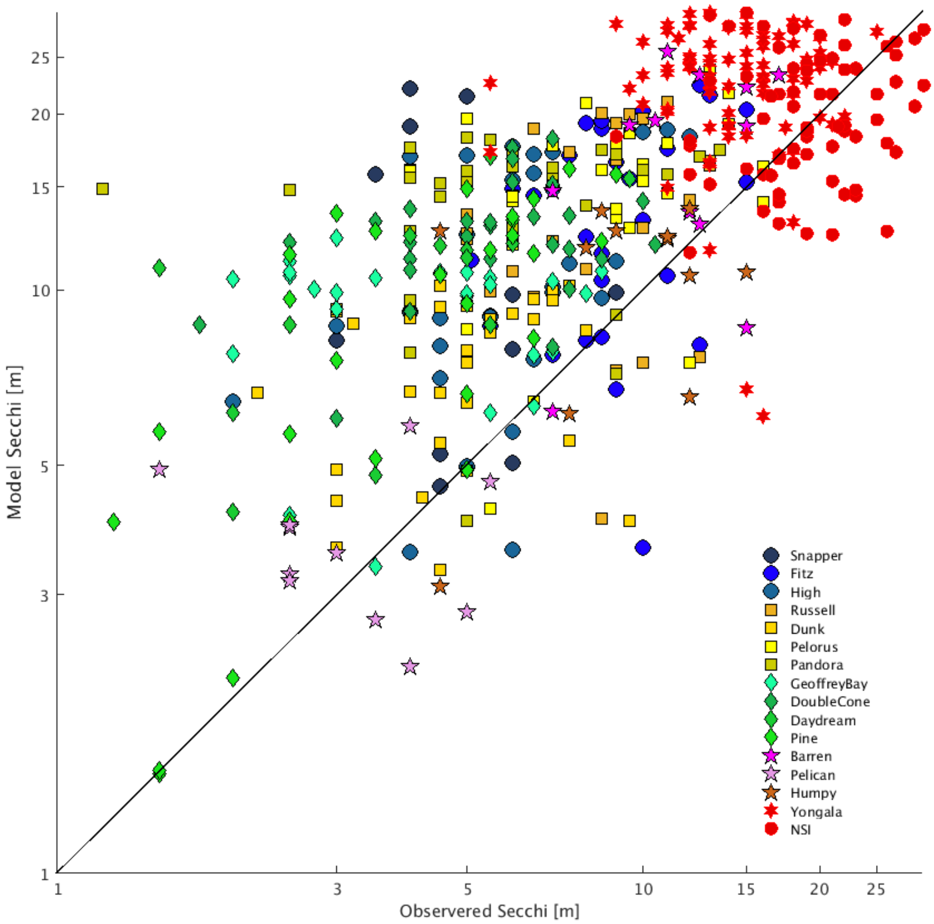


Figure 6 Scatter plot of observed Secchi for long Term Monitoring sites and NRS sites (Yongala and North Stradbroke) assessment against simulated Secchi for model version 3p0

12. Simulated DIP assessment against AIMS Long Term Monitoring

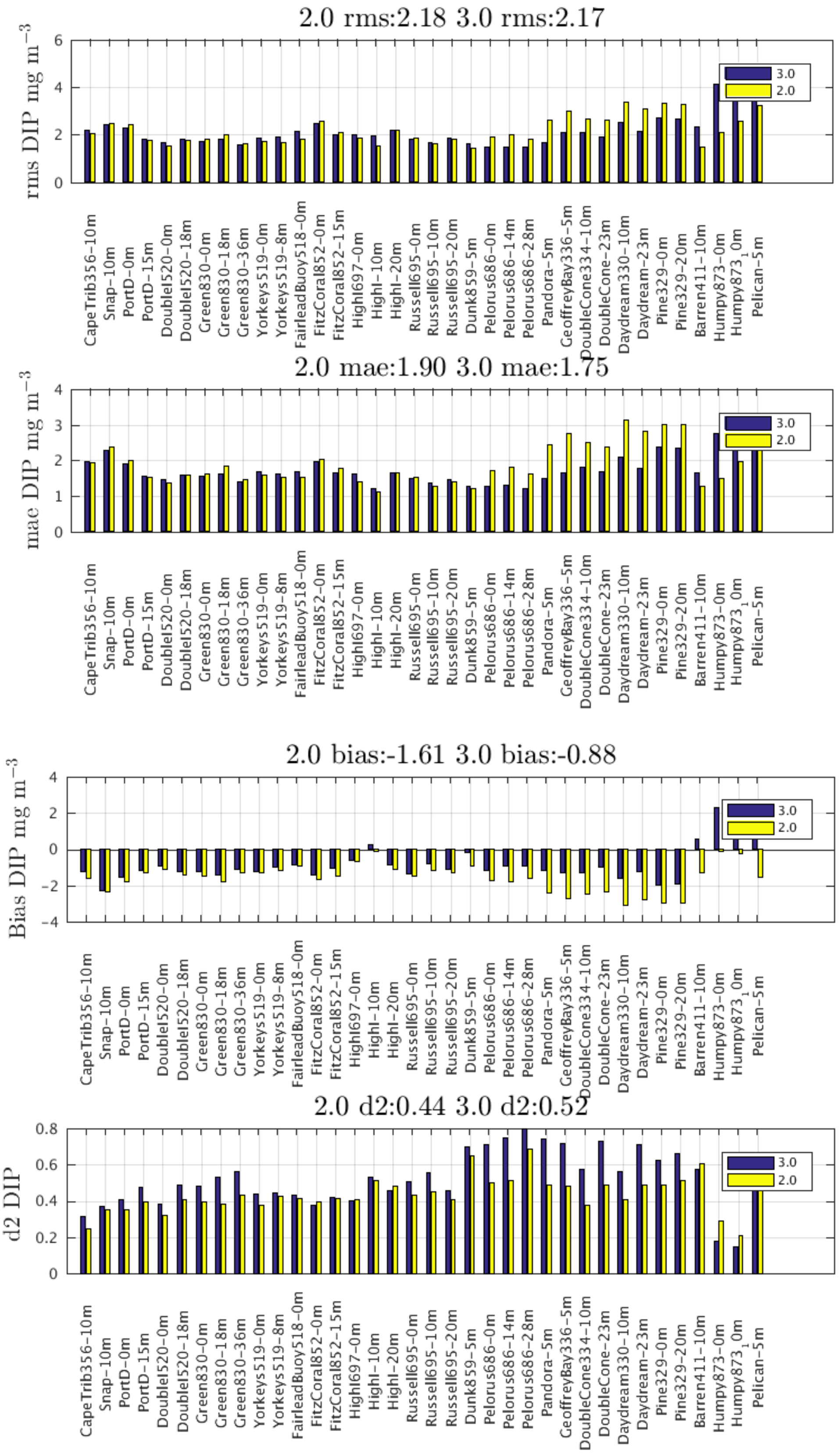
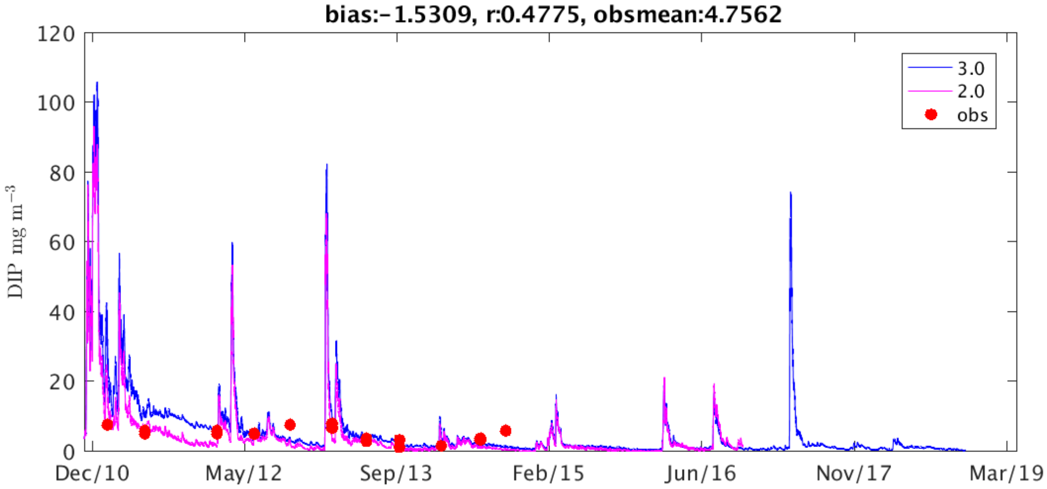
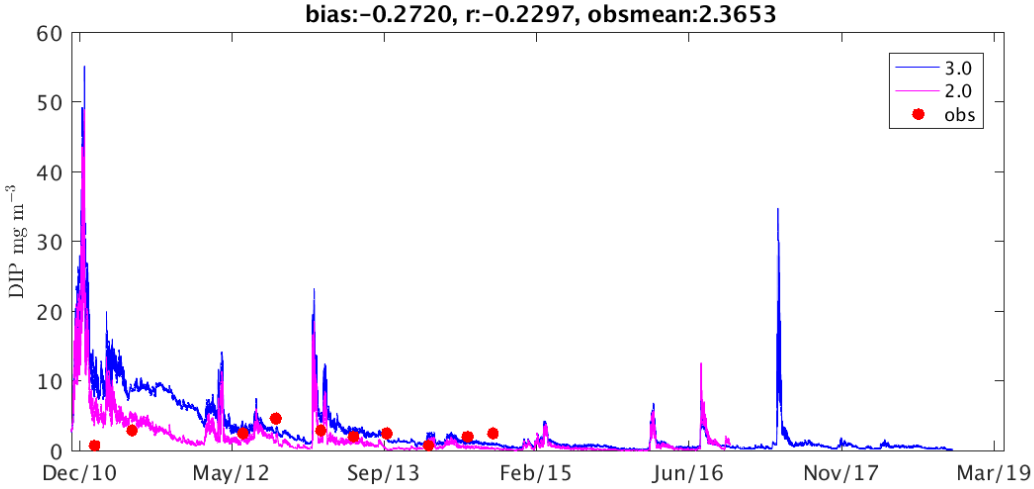


Figure 7 Metrics for Long Term Monitoring sites DIP assessment against observations for model version 3p0 and 2p0 d2 = Willmott index see Statistical metric page 27.mae:mean absolute error, rms root mean square

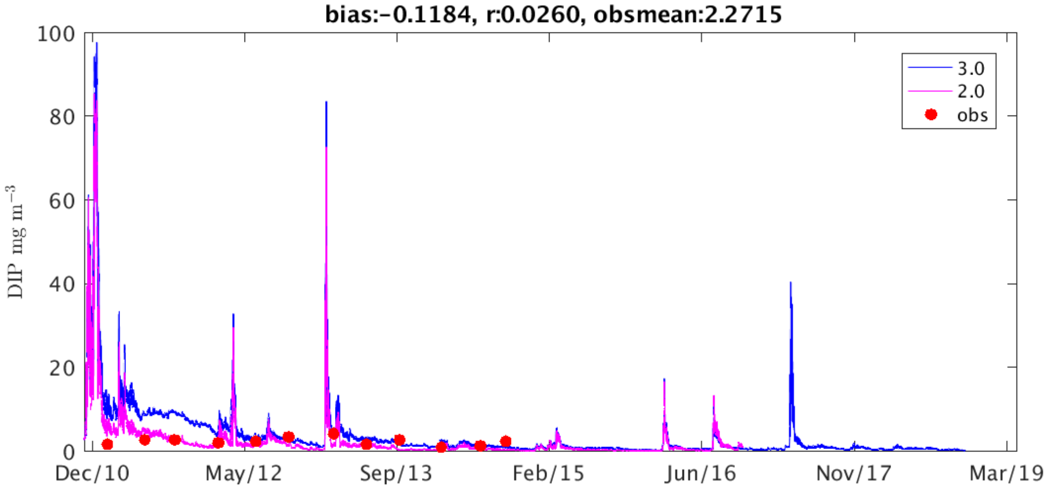
Pelican_5m 3.0 d2:0.52, mape:60.1, rms:4.4336
bias:0.9543, r:0.5008, obsmean:4.7562
Pelican_5m 2.0 d2:0.62, mape:57.9, rms:3.2174
bias:-1.5309, r:0.4775, obsmean:4.7562

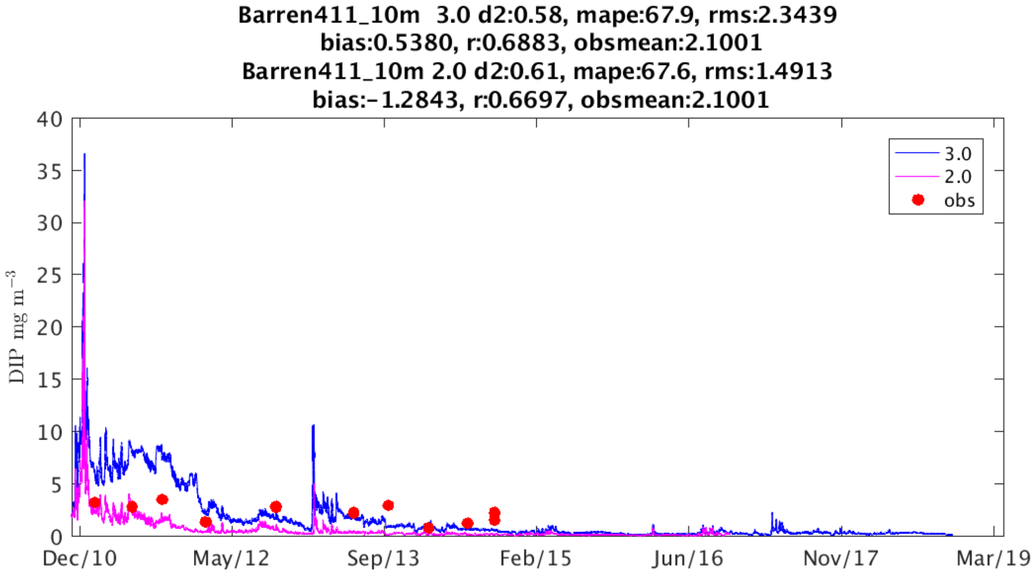


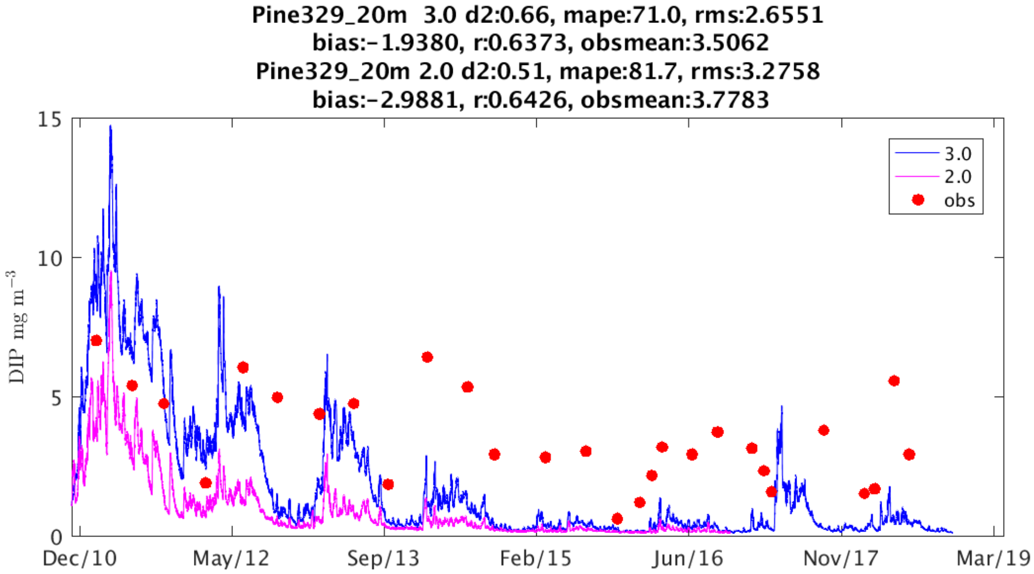
Humpy873_10m 3.0 d2:0.15, mape:220.4, rms:4.2733
bias:1.7741, r:-0.2305, obsmean:2.3653
Humpy873_10m 2.0 d2:0.20, mape:136.1, rms:2.5691
bias:-0.2720, r:-0.2297, obsmean:2.3653

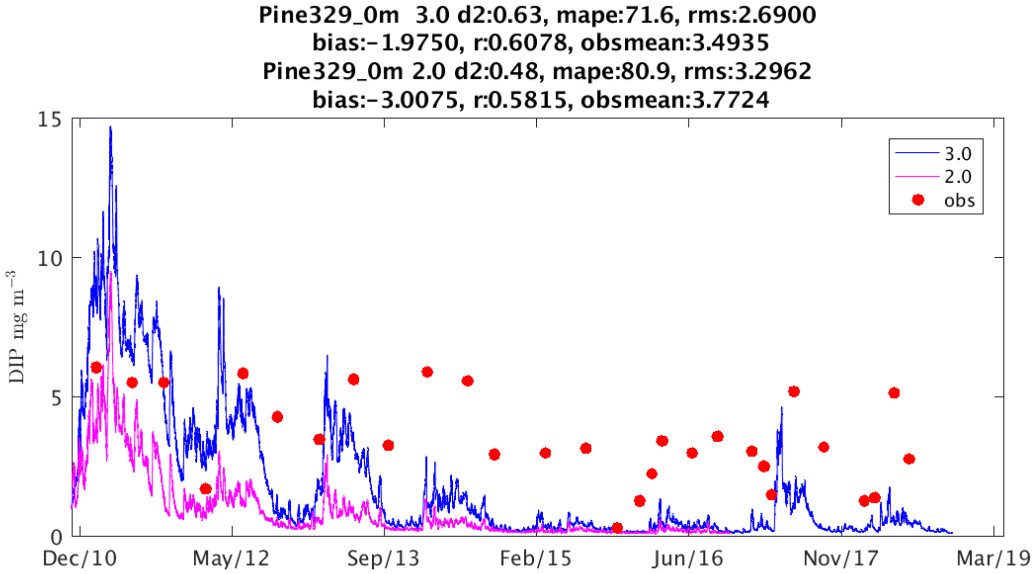


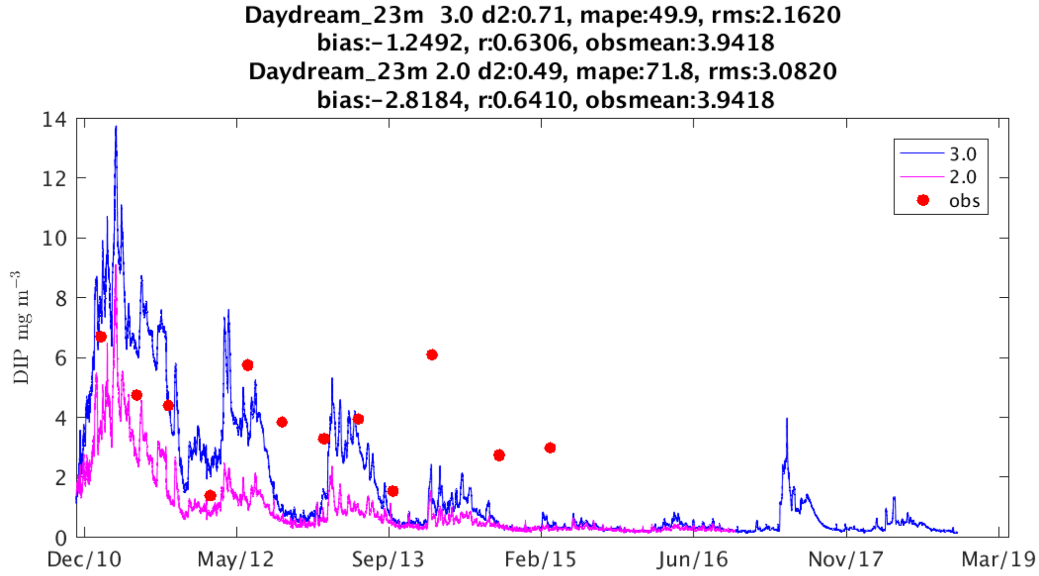
Humpy873_0m 3.0 d2:0.18, mape:136.5, rms:4.1244
bias:2.2803, r:0.1179, obsmean:2.2715
Humpy873_0m 2.0 d2:0.29, mape:68.9, rms:2.1009
bias:-0.1184, r:0.0260, obsmean:2.2715

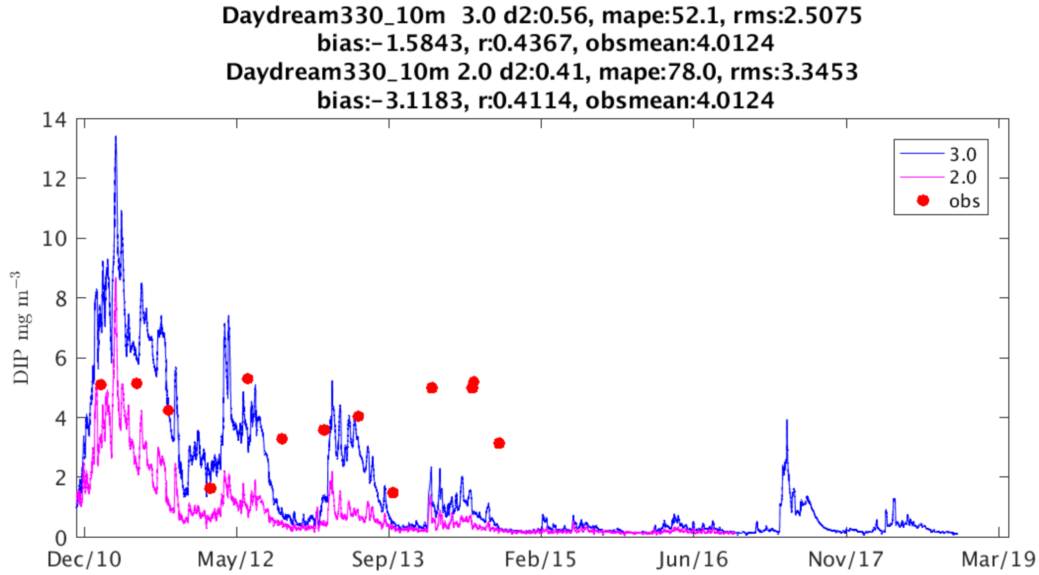


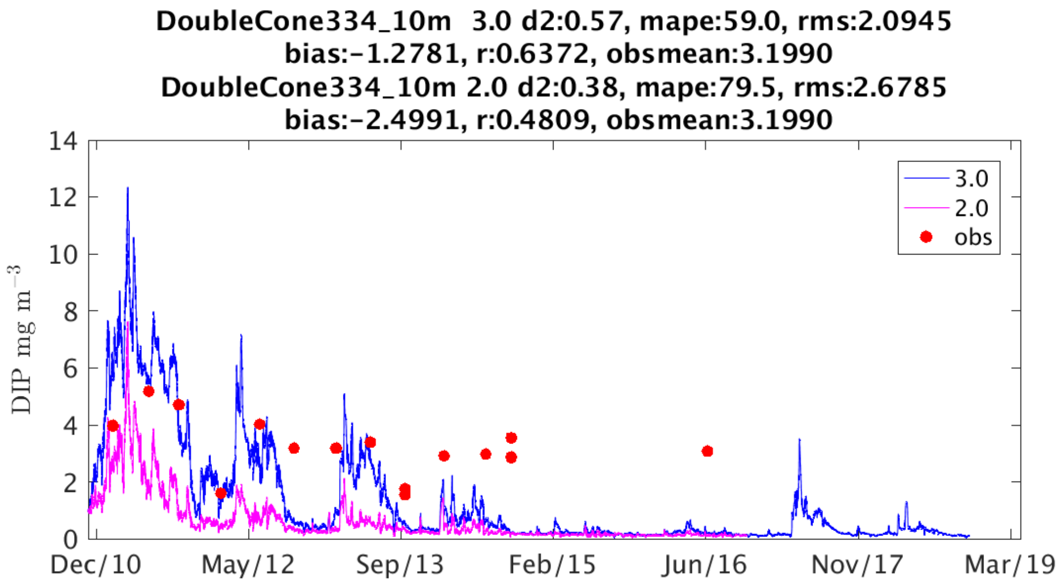

Barren411_10m 3.0 d2:0.58, mape:67.9, rms:2.3439
bias:0.5380, r:0.6883, obsmean:2.1001
Barren411_10m 2.0 d2:0.61, mape:67.6, rms:1.4913
bias:-1.2843, r:0.6697, obsmean:2.1001
DIP mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

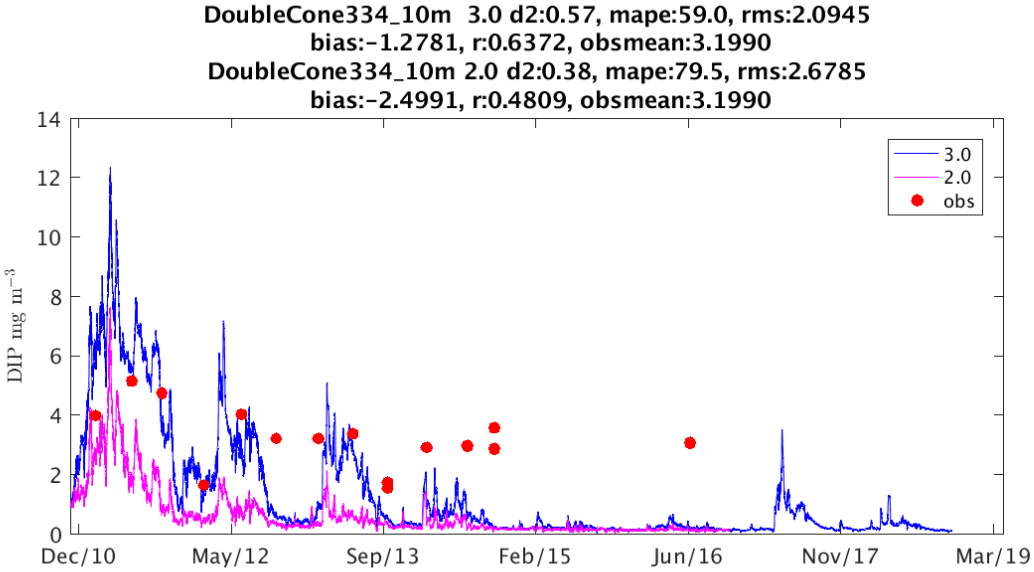

Pine329_20m 3.0 d2:0.66, mape:71.0, rms:2.6551
bias:-1.9380, r:0.6373, obsmean:3.5062
Pine329_20m 2.0 d2:0.51, mape:81.7, rms:3.2758
bias:-2.9881, r:0.6426, obsmean:3.7783
DIP mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

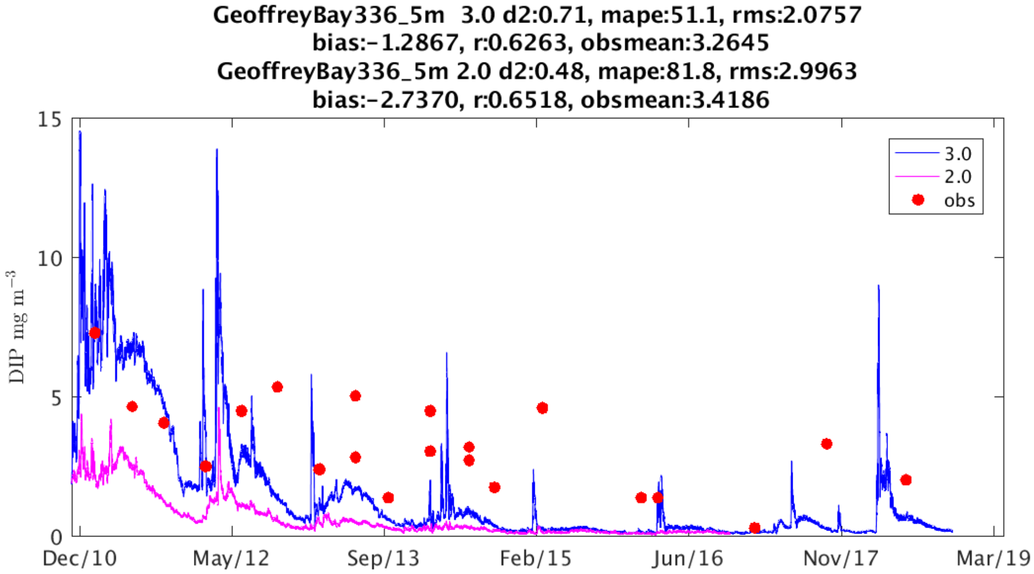

Pine329_0m 3.0 d2:0.63, mape:71.6, rms:2.6900
bias:-1.9750, r:0.6078, obsmean:3.4935
Pine329_0m 2.0 d2:0.48, mape:80.9, rms:3.2962
bias:-3.0075, r:0.5815, obsmean:3.7724
DIP mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

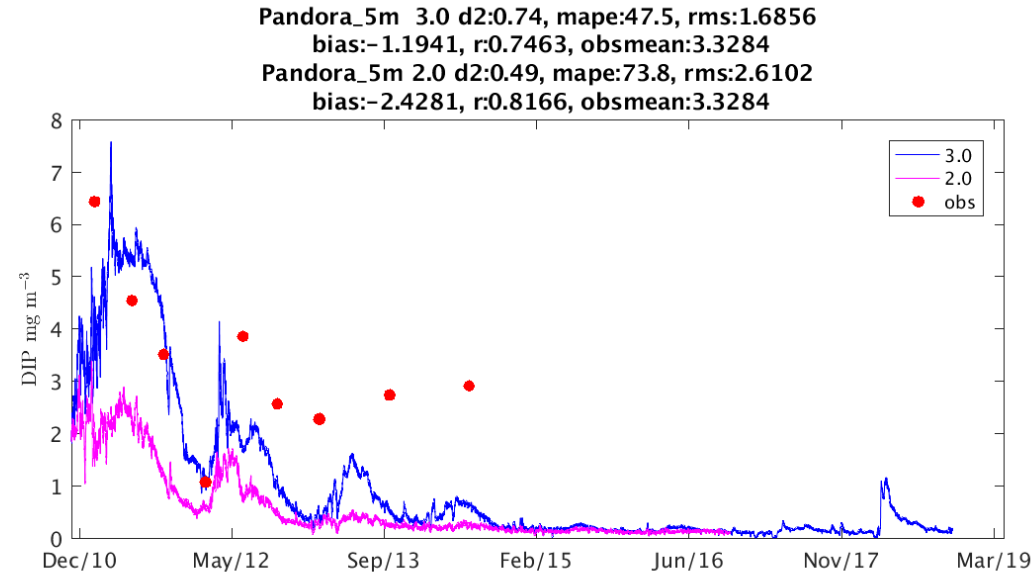

Daydream_23m 3.0 d2:0.71, mape:49.9, rms:2.1620
bias:-1.2492, r:0.6306, obsmean:3.9418
Daydream_23m 2.0 d2:0.49, mape:71.8, rms:3.0820
bias:-2.8184, r:0.6410, obsmean:3.9418
DIP mg m^{-3}
3.0
2.0
obs
0
2
4
6
8
10
12
14
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

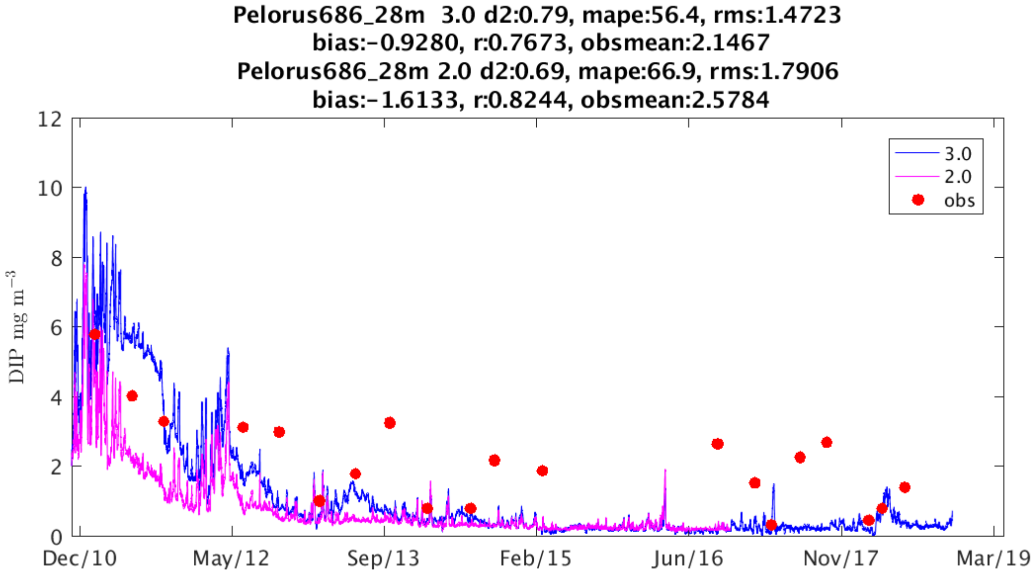

Daydream330_10m 3.0 d2:0.56, mape:52.1, rms:2.5075
bias:-1.5843, r:0.4367, obsmean:4.0124
Daydream330_10m 2.0 d2:0.41, mape:78.0, rms:3.3453
bias:-3.1183, r:0.4114, obsmean:4.0124
DIP mg m^{-3}
3.0
2.0
obs
0
2
4
6
8
10
12
14
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

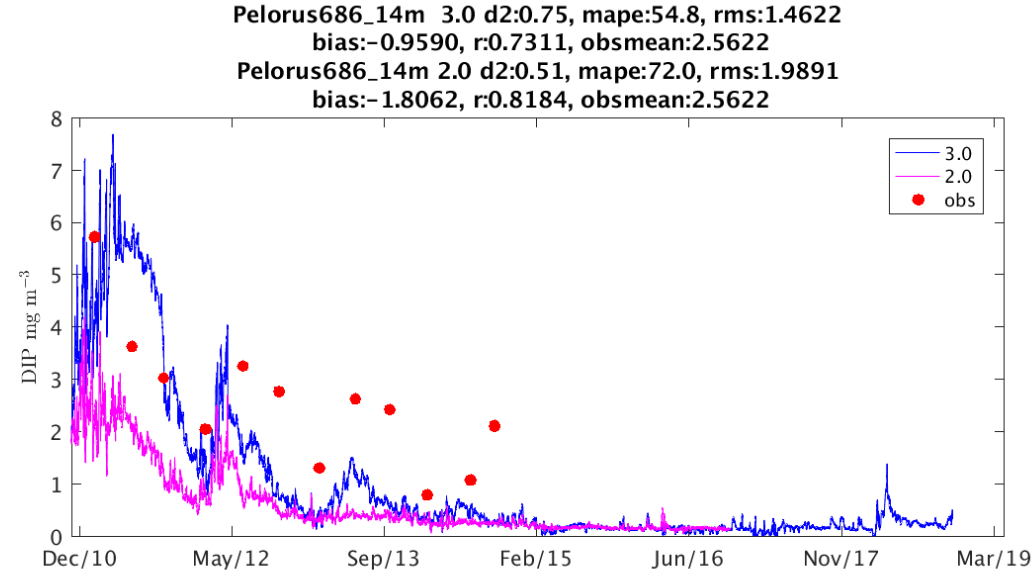

DoubleCone334_10m 3.0 d2:0.57, mape:59.0, rms:2.0945
bias:-1.2781, r:0.6372, obsmean:3.1990
DoubleCone334_10m 2.0 d2:0.38, mape:79.5, rms:2.6785
bias:-2.4991, r:0.4809, obsmean:3.1990
DIP mg m^{-3}
3.0
2.0
obs
0
2
4
6
8
10
12
14
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

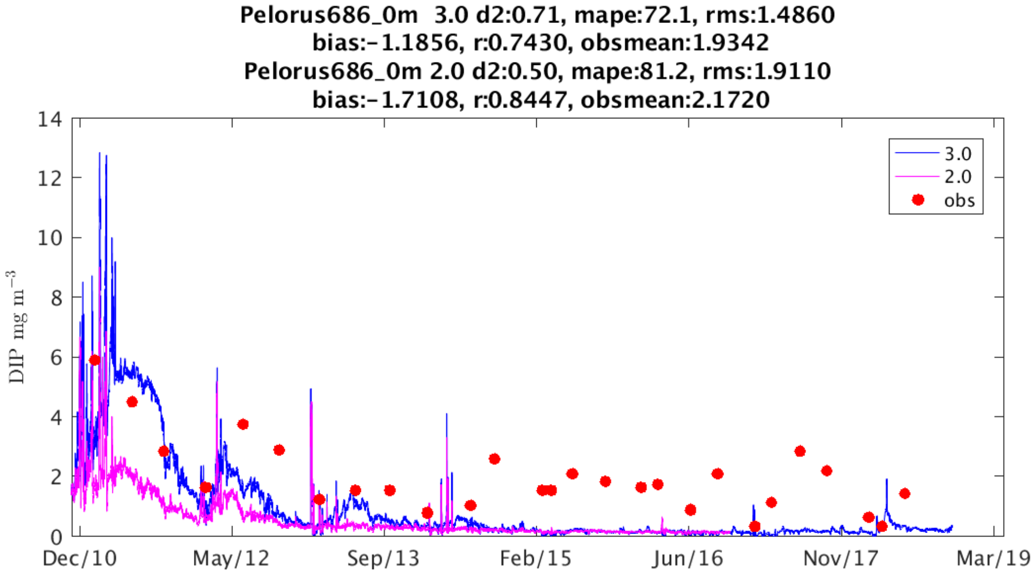

DoubleCone334_10m 3.0 d2:0.57, mape:59.0, rms:2.0945
bias:-1.2781, r:0.6372, obsmean:3.1990
DoubleCone334_10m 2.0 d2:0.38, mape:79.5, rms:2.6785
bias:-2.4991, r:0.4809, obsmean:3.1990
DIP mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


GeoffreyBay336_5m 3.0 d2:0.71, mape:51.1, rms:2.0757
bias:-1.2867, r:0.6263, obsmean:3.2645
GeoffreyBay336_5m 2.0 d2:0.48, mape:81.8, rms:2.9963
bias:-2.7370, r:0.6518, obsmean:3.4186
DIP mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

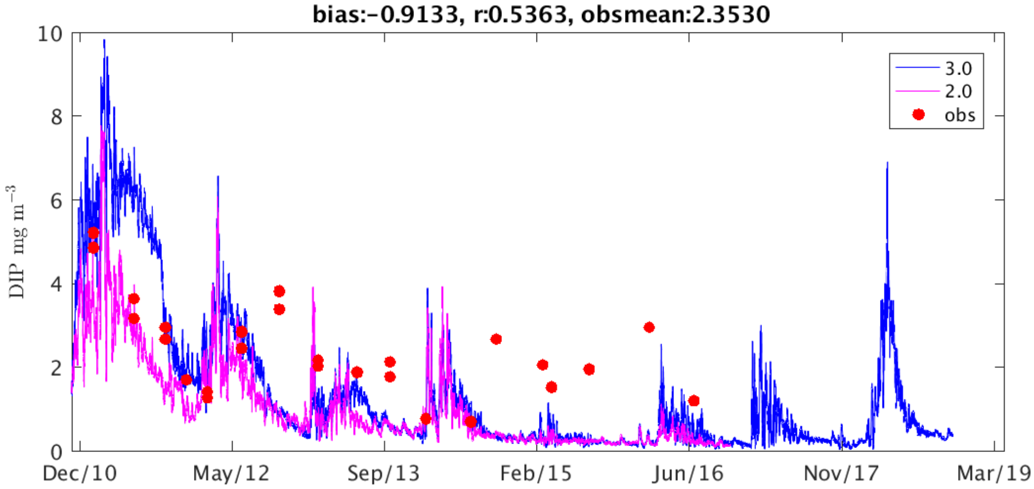

Pandora_5m 3.0 d2:0.74, mape:47.5, rms:1.6856
bias:-1.1941, r:0.7463, obsmean:3.3284
Pandora_5m 2.0 d2:0.49, mape:73.8, rms:2.6102
bias:-2.4281, r:0.8166, obsmean:3.3284
DIP mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


Pelorus686_28m 3.0 d2:0.79, mape:56.4, rms:1.4723
bias:-0.9280, r:0.7673, obsmean:2.1467
Pelorus686_28m 2.0 d2:0.69, mape:66.9, rms:1.7906
bias:-1.6133, r:0.8244, obsmean:2.5784
DIP mg m−3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

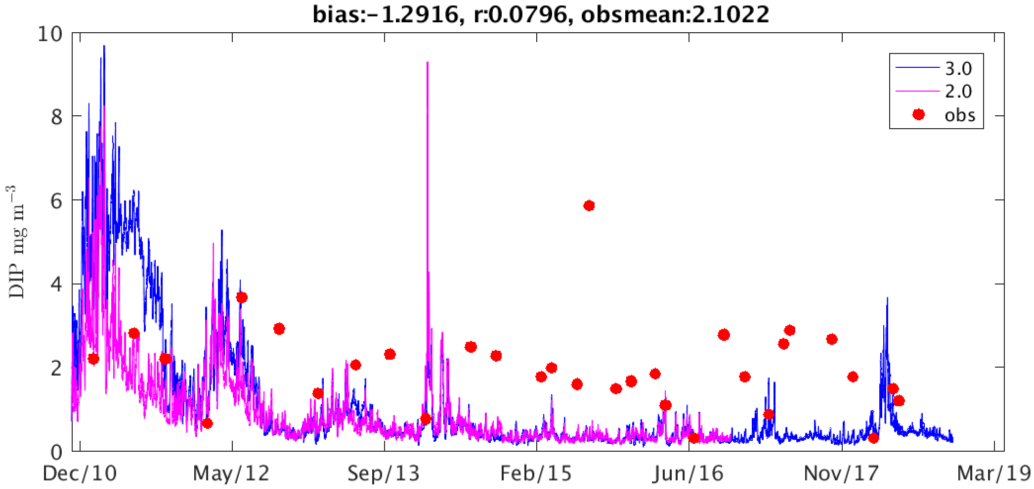

Pelorus686_14m 3.0 d2:0.75, mape:54.8, rms:1.4622
bias:-0.9590, r:0.7311, obsmean:2.5622
Pelorus686_14m 2.0 d2:0.51, mape:72.0, rms:1.9891
bias:-1.8062, r:0.8184, obsmean:2.5622
DIP mg m−3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


Pelorus686_0m 3.0 d2:0.71, mape:72.1, rms:1.4860
bias:-1.1856, r:0.7430, obsmean:1.9342
Pelorus686_0m 2.0 d2:0.50, mape:81.2, rms:1.9110
bias:-1.7108, r:0.8447, obsmean:2.1720
DIP mg m−3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

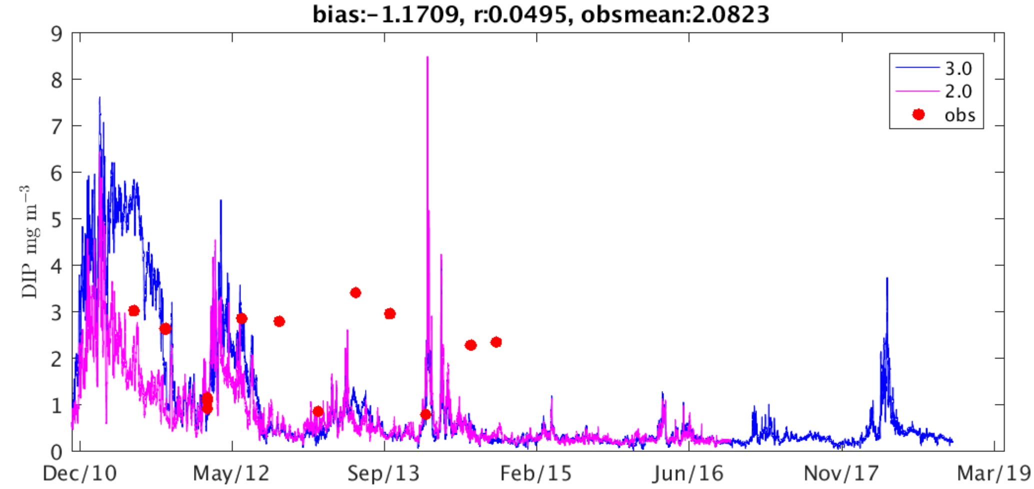
Dunk859_5m 3.0 d2:0.70, mape:57.6, rms:1.6308
bias:−0.1835, r:0.5943, obsmean:2.3530
Dunk859_5m 2.0 d2:0.65, mape:56.3, rms:1.4147
bias:−0.9133, r:0.5363, obsmean:2.3530

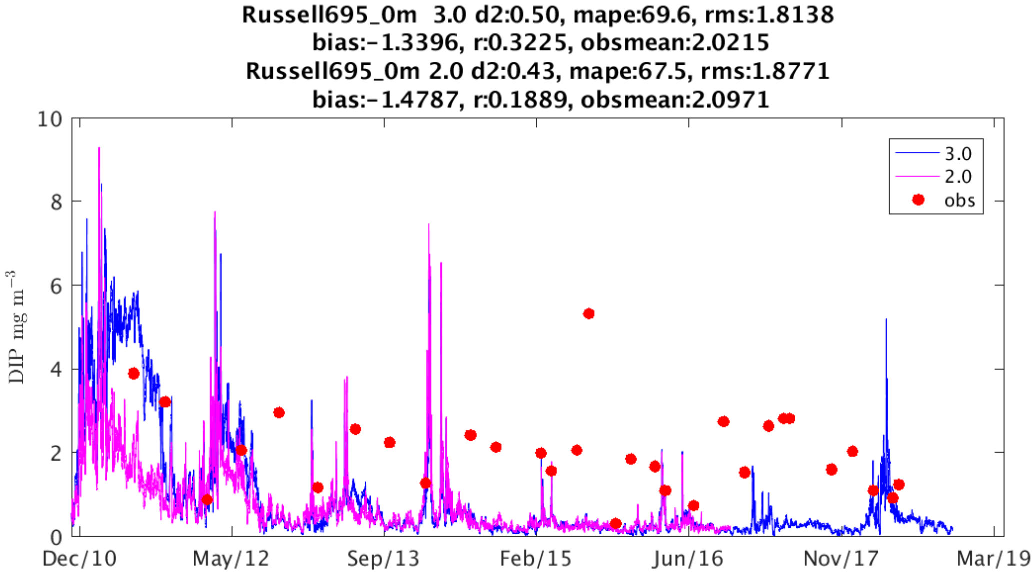


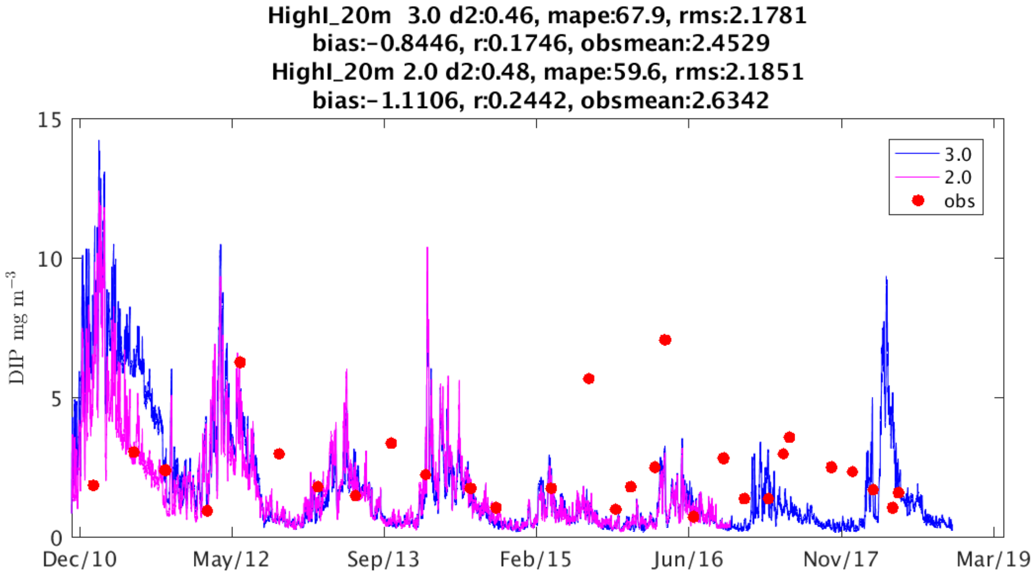
Russell695_20m 3.0 d2:0.46, mape:64.6, rms:1.8396
bias:−1.0928, r:0.1808, obsmean:1.9928
Russell695_20m 2.0 d2:0.40, mape:62.9, rms:1.8190
bias:−1.2916, r:0.0796, obsmean:2.1022

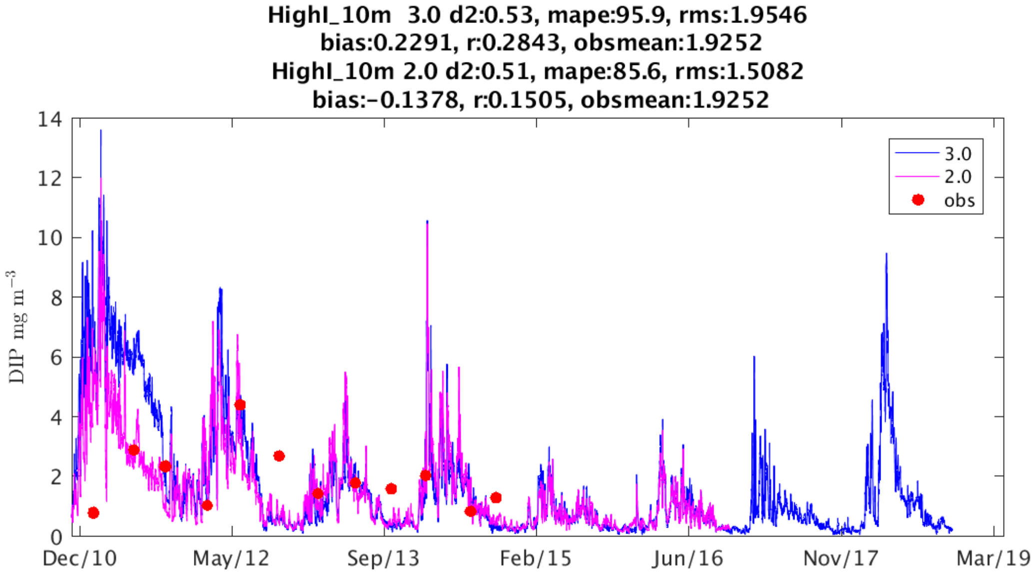


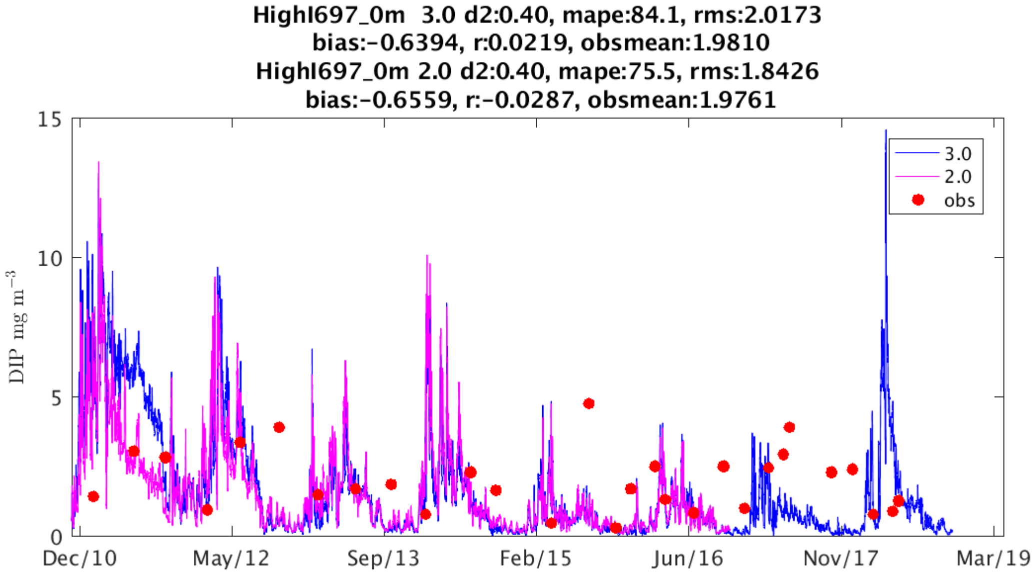
Russell695_10m 3.0 d2:0.56, mape:62.3, rms:1.6678
bias:−0.8214, r:0.3468, obsmean:2.0823
Russell695_10m 2.0 d2:0.45, mape:56.8, rms:1.5992
bias:−1.1709, r:0.0495, obsmean:2.0823

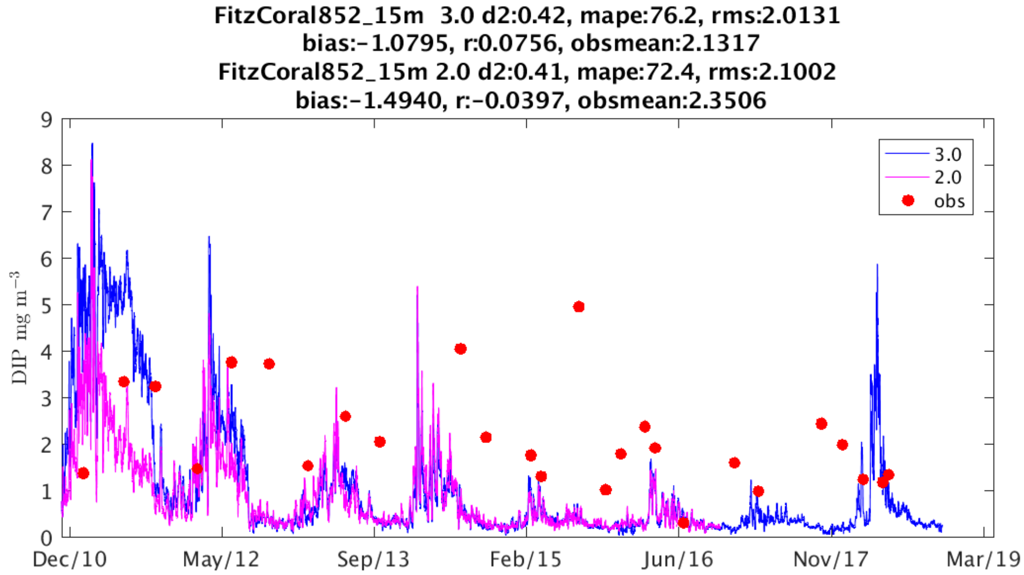


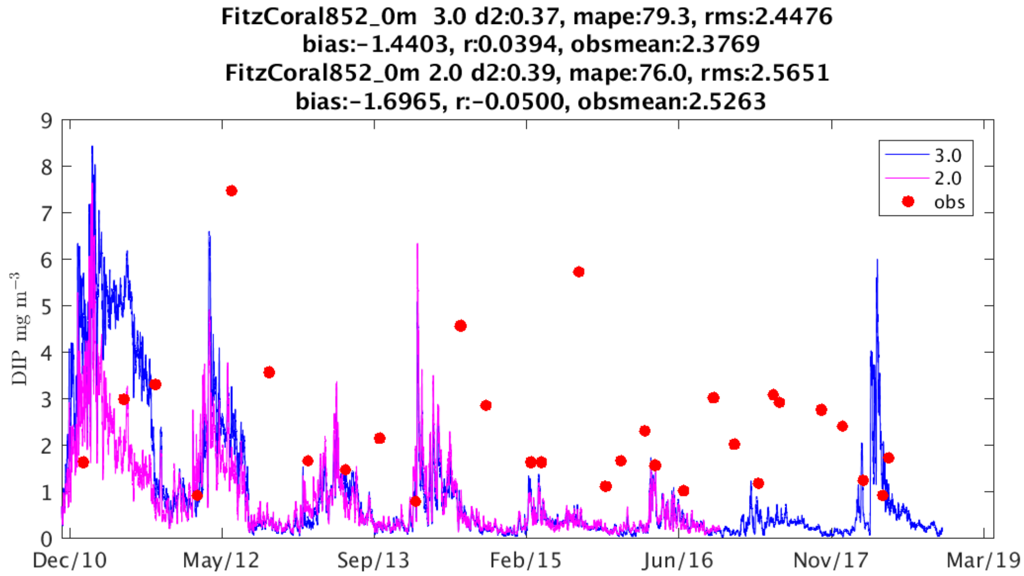

Russell695_0m 3.0 d2:0.50, mape:69.6, rms:1.8138
bias:-1.3396, r:0.3225, obsmean:2.0215
Russell695_0m 2.0 d2:0.43, mape:67.5, rms:1.8771
bias:-1.4787, r:0.1889, obsmean:2.0971
DIP mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


HighI_20m 3.0 d2:0.46, mape:67.9, rms:2.1781
bias:-0.8446, r:0.1746, obsmean:2.4529
HighI_20m 2.0 d2:0.48, mape:59.6, rms:2.1851
bias:-1.1106, r:0.2442, obsmean:2.6342
DIP mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

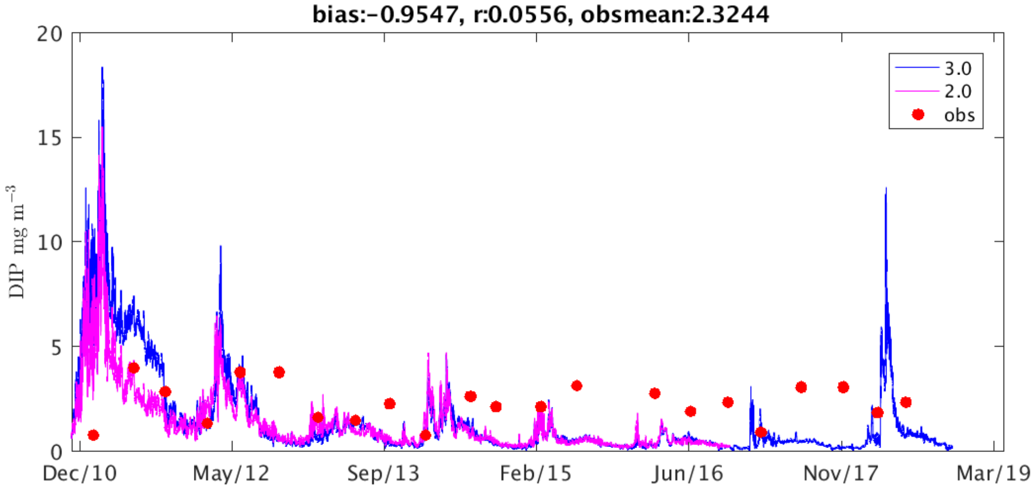

HighI_10m 3.0 d2:0.53, mape:95.9, rms:1.9546
bias:0.2291, r:0.2843, obsmean:1.9252
HighI_10m 2.0 d2:0.51, mape:85.6, rms:1.5082
bias:-0.1378, r:0.1505, obsmean:1.9252
DIP mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


HighI697_0m 3.0 d2:0.40, mape:84.1, rms:2.0173
bias:-0.6394, r:0.0219, obsmean:1.9810
HighI697_0m 2.0 d2:0.40, mape:75.5, rms:1.8426
bias:-0.6559, r:-0.0287, obsmean:1.9761
DIP mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

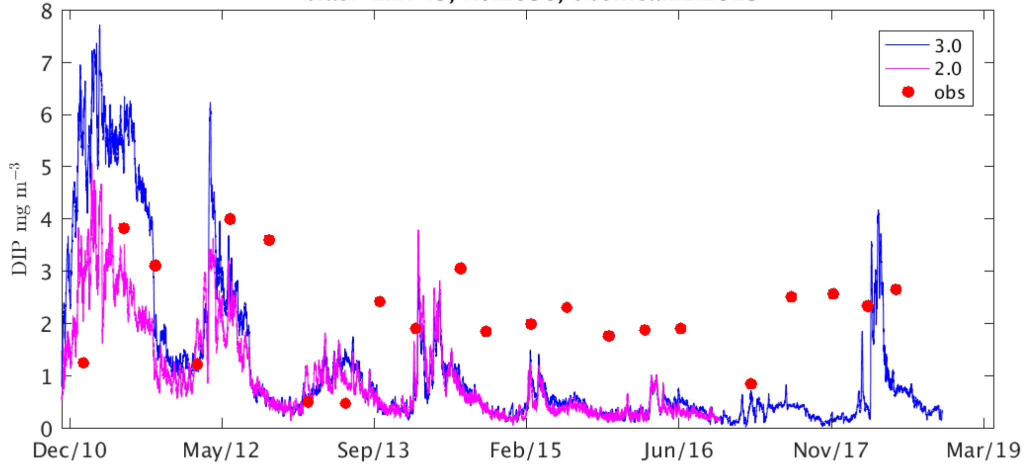

FitzCoral852_15m 3.0 d2:0.42, mape:76.2, rms:2.0131
bias:-1.0795, r:0.0756, obsmean:2.1317
FitzCoral852_15m 2.0 d2:0.41, mape:72.4, rms:2.1002
bias:-1.4940, r:-0.0397, obsmean:2.3506
DIP mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


FitzCoral852_0m 3.0 d2:0.37, mape:79.3, rms:2.4476
bias:-1.4403, r:0.0394, obsmean:2.3769
FitzCoral852_0m 2.0 d2:0.39, mape:76.0, rms:2.5651
bias:-1.6965, r:-0.0500, obsmean:2.5263
DIP mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

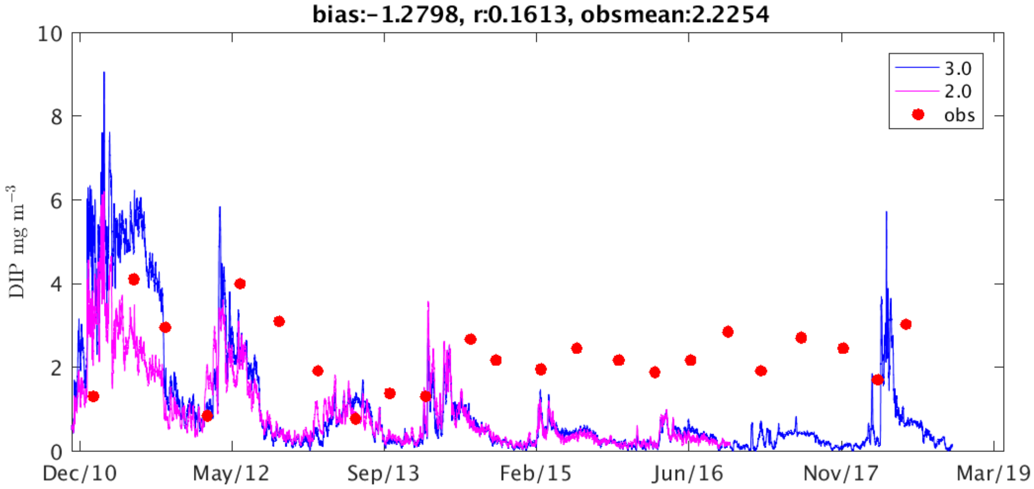
FairleadBuoy518_0m 3.0 d2:0.43, mape:88.5, rms:2.1537
bias:-0.8519, r:0.1135, obsmean:2.3035
FairleadBuoy518_0m 2.0 d2:0.42, mape:82.8, rms:1.7984
bias:-0.9547, r:0.0556, obsmean:2.3244

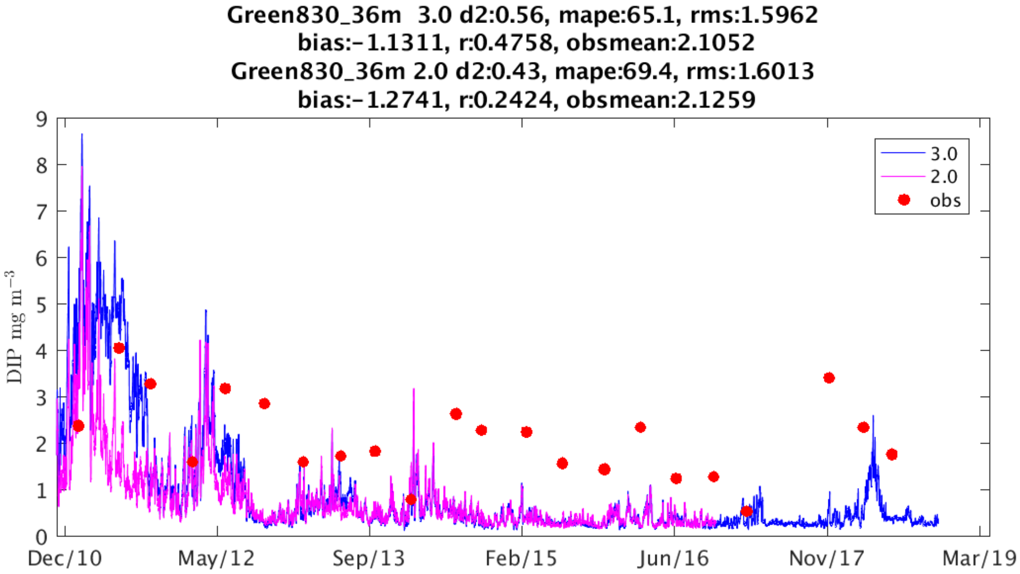


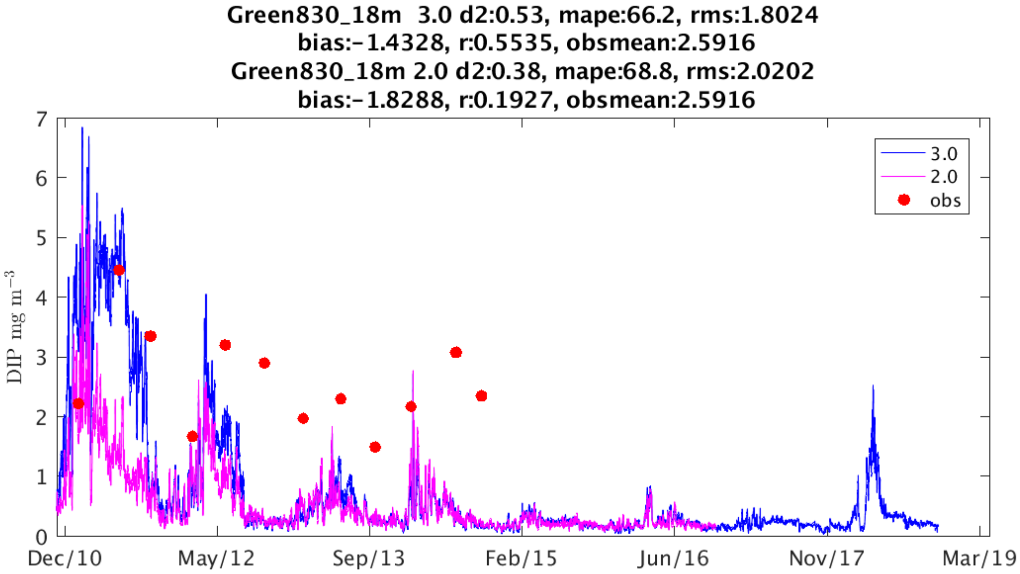
Yorkeys519_8m 3.0 d2:0.44, mape:82.3, rms:1.9025
bias:-0.9954, r:0.1730, obsmean:2.1810
Yorkeys519_8m 2.0 d2:0.43, mape:75.1, rms:1.6567
bias:-1.1749, r:0.2096, obsmean:2.1815

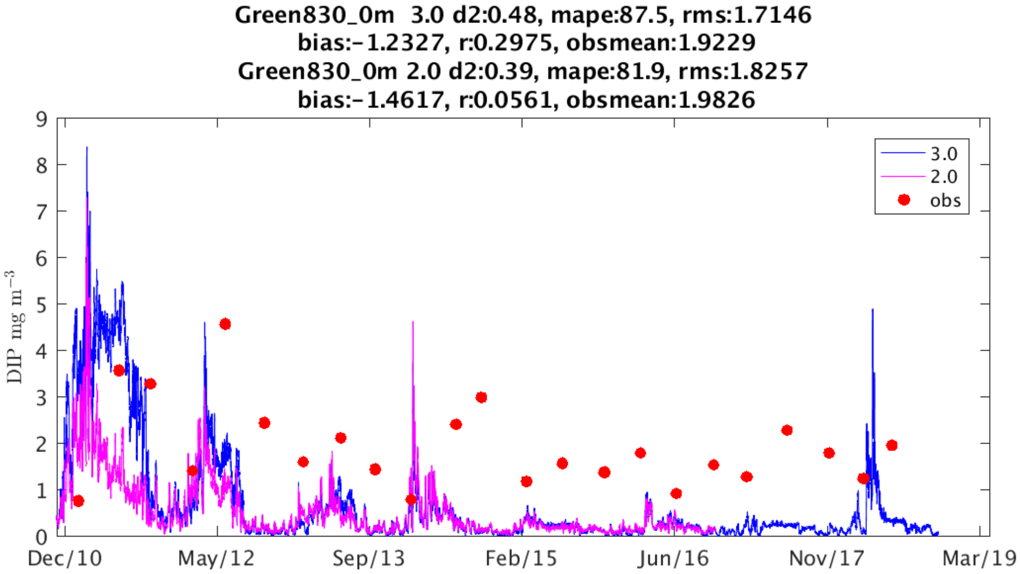


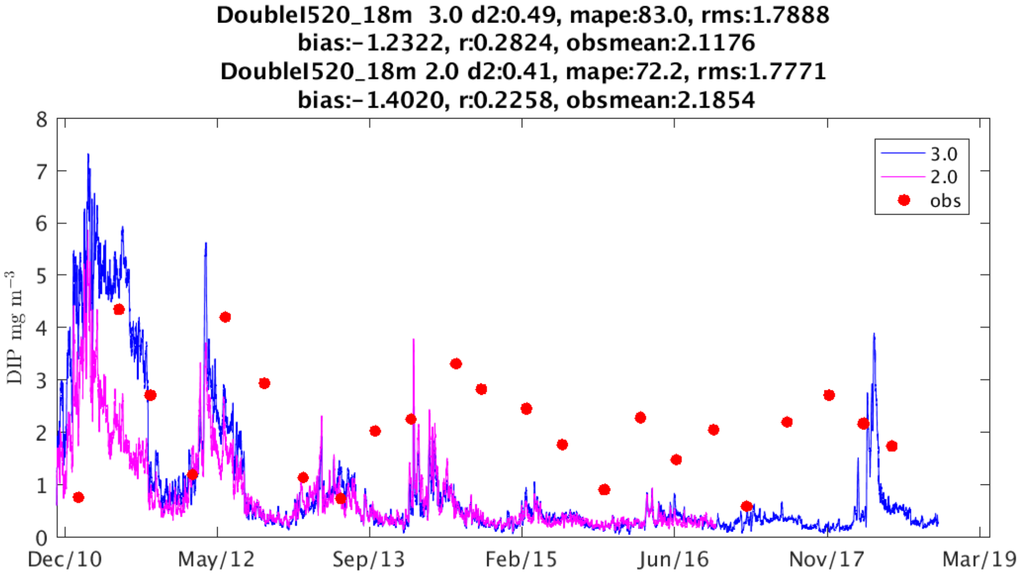
Yorkeys519_0m 3.0 d2:0.44, mape:79.9, rms:1.8592
bias:-1.2355, r:0.2365, obsmean:2.2547
Yorkeys519_0m 2.0 d2:0.37, mape:73.2, rms:1.7175
bias:-1.2798, r:0.1613, obsmean:2.2254

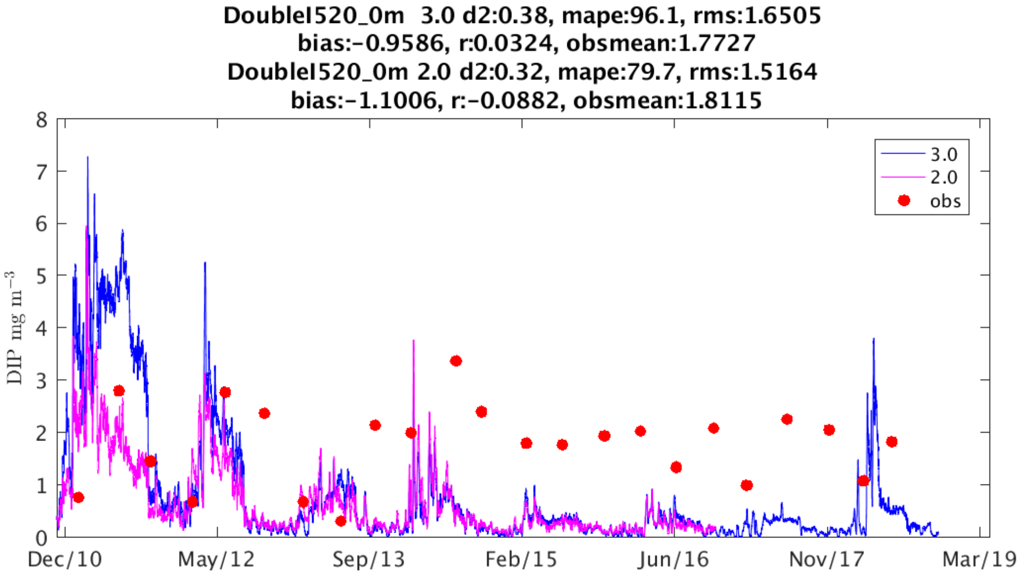


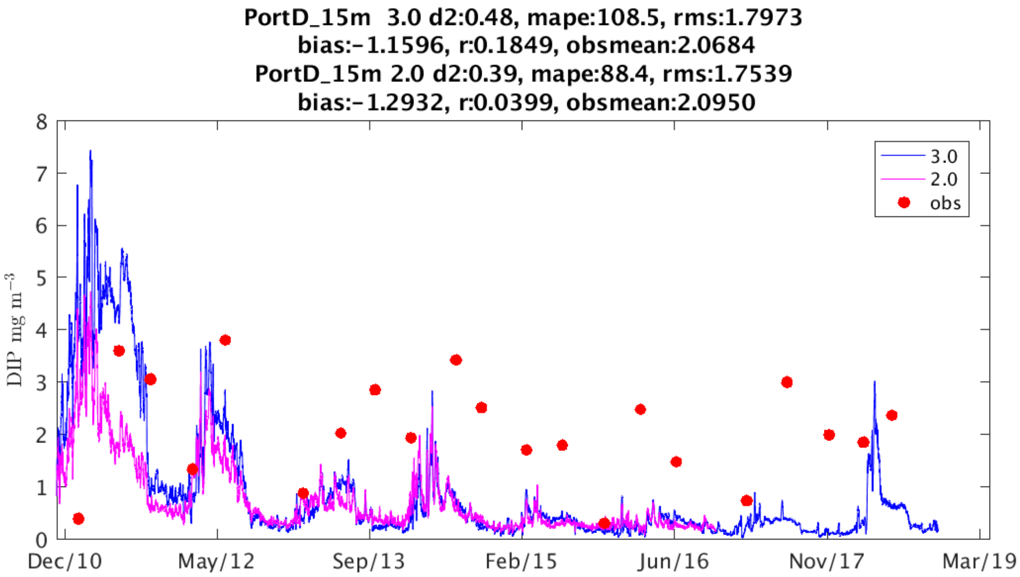

Green830_36m 3.0 d2:0.56, mape:65.1, rms:1.5962
bias:-1.1311, r:0.4758, obsmean:2.1052
Green830_36m 2.0 d2:0.43, mape:69.4, rms:1.6013
bias:-1.2741, r:0.2424, obsmean:2.1259
DIP mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

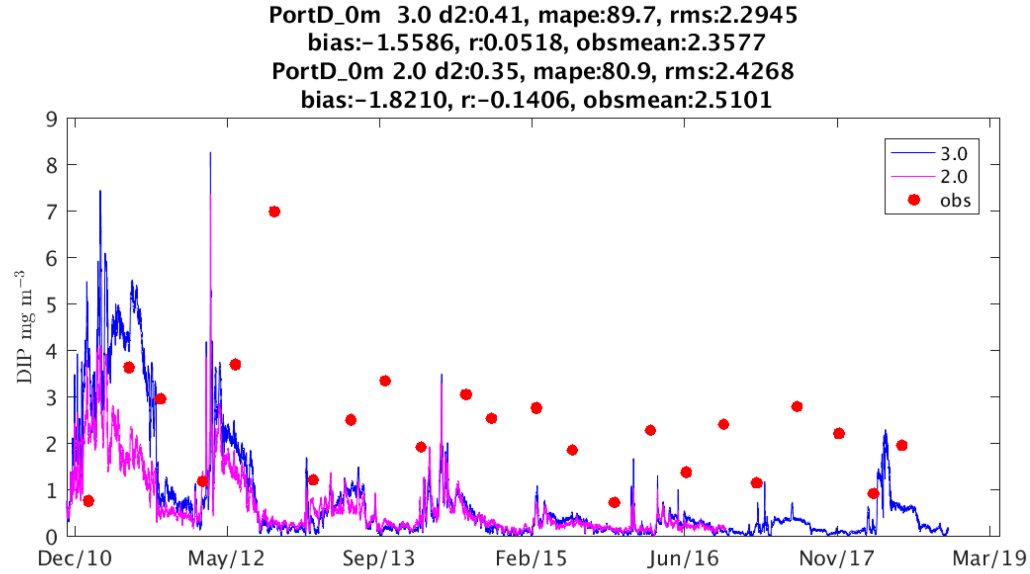

Green830_18m 3.0 d2:0.53, mape:66.2, rms:1.8024
bias:-1.4328, r:0.5535, obsmean:2.5916
Green830_18m 2.0 d2:0.38, mape:68.8, rms:2.0202
bias:-1.8288, r:0.1927, obsmean:2.5916
DIP mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

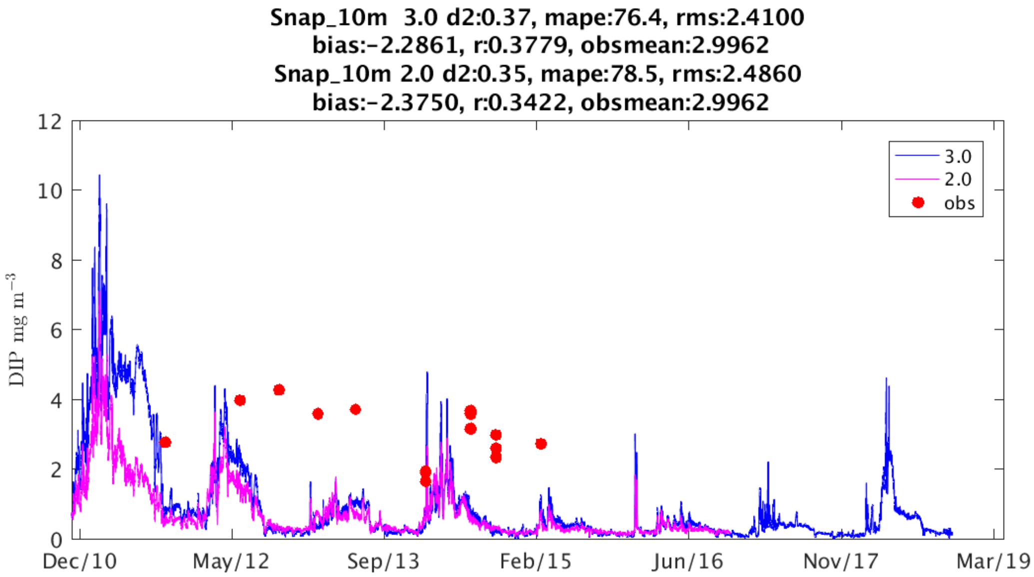

Green830_0m 3.0 d2:0.48, mape:87.5, rms:1.7146
bias:-1.2327, r:0.2975, obsmean:1.9229
Green830_0m 2.0 d2:0.39, mape:81.9, rms:1.8257
bias:-1.4617, r:0.0561, obsmean:1.9826
DIP mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


DoubleI520_18m 3.0 d2:0.49, mape:83.0, rms:1.7888
bias:-1.2322, r:0.2824, obsmean:2.1176
DoubleI520_18m 2.0 d2:0.41, mape:72.2, rms:1.7771
bias:-1.4020, r:0.2258, obsmean:2.1854
DIP mg m−3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


DoubleI520_0m 3.0 d2:0.38, mape:96.1, rms:1.6505
bias:-0.9586, r:0.0324, obsmean:1.7727
DoubleI520_0m 2.0 d2:0.32, mape:79.7, rms:1.5164
bias:-1.1006, r:-0.0882, obsmean:1.8115
DIP mg m−3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


PortD_15m 3.0 d2:0.48, mape:108.5, rms:1.7973
bias:-1.1596, r:0.1849, obsmean:2.0684
PortD_15m 2.0 d2:0.39, mape:88.4, rms:1.7539
bias:-1.2932, r:0.0399, obsmean:2.0950
DIP mg m−3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


PortD_0m 3.0 d2:0.41, mape:89.7, rms:2.2945
bias:-1.5586, r:0.0518, obsmean:2.3577
PortD_0m 2.0 d2:0.35, mape:80.9, rms:2.4268
bias:-1.8210, r:-0.1406, obsmean:2.5101
3.0
2.0
obs
DIP mg m−3
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


Snap_10m 3.0 d2:0.37, mape:76.4, rms:2.4100
bias:-2.2861, r:0.3779, obsmean:2.9962
Snap_10m 2.0 d2:0.35, mape:78.5, rms:2.4860
bias:-2.3750, r:0.3422, obsmean:2.9962
3.0
2.0
obs
DIP mg m−3
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

13. Simulated NOx assessment against AIMS Long Term Monitoring

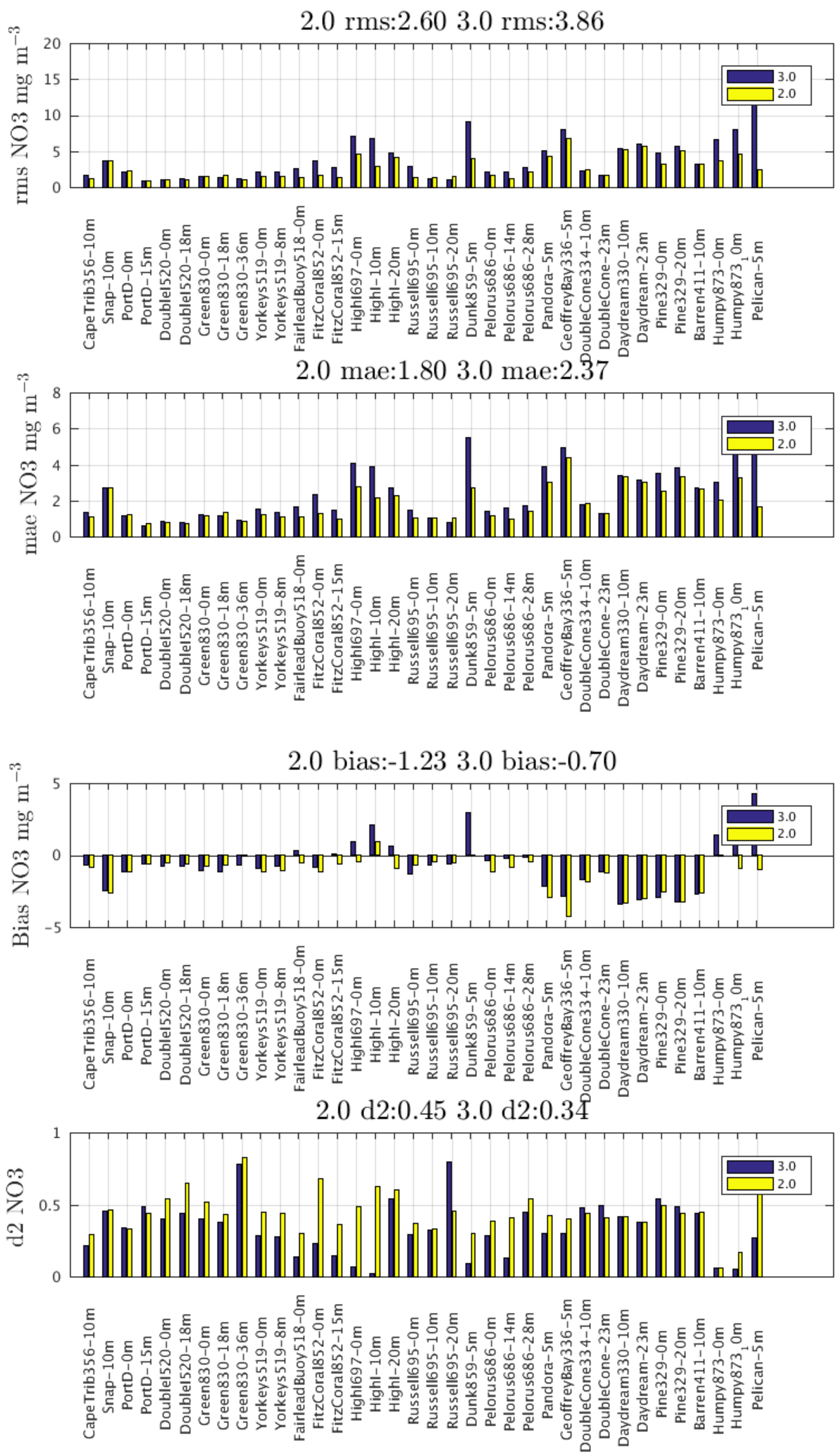
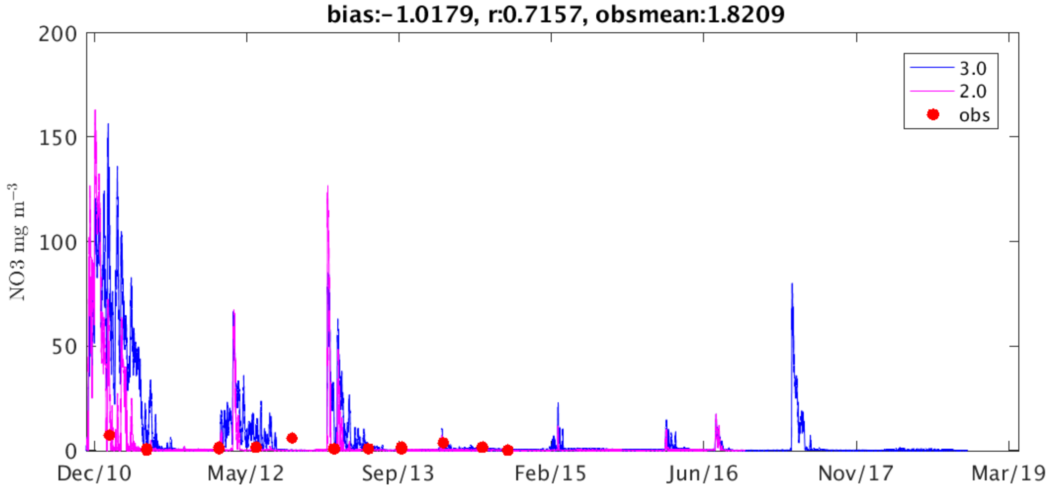
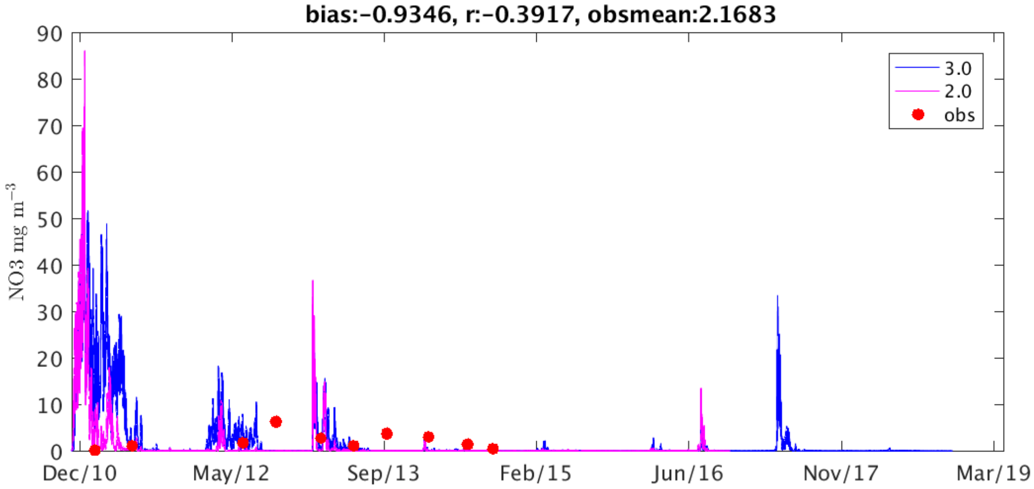


Figure 8 Metrics for Long Term Monitoring sites NO3 assessment against observations for model version 3p0 and 2p0 d2 = Willmott index see Statistical metric page 27.mae:mean absolute error, rms root mean square

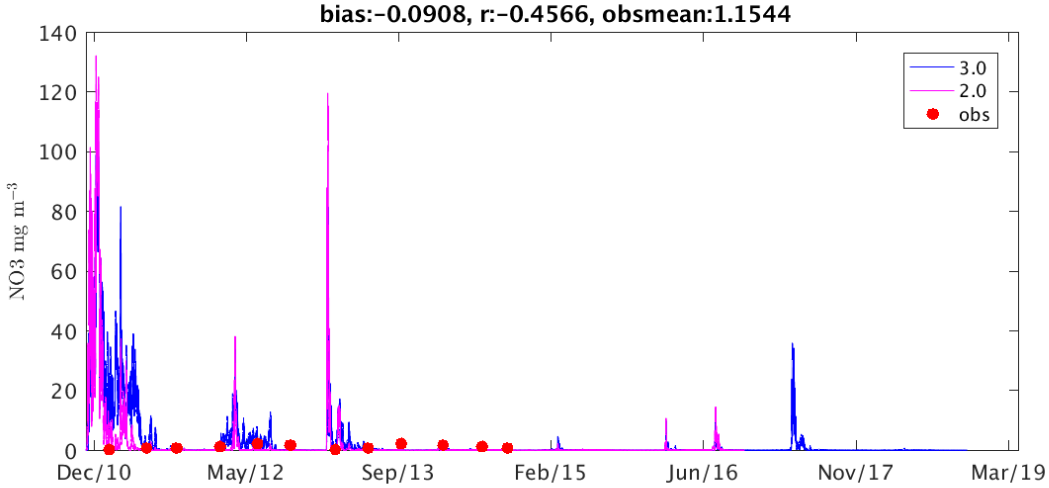
Pelican_5m 3.0 d2:0.27, mape:463.2, rms:15.8783
bias:4.2269, r:0.6679, obsmean:1.8209
Pelican_5m 2.0 d2:0.78, mape:91.0, rms:2.3327
bias:-1.0179, r:0.7157, obsmean:1.8209



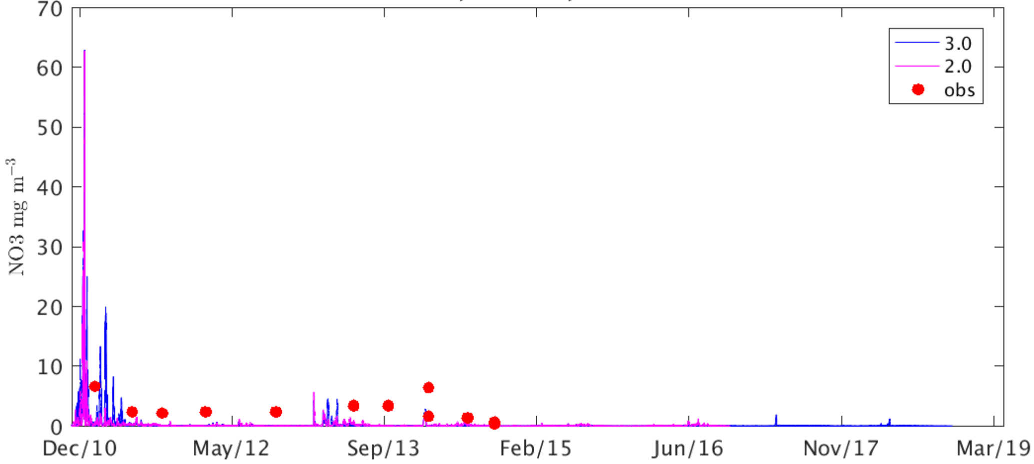
Humpy873_10m 3.0 d2:0.05, mape:1749.5, rms:7.9106
bias:0.9358, r:-0.4230, obsmean:2.1683
Humpy873_10m 2.0 d2:0.17, mape:906.1, rms:4.5475
bias:-0.9346, r:-0.3917, obsmean:2.1683



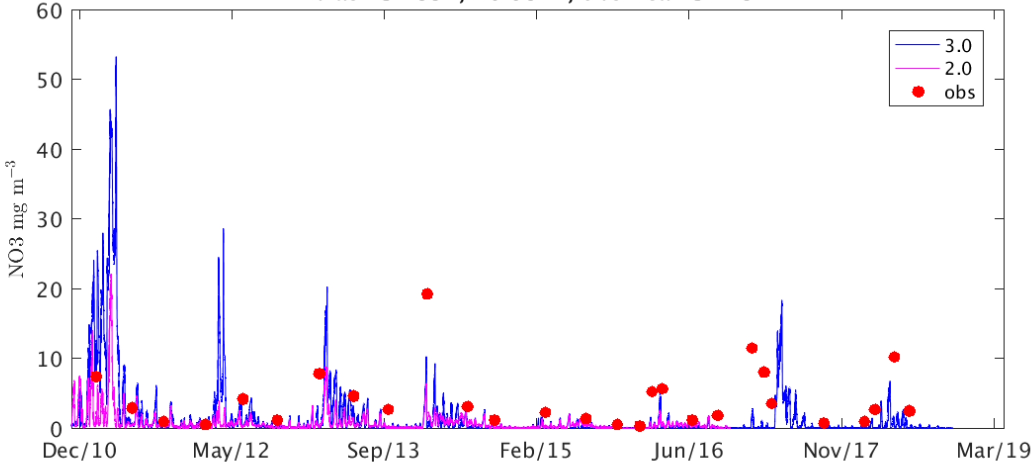
Humpy873_0m 3.0 d2:0.06, mape:1394.5, rms:6.5672
bias:1.3937, r:-0.2983, obsmean:1.1544
Humpy873_0m 2.0 d2:0.06, mape:768.7, rms:3.5890
bias:-0.0908, r:-0.4566, obsmean:1.1544



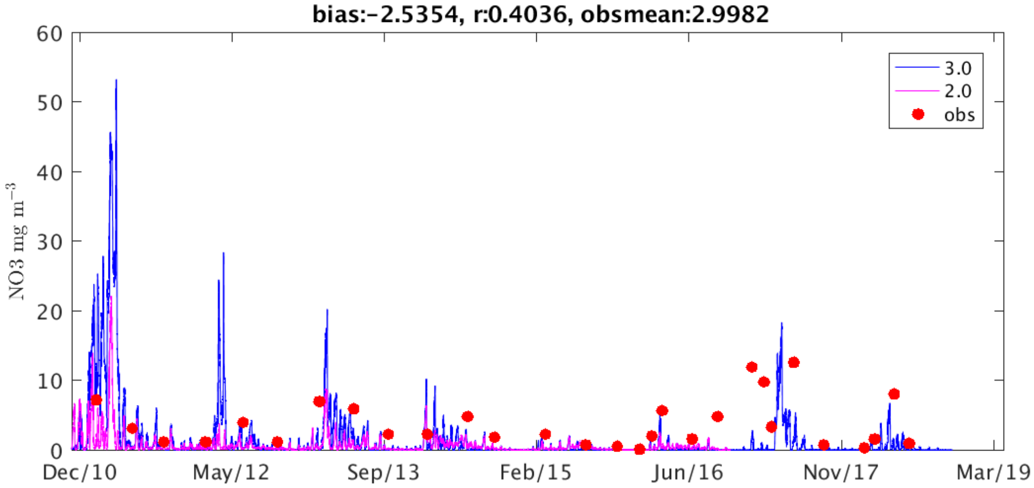
Barren411_10m 3.0 d2:0.44, mape:96.7, rms:3.2380
bias:-2.6796, r:0.5995, obsmean:2.7836
Barren411_10m 2.0 d2:0.45, mape:94.2, rms:3.1538
bias:-2.6084, r:0.5675, obsmean:2.7836



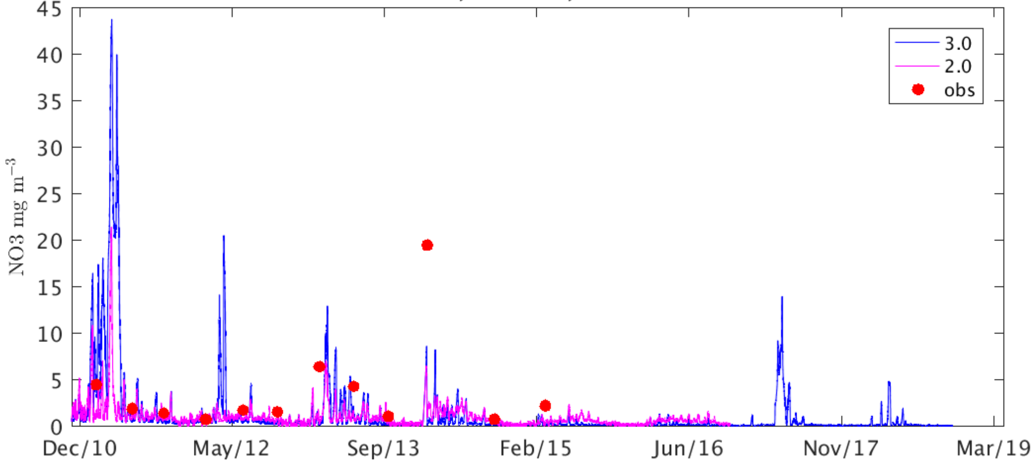
Pine329_20m 3.0 d2:0.49, mape:87.2, rms:5.6015
bias:-3.2316, r:0.2042, obsmean:4.1014
Pine329_20m 2.0 d2:0.44, mape:85.1, rms:5.0701
bias:-3.2891, r:0.6814, obsmean:3.7297



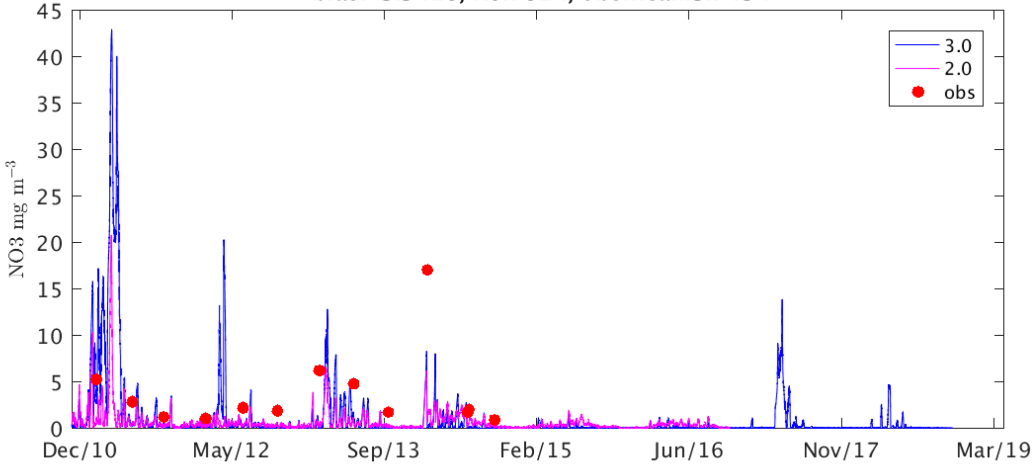
Pine329_0m 3.0 d2:0.54, mape:91.2, rms:4.7214
bias:-2.9330, r:0.3001, obsmean:3.7608
Pine329_0m 2.0 d2:0.49, mape:78.8, rms:3.2404
bias:-2.5354, r:0.4036, obsmean:2.9982



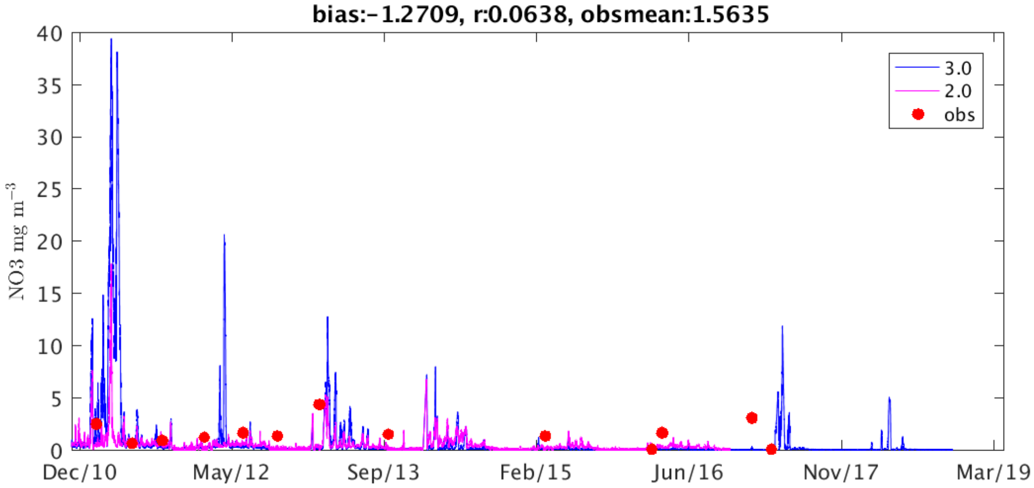
Daydream_23m 3.0 d2:0.38, mape:70.0, rms:5.9701
bias:-3.1180, r:-0.0331, obsmean:3.7987
Daydream_23m 2.0 d2:0.38, mape:56.5, rms:5.7215
bias:-3.0172, r:0.5135, obsmean:3.7987

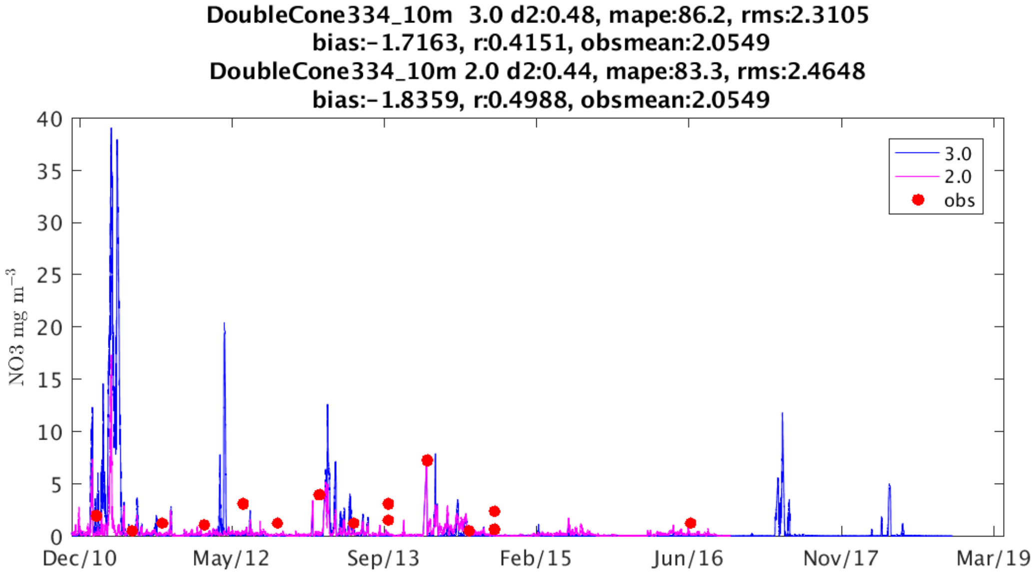


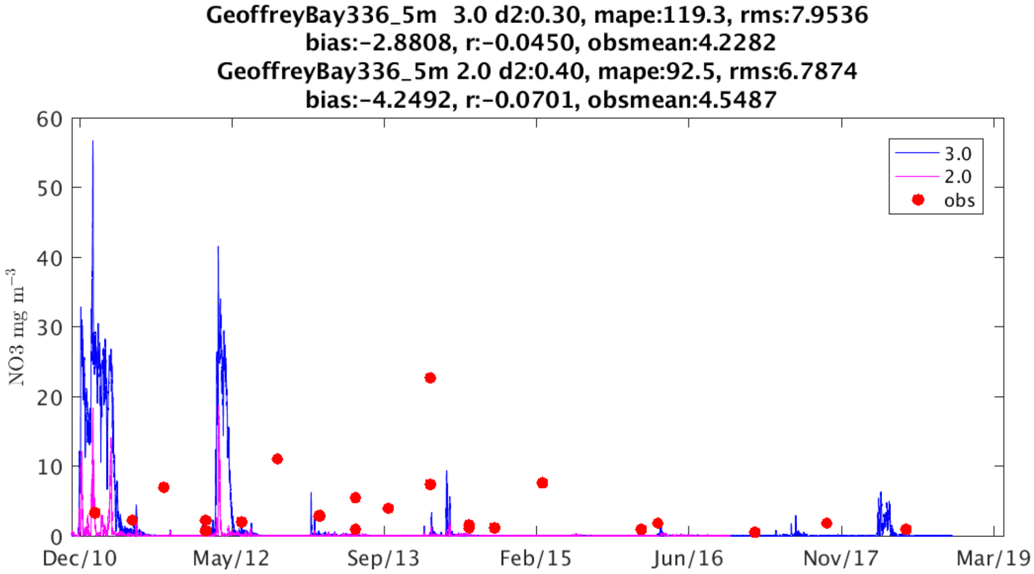
Daydream330_10m 3.0 d2:0.41, mape:88.8, rms:5.3704
bias:-3.3853, r:0.0920, obsmean:3.7434
Daydream330_10m 2.0 d2:0.41, mape:83.4, rms:5.2331
bias:-3.3416, r:0.7824, obsmean:3.7434

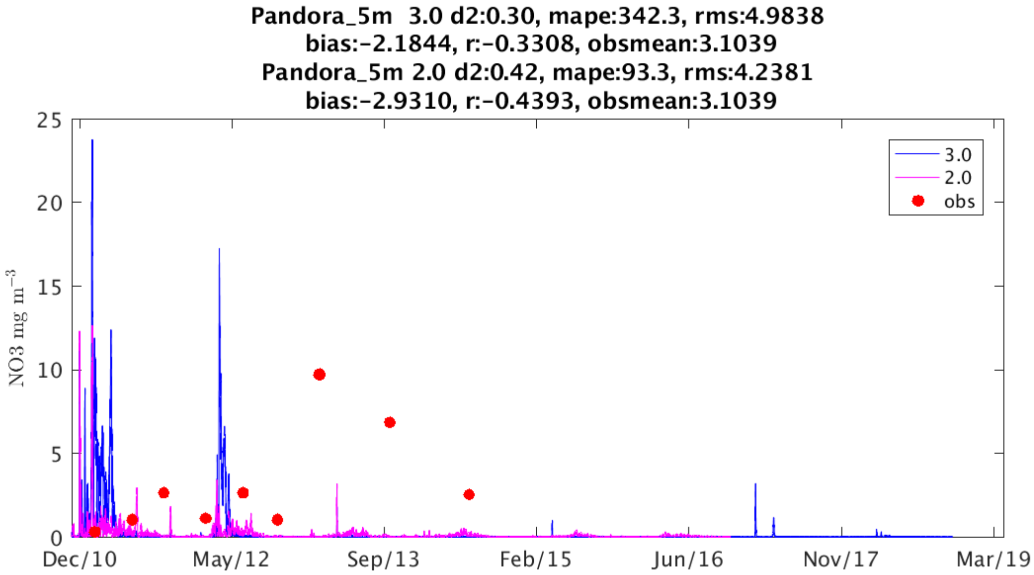


DoubleCone_23m 3.0 d2:0.49, mape:78.3, rms:1.6977
bias:-1.1957, r:0.2328, obsmean:1.5676
DoubleCone_23m 2.0 d2:0.41, mape:76.9, rms:1.6603
bias:-1.2709, r:0.0638, obsmean:1.5635

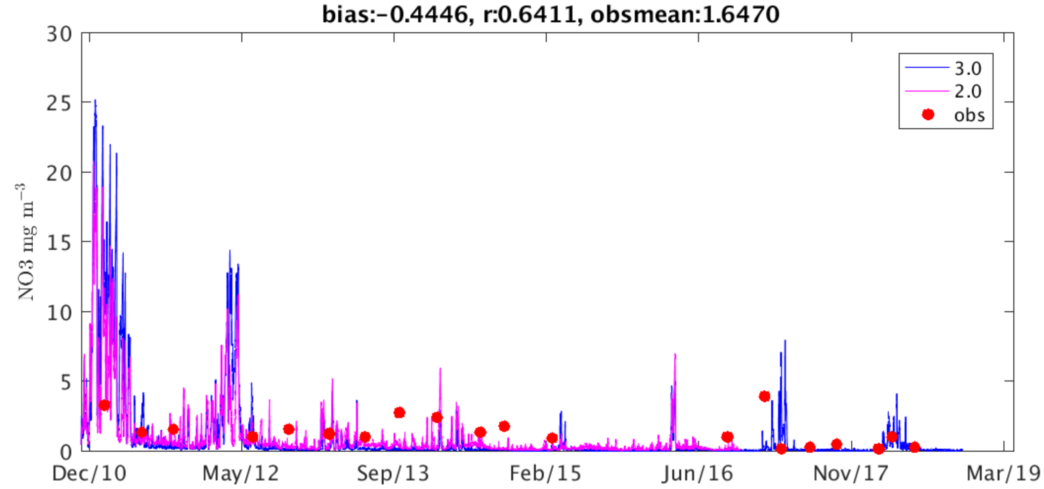



DoubleCone334_10m 3.0 d2:0.48, mape:86.2, rms:2.3105
bias:-1.7163, r:0.4151, obsmean:2.0549
DoubleCone334_10m 2.0 d2:0.44, mape:83.3, rms:2.4648
bias:-1.8359, r:0.4988, obsmean:2.0549
NO3 mg m-3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

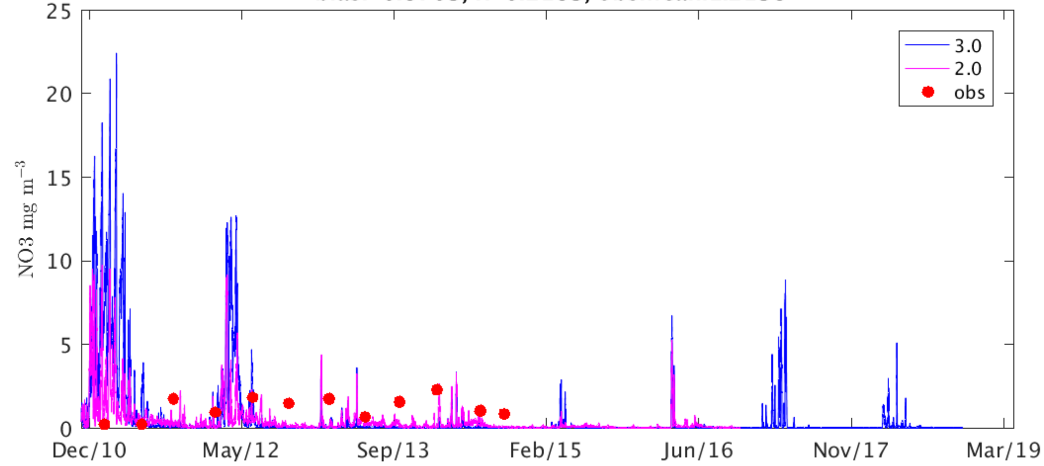

GeoffreyBay336_5m 3.0 d2:0.30, mape:119.3, rms:7.9536
bias:-2.8808, r:-0.0450, obsmean:4.2282
GeoffreyBay336_5m 2.0 d2:0.40, mape:92.5, rms:6.7874
bias:-4.2492, r:-0.0701, obsmean:4.5487
NO3 mg m-3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


Pandora_5m 3.0 d2:0.30, mape:342.3, rms:4.9838
bias:-2.1844, r:-0.3308, obsmean:3.1039
Pandora_5m 2.0 d2:0.42, mape:93.3, rms:4.2381
bias:-2.9310, r:-0.4393, obsmean:3.1039
NO3 mg m-3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

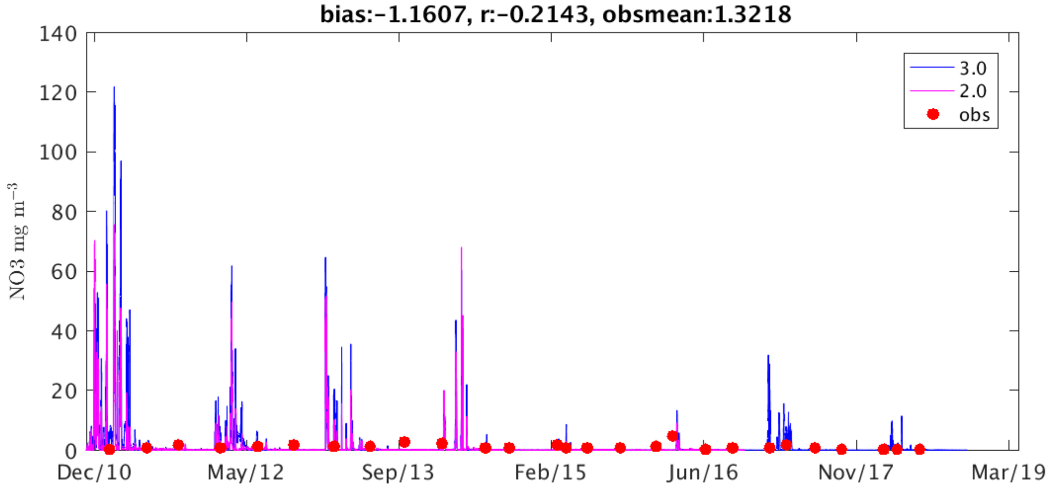
Pelorus686_28m 3.0 d2:0.45, mape:199.3, rms:2.7353
bias:-0.1555, r:0.3491, obsmean:1.3843
Pelorus686_28m 2.0 d2:0.54, mape:72.8, rms:2.1121
bias:-0.4446, r:0.6411, obsmean:1.6470

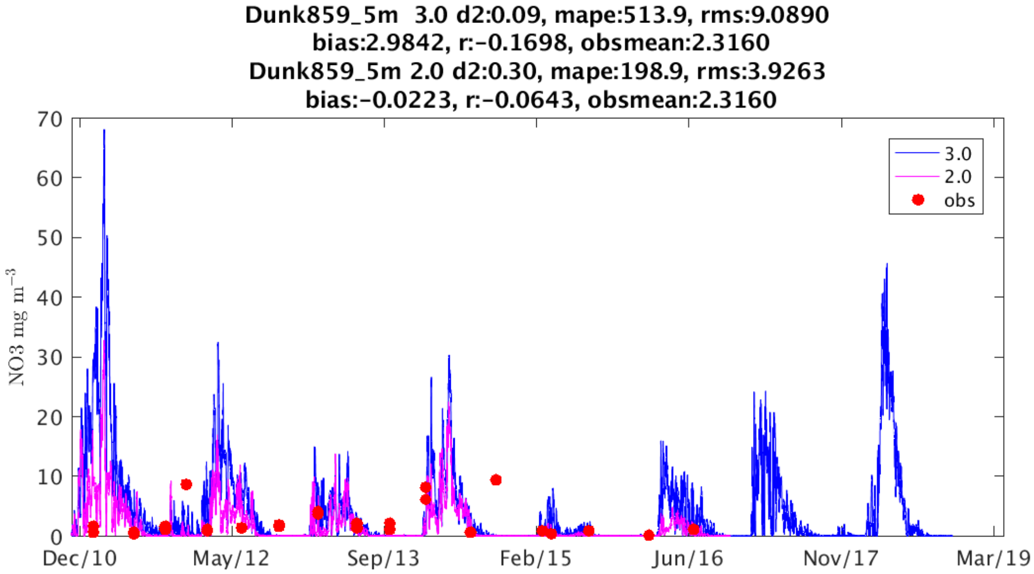


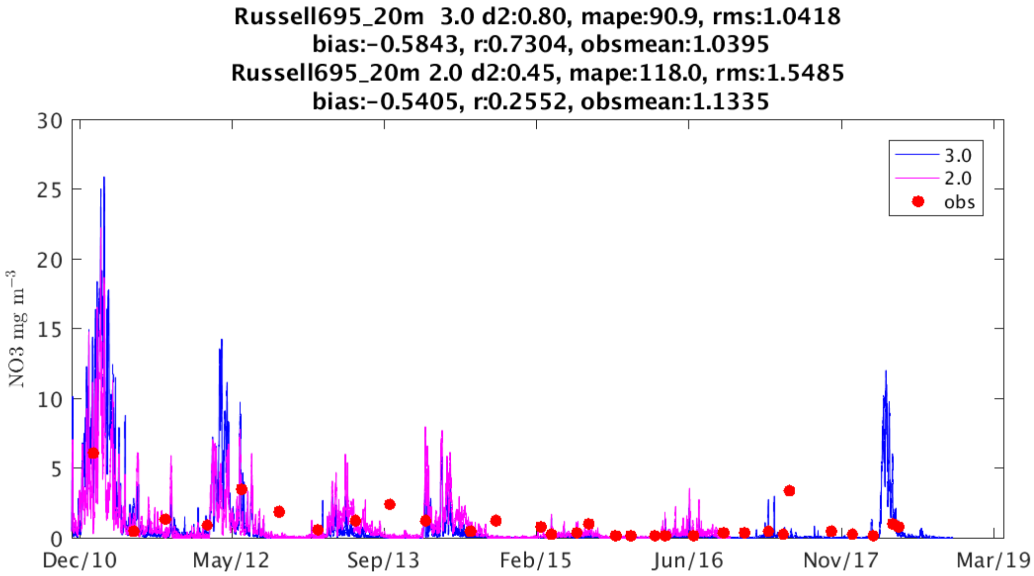
Pelorus686_14m 3.0 d2:0.12, mape:384.5, rms:2.1355
bias:-0.2636, r:-0.5484, obsmean:1.2138
Pelorus686_14m 2.0 d2:0.41, mape:84.2, rms:1.1510
bias:-0.8703, r:-0.2183, obsmean:1.2138

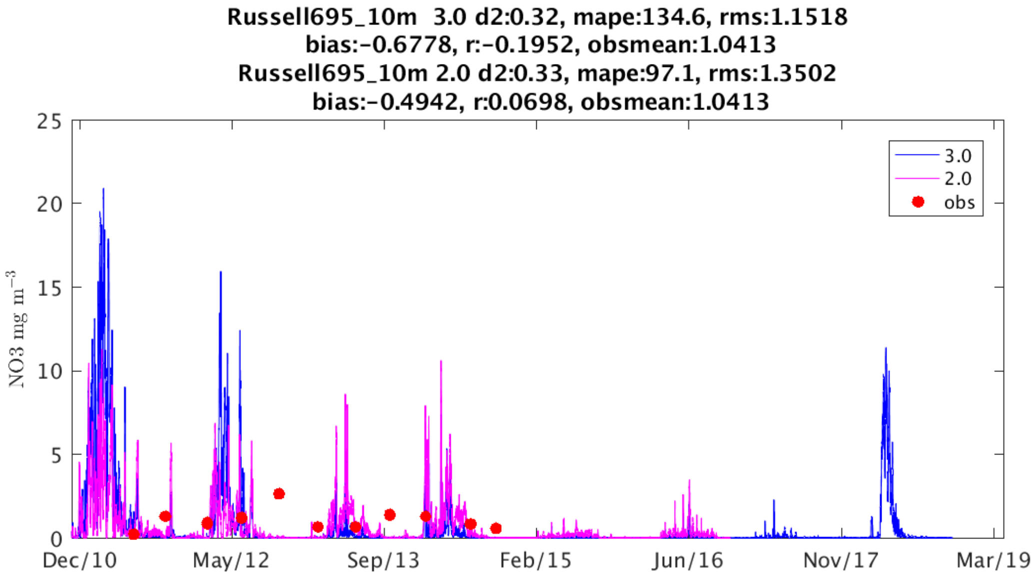


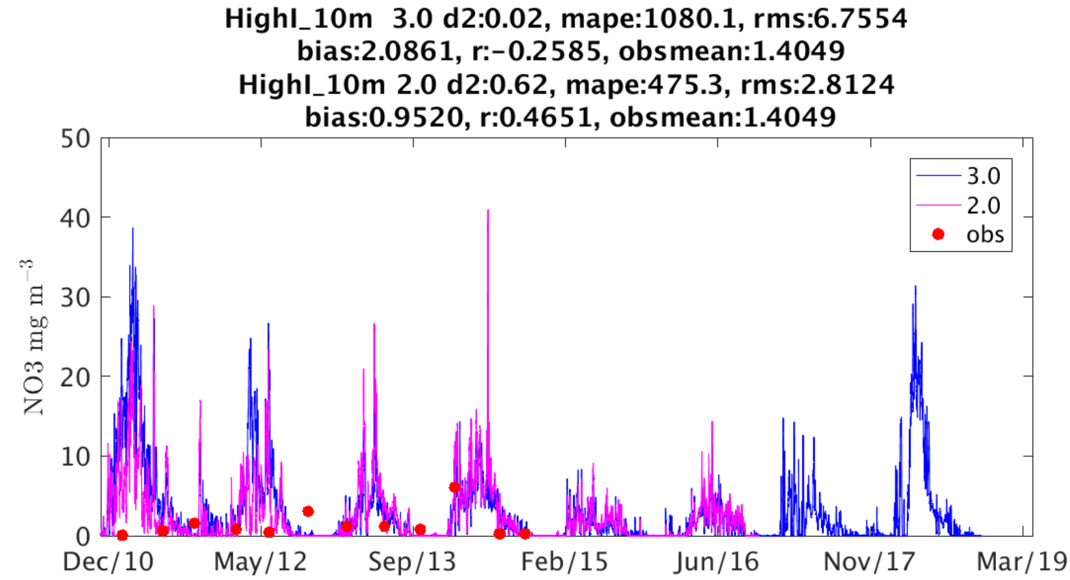
Pelorus686_0m 3.0 d2:0.28, mape:136.0, rms:2.0423
bias:-0.3503, r:-0.0325, obsmean:1.1362
Pelorus686_0m 2.0 d2:0.38, mape:80.0, rms:1.5936
bias:-1.1607, r:-0.2143, obsmean:1.3218

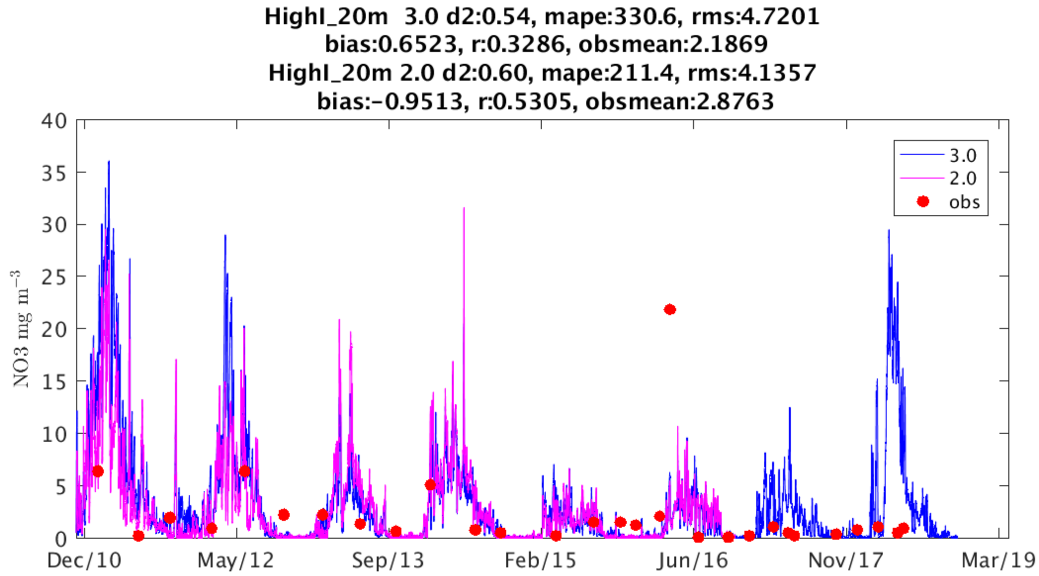


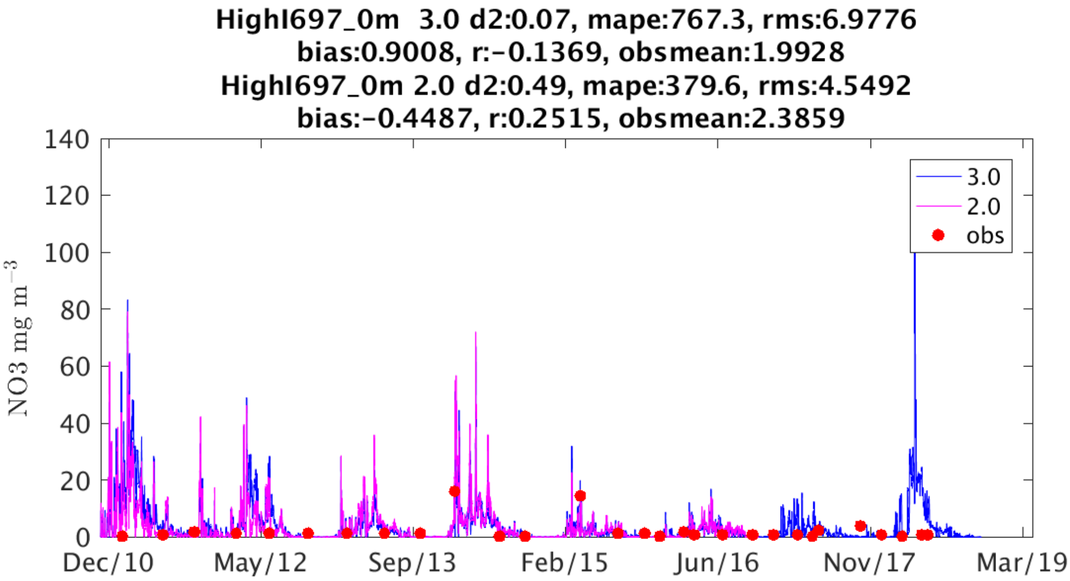

Dunk859_5m 3.0 d2:0.09, mape:513.9, rms:9.0890
bias:2.9842, r:-0.1698, obsmean:2.3160
Dunk859_5m 2.0 d2:0.30, mape:198.9, rms:3.9263
bias:-0.0223, r:-0.0643, obsmean:2.3160
NO3 mg m^-3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

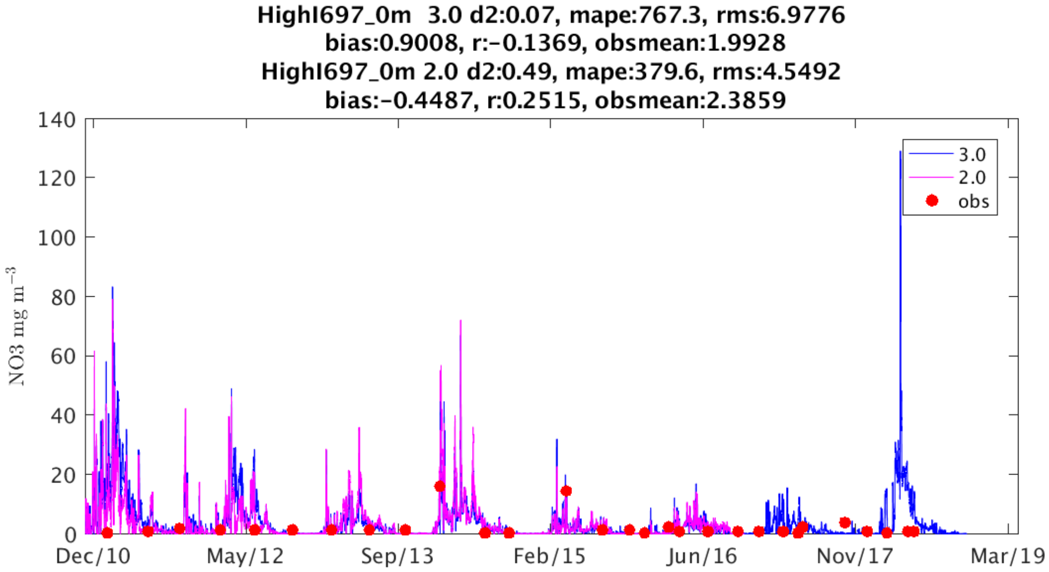

Russell695_20m 3.0 d2:0.80, mape:90.9, rms:1.0418
bias:-0.5843, r:0.7304, obsmean:1.0395
Russell695_20m 2.0 d2:0.45, mape:118.0, rms:1.5485
bias:-0.5405, r:0.2552, obsmean:1.1335
NO3 mg m^-3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

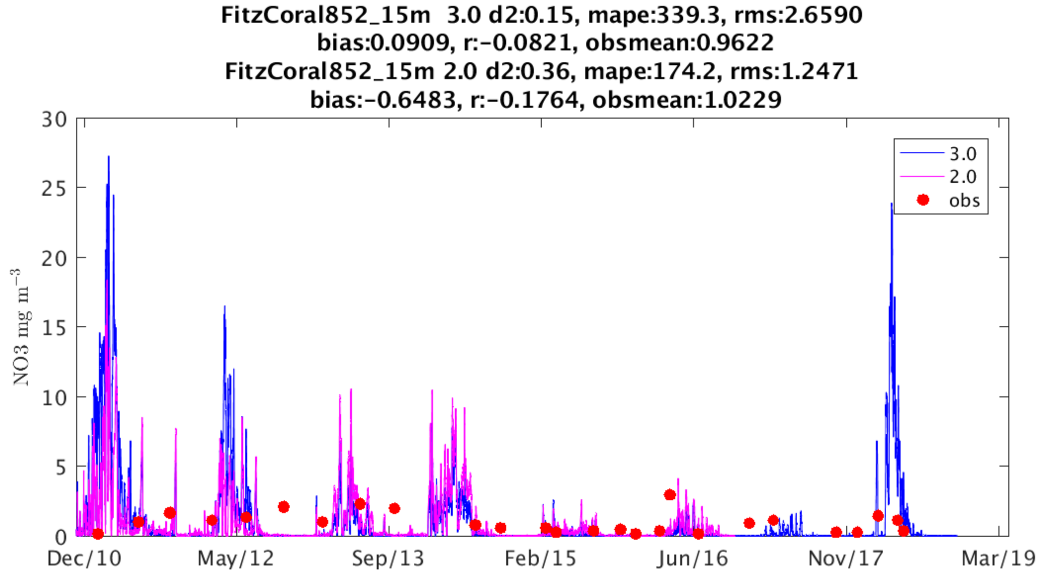

Russell695_10m 3.0 d2:0.32, mape:134.6, rms:1.1518
bias:-0.6778, r:-0.1952, obsmean:1.0413
Russell695_10m 2.0 d2:0.33, mape:97.1, rms:1.3502
bias:-0.4942, r:0.0698, obsmean:1.0413
NO3 mg m^-3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

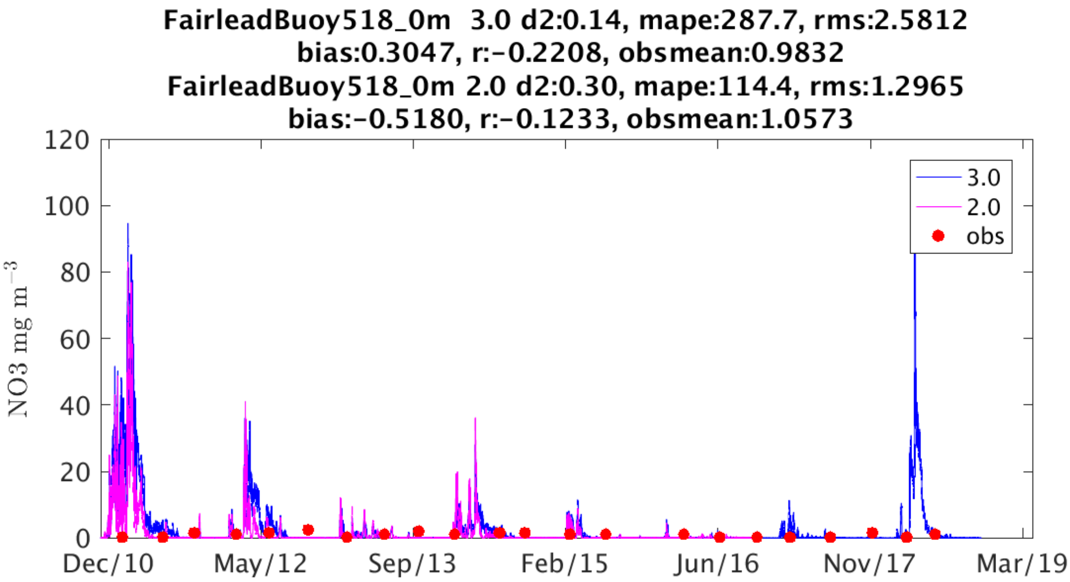

HighI_10m 3.0 d2:0.02, mape:1080.1, rms:6.7554
bias:2.0861, r:-0.2585, obsmean:1.4049
HighI_10m 2.0 d2:0.62, mape:475.3, rms:2.8124
bias:0.9520, r:0.4651, obsmean:1.4049
NO3 mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

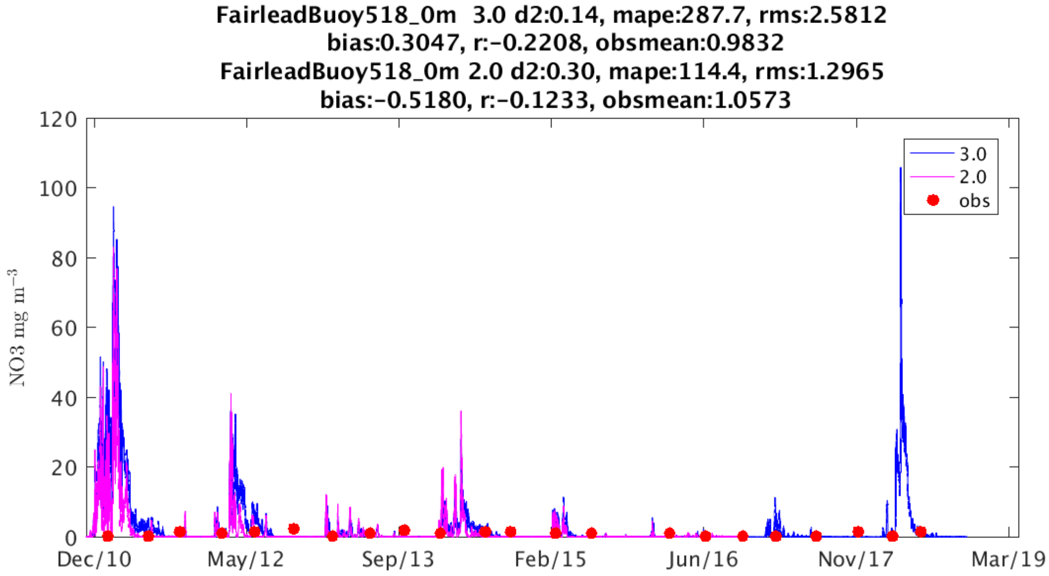

HighI_20m 3.0 d2:0.54, mape:330.6, rms:4.7201
bias:0.6523, r:0.3286, obsmean:2.1869
HighI_20m 2.0 d2:0.60, mape:211.4, rms:4.1357
bias:-0.9513, r:0.5305, obsmean:2.8763
NO3 mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

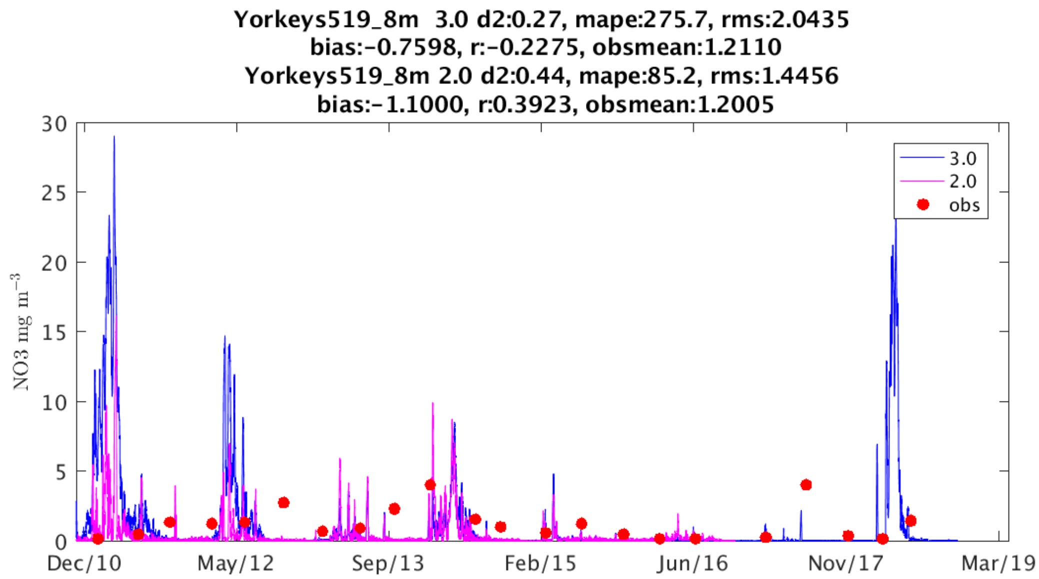

HighI697_0m 3.0 d2:0.07, mape:767.3, rms:6.9776
bias:0.9008, r:-0.1369, obsmean:1.9928
HighI697_0m 2.0 d2:0.49, mape:379.6, rms:4.5492
bias:-0.4487, r:0.2515, obsmean:2.3859
NO3 mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

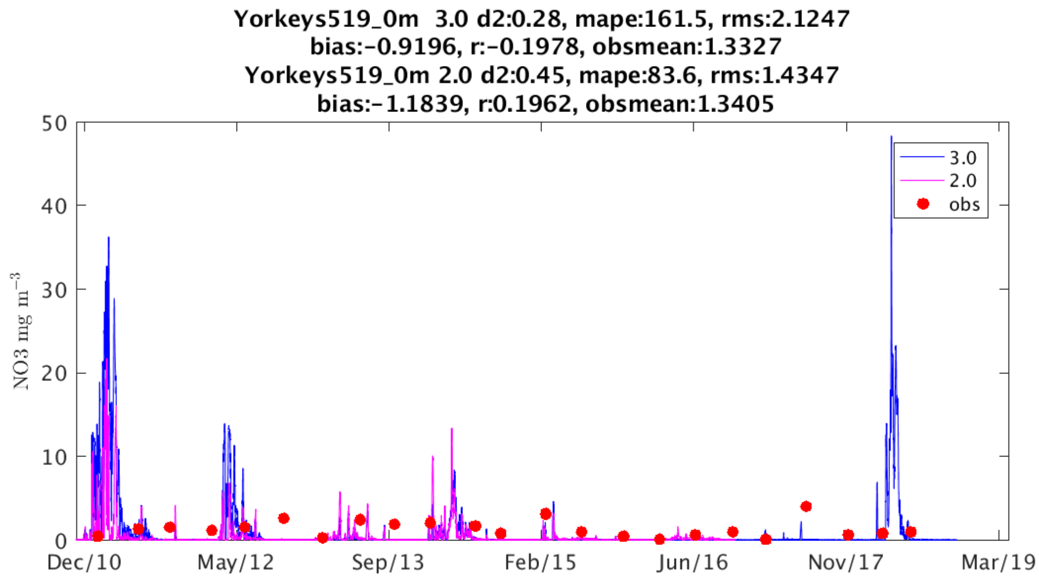

HighI697_0m 3.0 d2:0.07, mape:767.3, rms:6.9776
bias:0.9008, r:-0.1369, obsmean:1.9928
HighI697_0m 2.0 d2:0.49, mape:379.6, rms:4.5492
bias:-0.4487, r:0.2515, obsmean:2.3859
NO3 mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


FitzCoral852_15m 3.0 d2:0.15, mape:339.3, rms:2.6590
bias:0.0909, r:-0.0821, obsmean:0.9622
FitzCoral852_15m 2.0 d2:0.36, mape:174.2, rms:1.2471
bias:-0.6483, r:-0.1764, obsmean:1.0229
NO3 mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

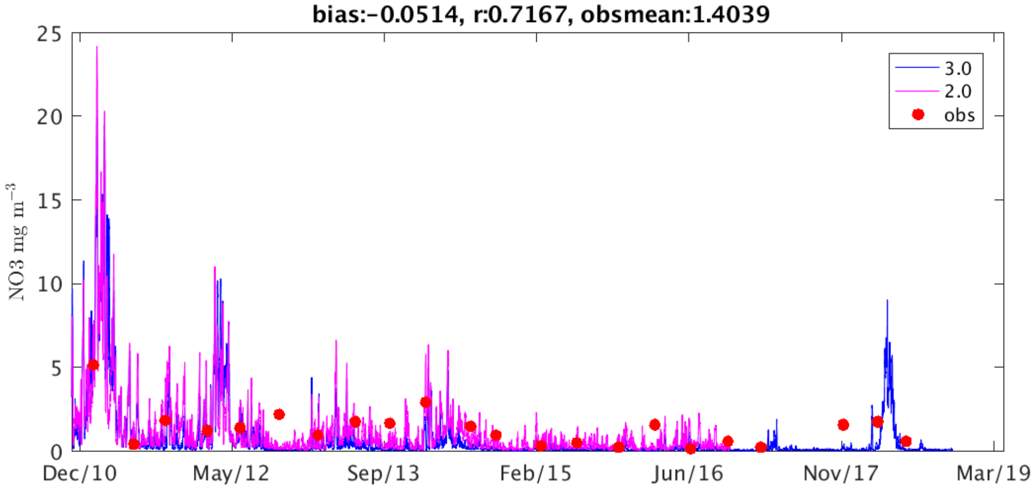

FairleadBuoy518_0m 3.0 d2:0.14, mape:287.7, rms:2.5812
bias:0.3047, r:-0.2208, obsmean:0.9832
FairleadBuoy518_0m 2.0 d2:0.30, mape:114.4, rms:1.2965
bias:-0.5180, r:-0.1233, obsmean:1.0573
NO3 mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


FairleadBuoy518_0m 3.0 d2:0.14, mape:287.7, rms:2.5812
bias:0.3047, r:-0.2208, obsmean:0.9832
FairleadBuoy518_0m 2.0 d2:0.30, mape:114.4, rms:1.2965
bias:-0.5180, r:-0.1233, obsmean:1.0573
NO3 mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

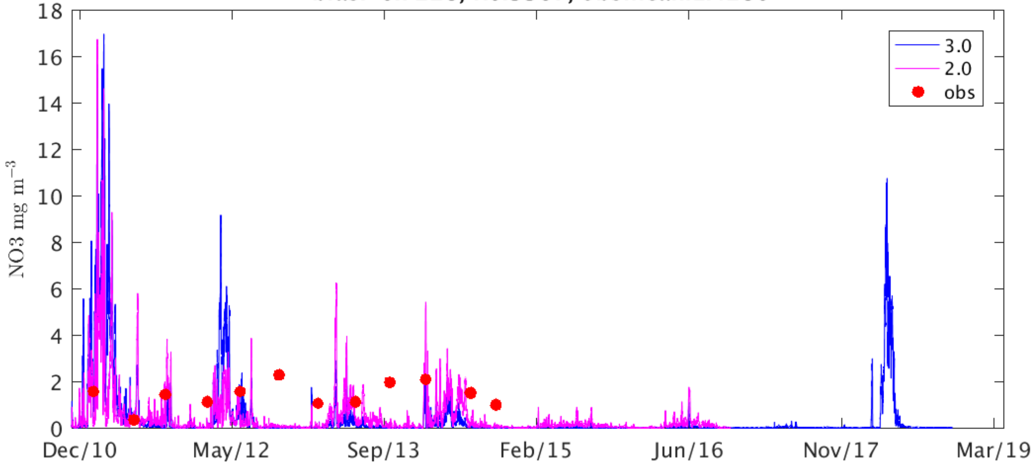

Yorkeys519_8m 3.0 d2:0.27, mape:275.7, rms:2.0435
bias:-0.7598, r:-0.2275, obsmean:1.2110
Yorkeys519_8m 2.0 d2:0.44, mape:85.2, rms:1.4456
bias:-1.1000, r:0.3923, obsmean:1.2005
NO3 mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


Yorkeys519_0m 3.0 d2:0.28, mape:161.5, rms:2.1247
bias:-0.9196, r:-0.1978, obsmean:1.3327
Yorkeys519_0m 2.0 d2:0.45, mape:83.6, rms:1.4347
bias:-1.1839, r:0.1962, obsmean:1.3405
NO3 mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

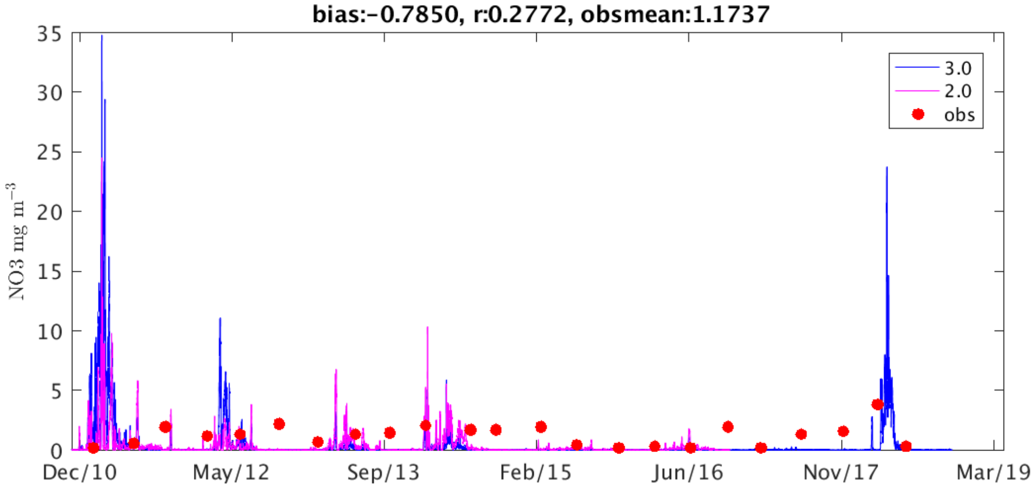
Green830_36m 3.0 d2:0.78, mape:79.5, rms:1.0963
bias:-0.7076, r:0.7112, obsmean:1.3384
Green830_36m 2.0 d2:0.83, mape:83.3, rms:1.0803
bias:-0.0514, r:0.7167, obsmean:1.4039



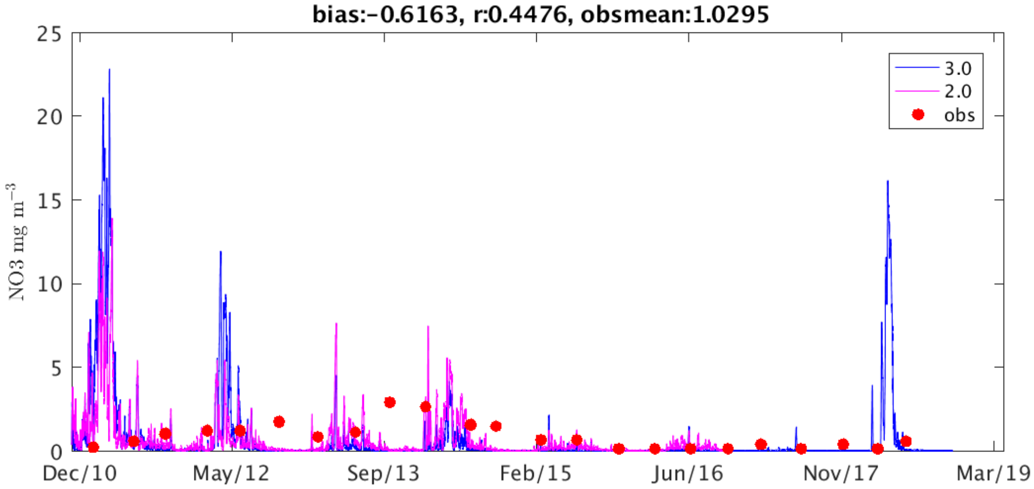
Green830_18m 3.0 d2:0.37, mape:77.3, rms:1.3029
bias:-1.1600, r:0.1396, obsmean:1.4280
Green830_18m 2.0 d2:0.43, mape:84.4, rms:1.5618
bias:-0.7228, r:0.3367, obsmean:1.4280



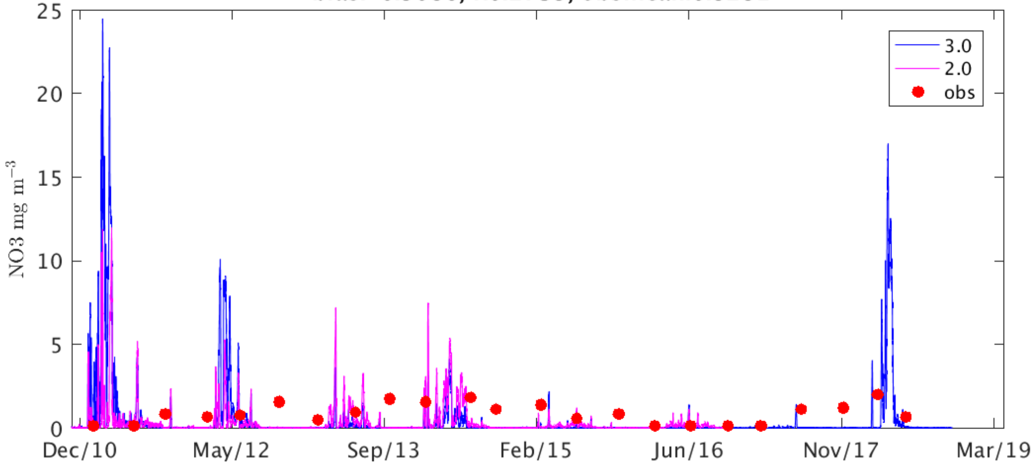
Green830_0m 3.0 d2:0.40, mape:125.6, rms:1.4871
bias:-1.1001, r:-0.2343, obsmean:1.2316
Green830_0m 2.0 d2:0.52, mape:86.4, rms:1.3991
bias:-0.7850, r:0.2772, obsmean:1.1737



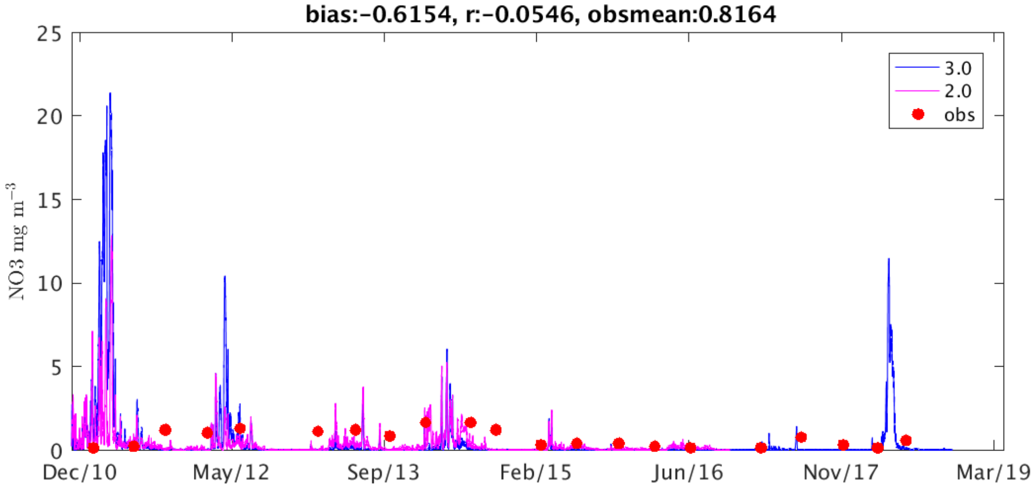
DoubleI520_18m 3.0 d2:0.44, mape:88.8, rms:1.0965
bias:-0.7440, r:-0.0741, obsmean:0.8782
DoubleI520_18m 2.0 d2:0.64, mape:70.8, rms:1.0140
bias:-0.6163, r:0.4476, obsmean:1.0295

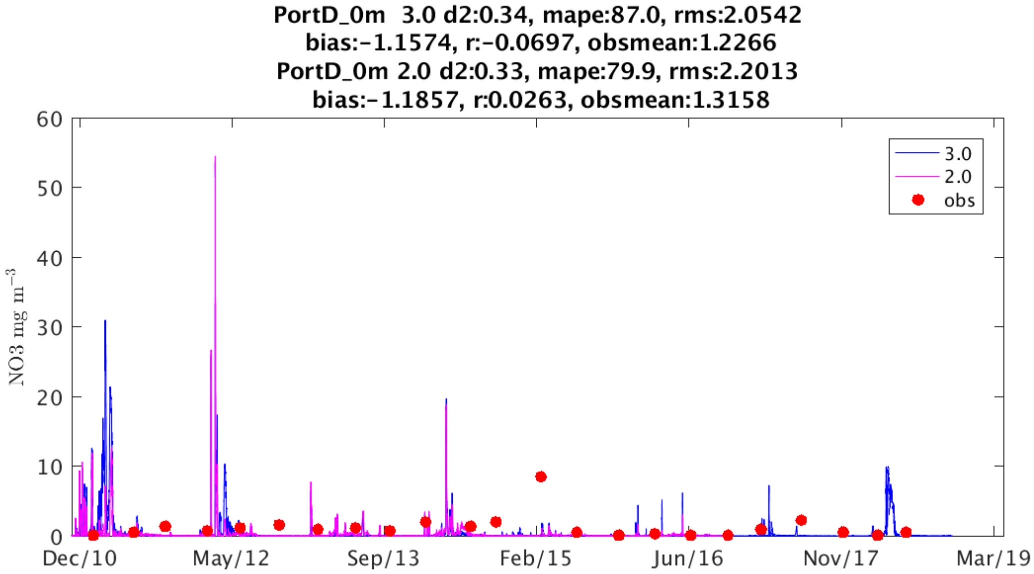


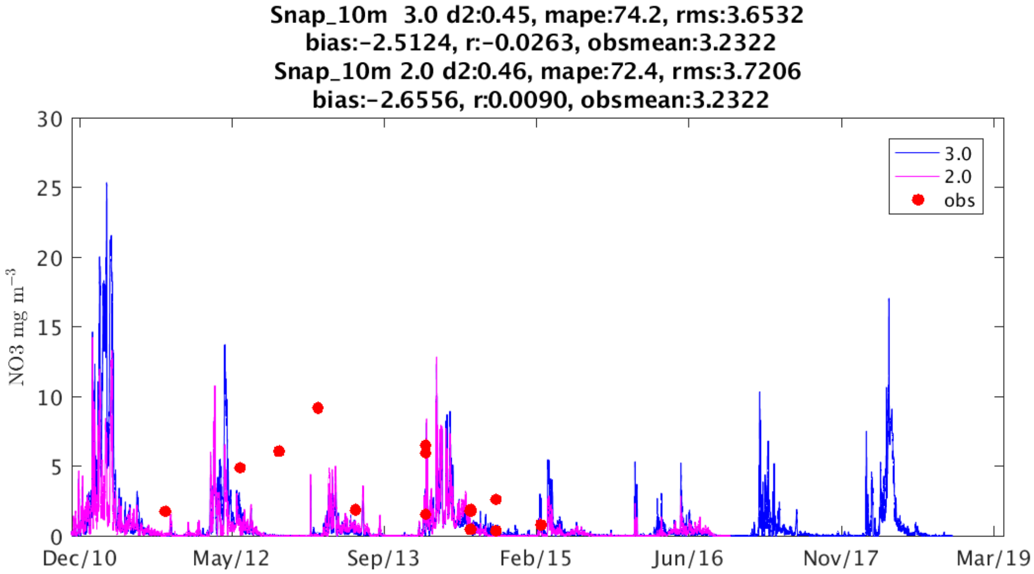
DoubleI520_0m 3.0 d2:0.40, mape:109.8, rms:1.0354
bias:-0.7818, r:-0.3071, obsmean:0.8739
DoubleI520_0m 2.0 d2:0.54, mape:92.8, rms:0.9328
bias:-0.5086, r:0.2739, obsmean:0.8281

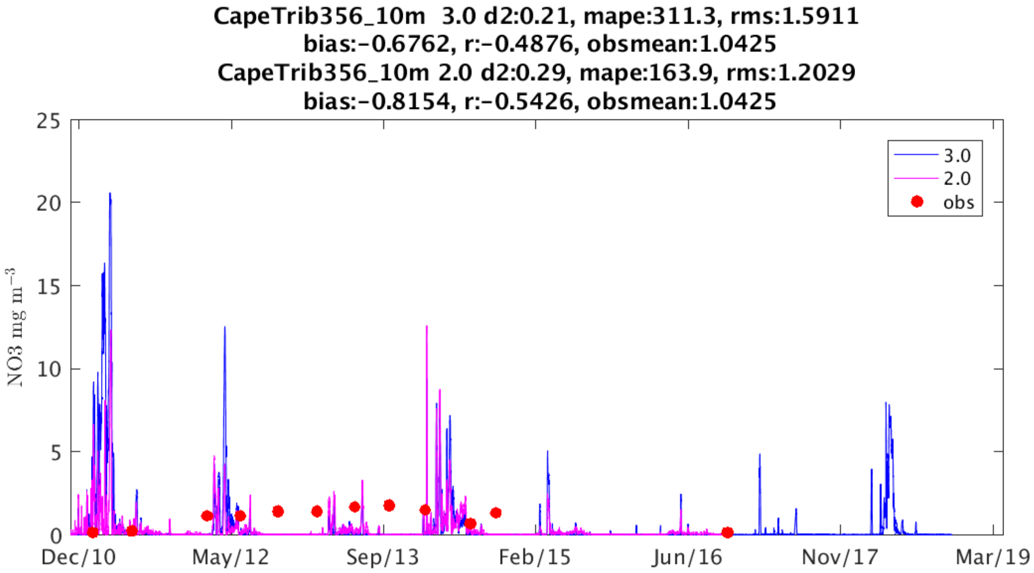


PortD_15m 3.0 d2:0.48, mape:78.9, rms:0.7965
bias:-0.6062, r:0.1459, obsmean:0.7116
PortD_15m 2.0 d2:0.44, mape:87.8, rms:0.8419
bias:-0.6154, r:-0.0546, obsmean:0.8164




PortD_0m 3.0 d2:0.34, mape:87.0, rms:2.0542
bias:-1.1574, r:-0.0697, obsmean:1.2266
PortD_0m 2.0 d2:0.33, mape:79.9, rms:2.2013
bias:-1.1857, r:0.0263, obsmean:1.3158
NO3 mg m^-3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


Snap_10m 3.0 d2:0.45, mape:74.2, rms:3.6532
bias:-2.5124, r:-0.0263, obsmean:3.2322
Snap_10m 2.0 d2:0.46, mape:72.4, rms:3.7206
bias:-2.6556, r:0.0090, obsmean:3.2322
NO3 mg m^-3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


CapeTrib356_10m 3.0 d2:0.21, mape:311.3, rms:1.5911
bias:-0.6762, r:-0.4876, obsmean:1.0425
CapeTrib356_10m 2.0 d2:0.29, mape:163.9, rms:1.2029
bias:-0.8154, r:-0.5426, obsmean:1.0425
NO3 mg m^-3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

14. Simulated NH4 assessment against AIMS Long Term Monitoring

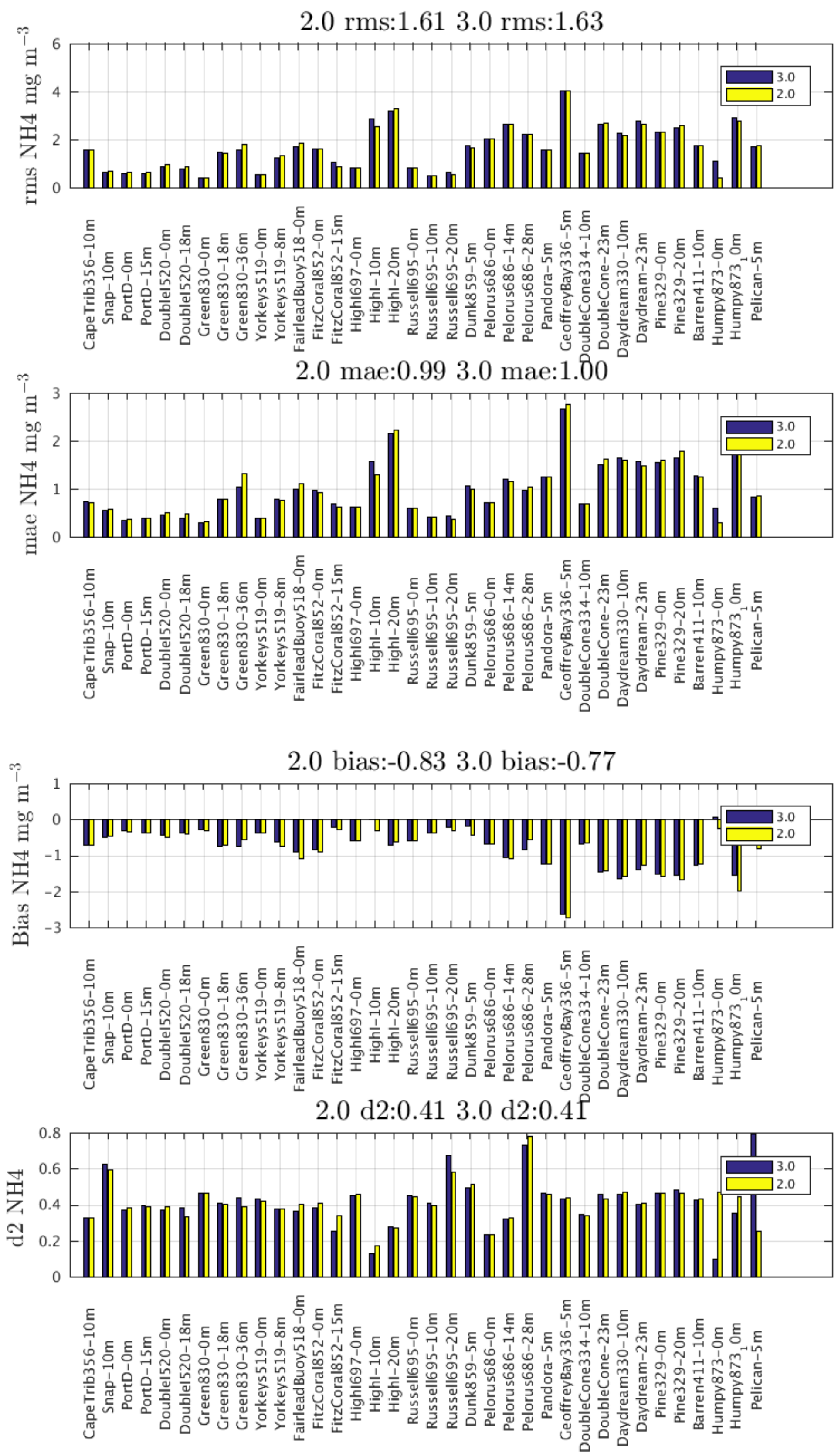
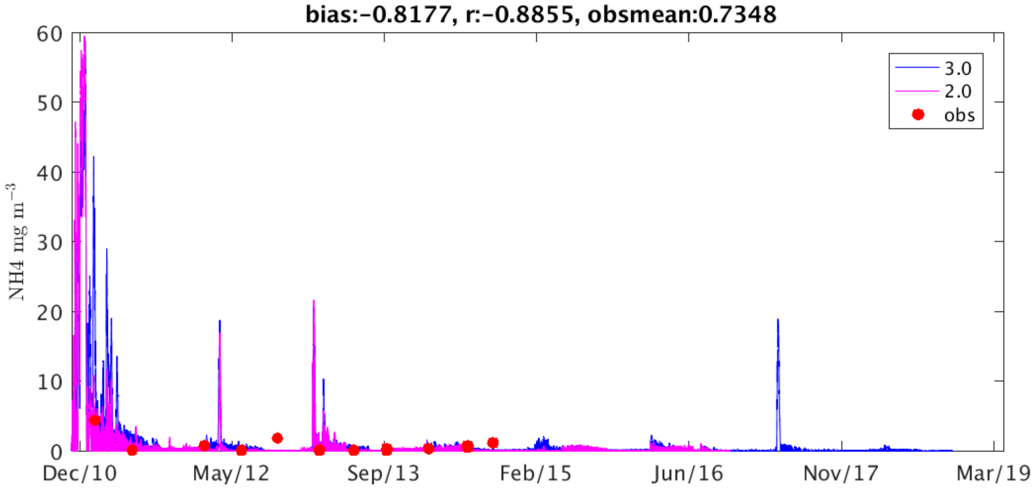
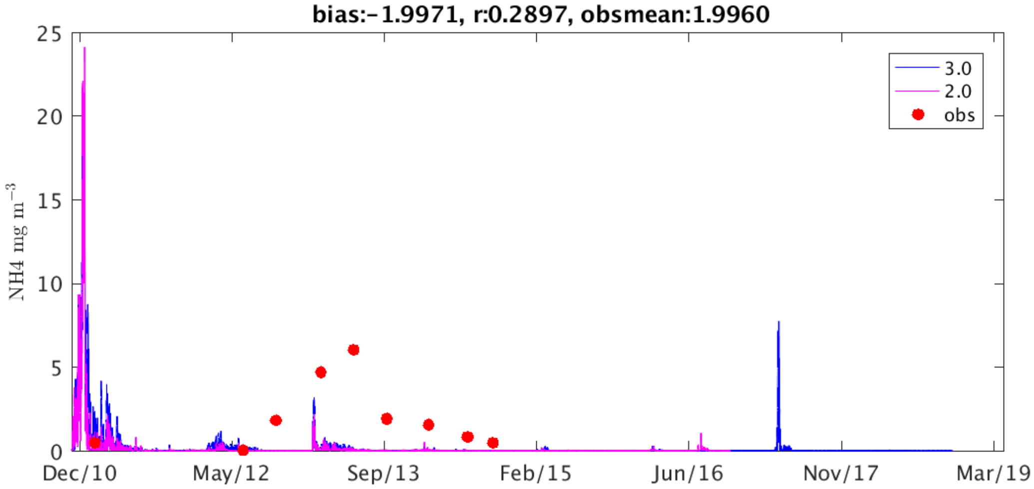


Figure 9 Metrics for Long Term Monitoring sites NH4 assessment against observations for model version 3p0 and 2p0 d2 = Willmott index see Statistical metric page 27.mae:mean absolute error, rms root mean square

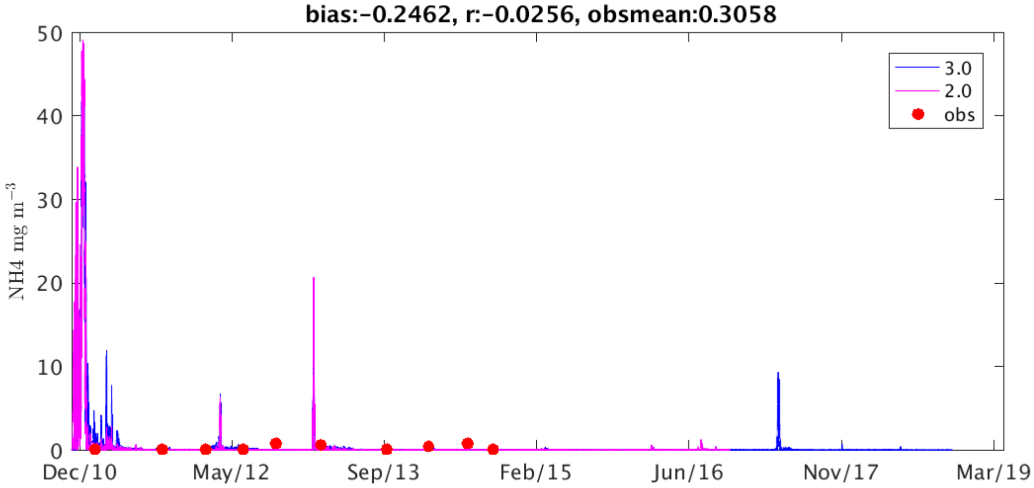
Pelican_5m 3.0 d2:0.79, mape:89.0, rms:1.6907
bias:0.0103, r:0.8810, obsmean:0.7348
Pelican_5m 2.0 d2:0.25, mape:94.7, rms:1.7502
bias:-0.8177, r:-0.8855, obsmean:0.7348

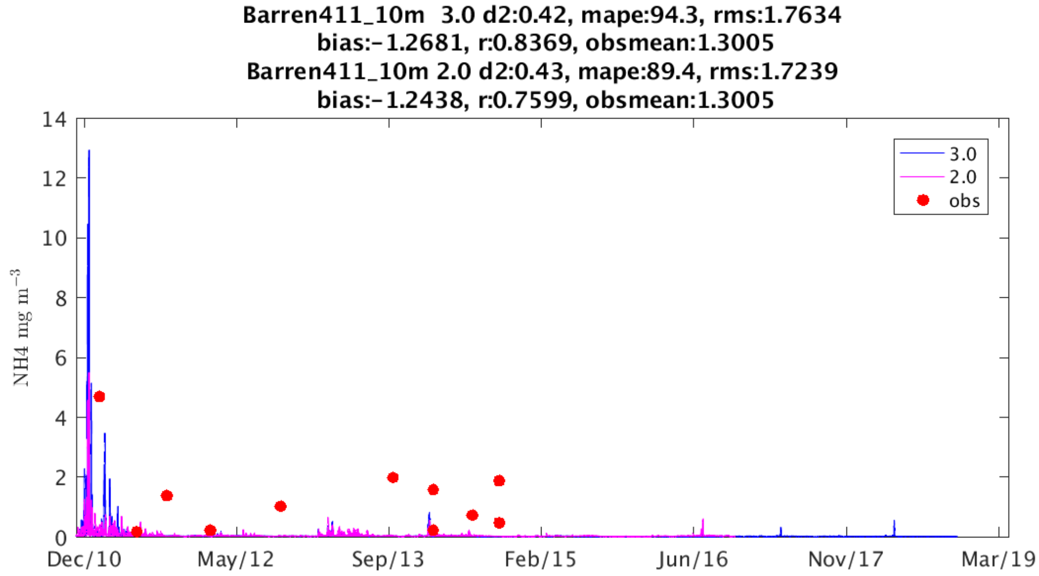


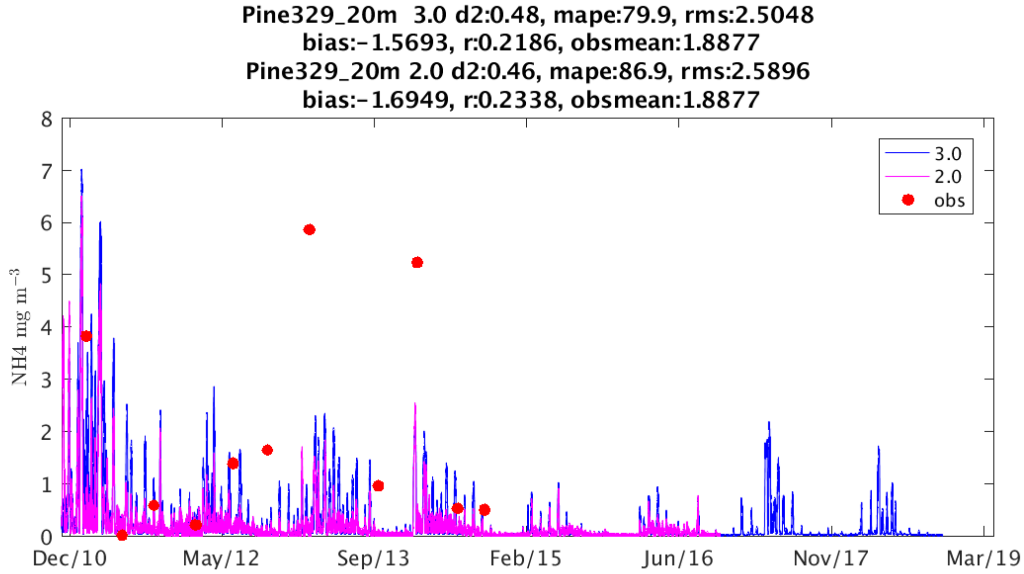
Humpy873_10m 3.0 d2:0.35, mape:237.6, rms:2.8912
bias:-1.5584, r:-0.2555, obsmean:1.9960
Humpy873_10m 2.0 d2:0.44, mape:127.5, rms:2.7663
bias:-1.9971, r:0.2897, obsmean:1.9960

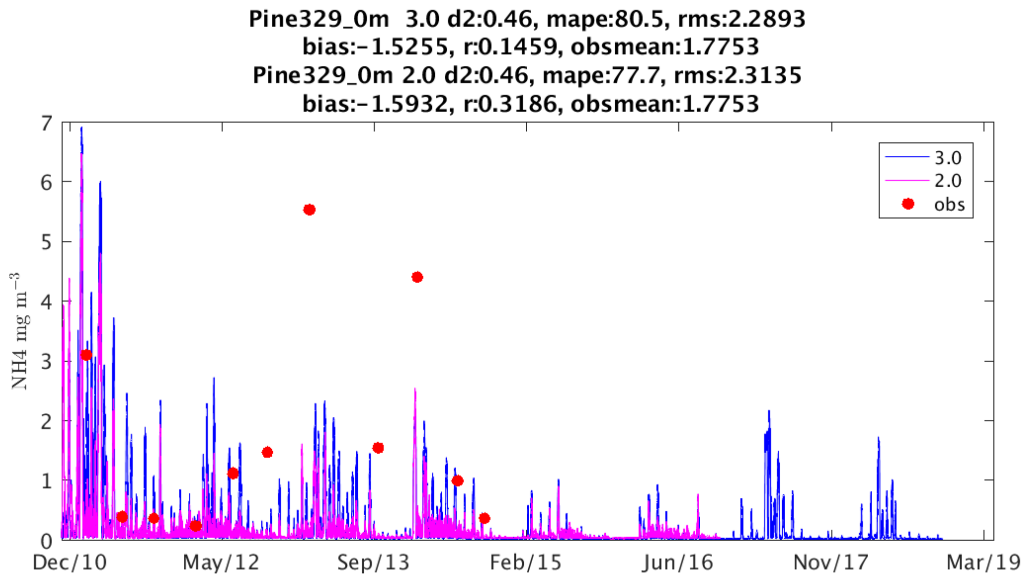


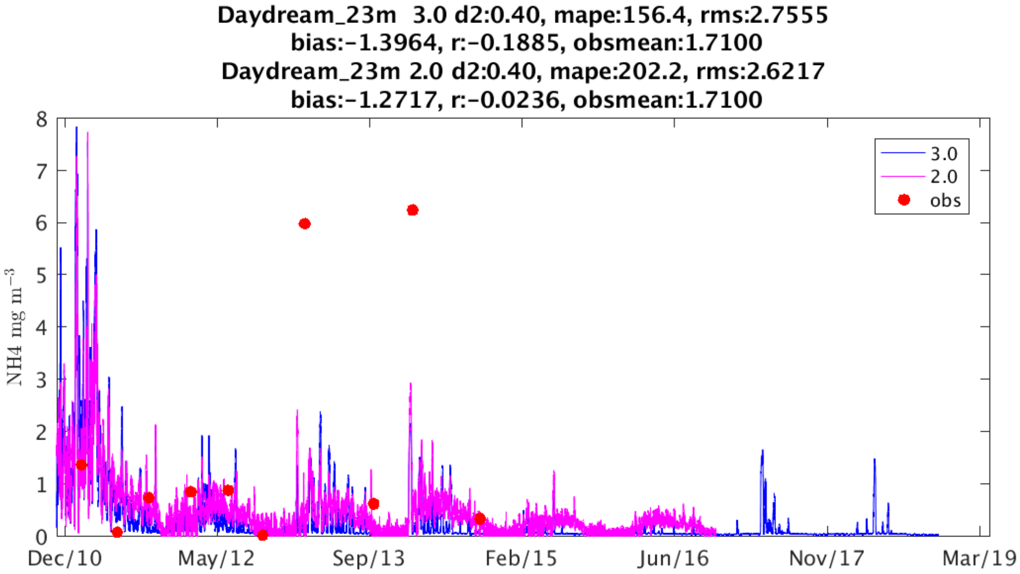
Humpy873_0m 3.0 d2:0.10, mape:220.2, rms:1.0706
bias:0.0604, r:-0.3076, obsmean:0.3058
Humpy873_0m 2.0 d2:0.47, mape:150.5, rms:0.4175
bias:-0.2462, r:-0.0256, obsmean:0.3058

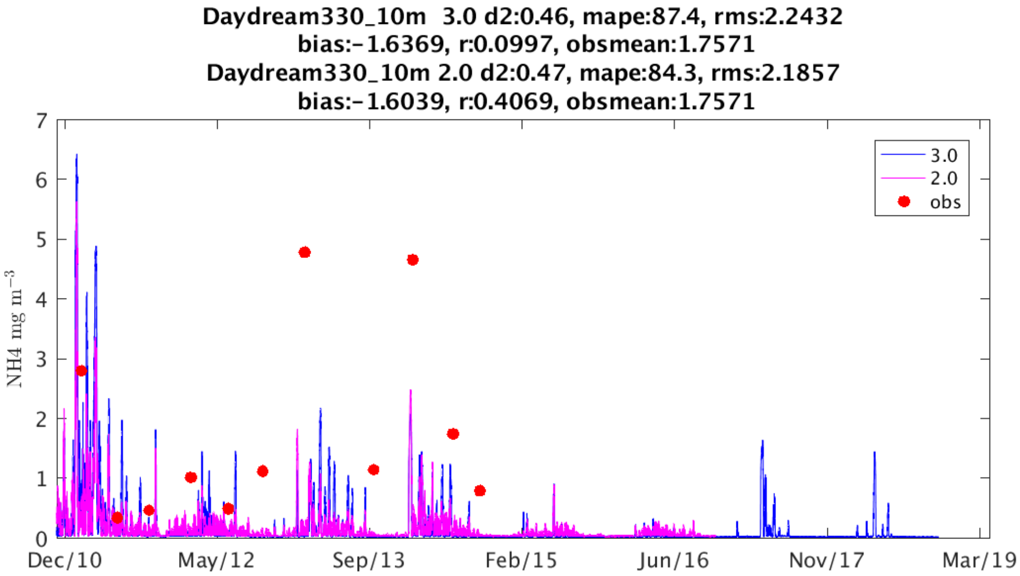


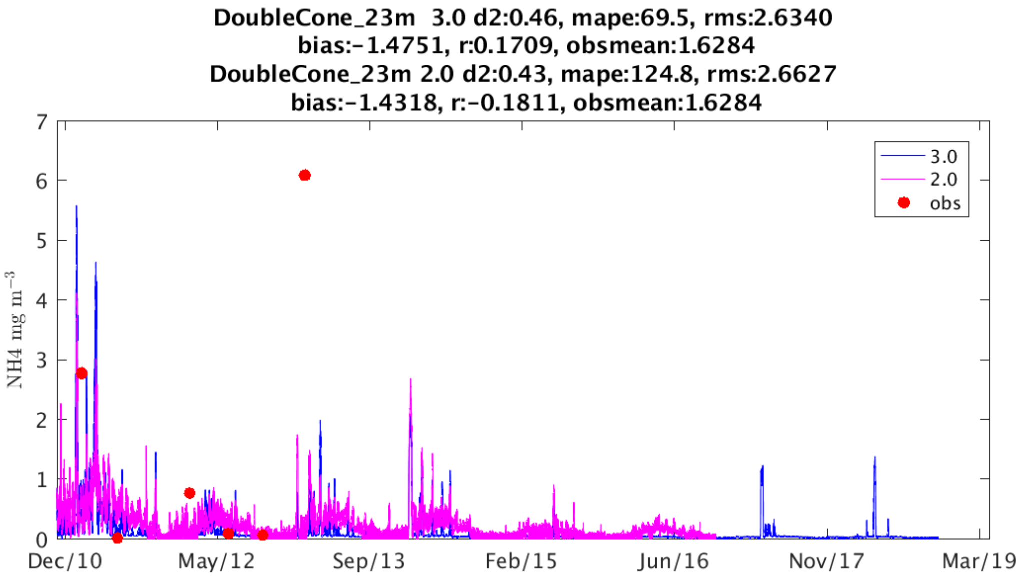

Barren411_10m 3.0 d2:0.42, mape:94.3, rms:1.7634
bias:-1.2681, r:0.8369, obsmean:1.3005
Barren411_10m 2.0 d2:0.43, mape:89.4, rms:1.7239
bias:-1.2438, r:0.7599, obsmean:1.3005
NH4 mg m−3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

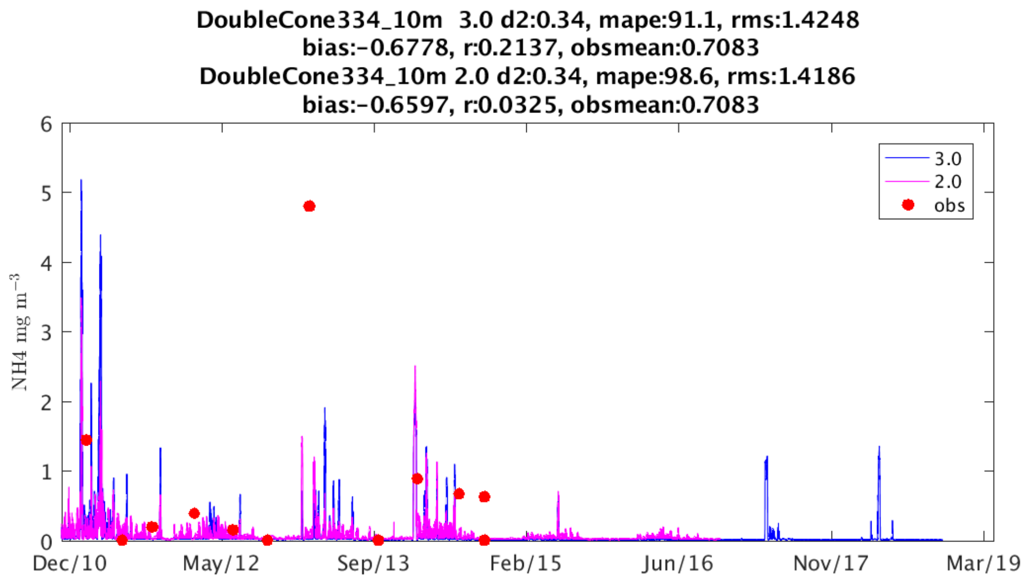

Pine329_20m 3.0 d2:0.48, mape:79.9, rms:2.5048
bias:-1.5693, r:0.2186, obsmean:1.8877
Pine329_20m 2.0 d2:0.46, mape:86.9, rms:2.5896
bias:-1.6949, r:0.2338, obsmean:1.8877
NH4 mg m−3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

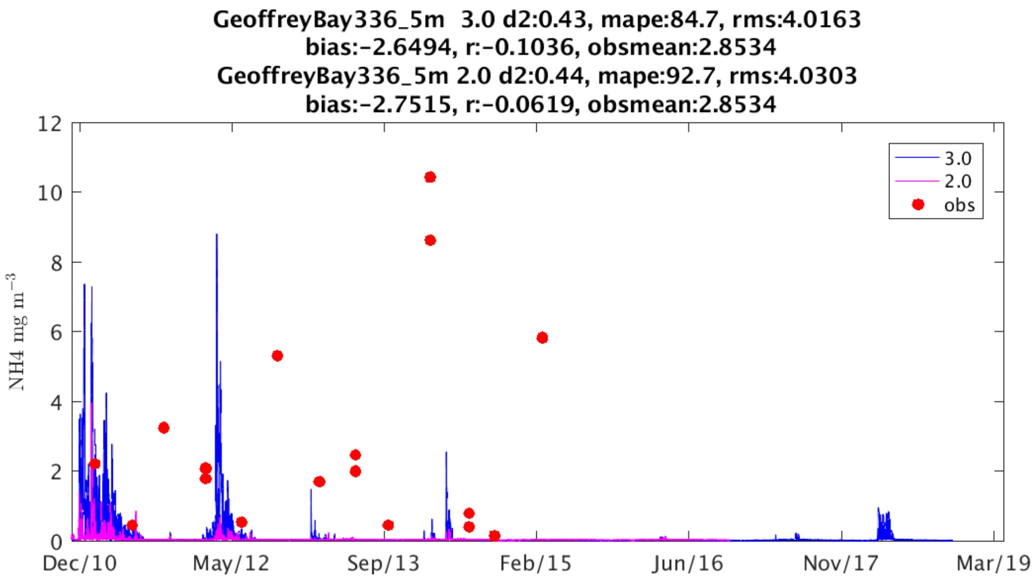

Pine329_0m 3.0 d2:0.46, mape:80.5, rms:2.2893
bias:-1.5255, r:0.1459, obsmean:1.7753
Pine329_0m 2.0 d2:0.46, mape:77.7, rms:2.3135
bias:-1.5932, r:0.3186, obsmean:1.7753
NH4 mg m−3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

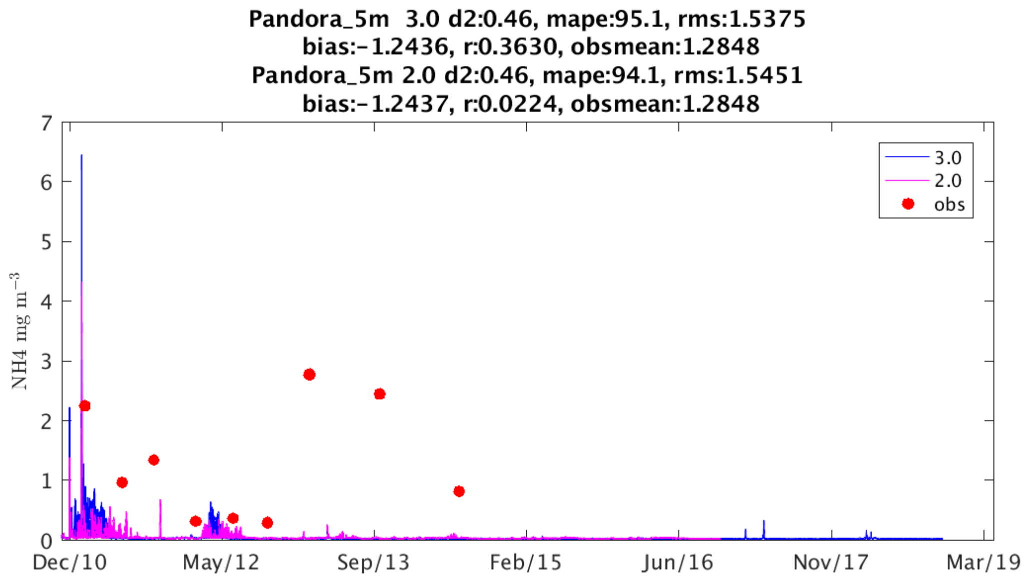

Daydream_23m 3.0 d2:0.40, mape:156.4, rms:2.7555
bias:-1.3964, r:-0.1885, obsmean:1.7100
Daydream_23m 2.0 d2:0.40, mape:202.2, rms:2.6217
bias:-1.2717, r:-0.0236, obsmean:1.7100
NH4 mg m^-3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

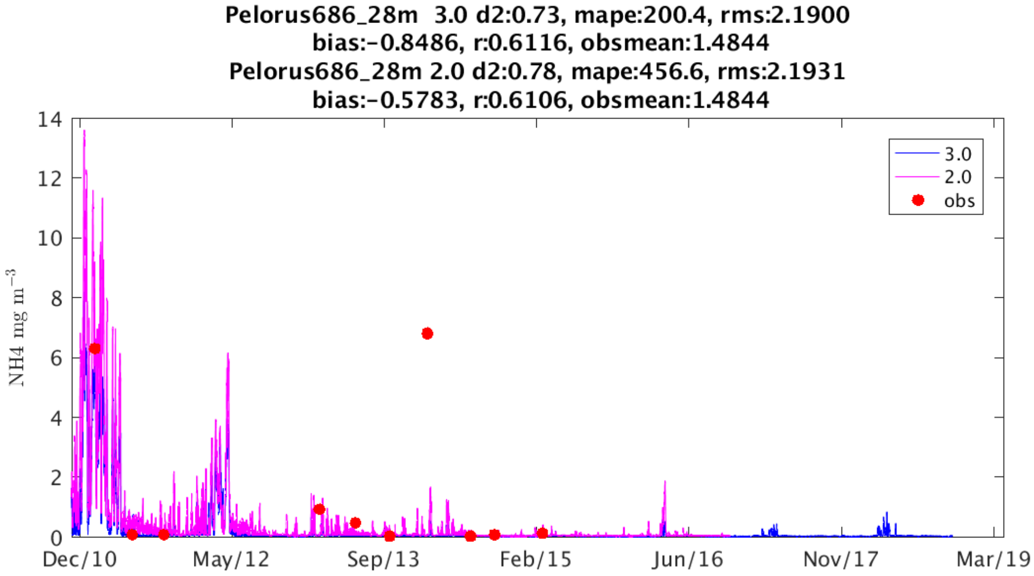

Daydream330_10m 3.0 d2:0.46, mape:87.4, rms:2.2432
bias:-1.6369, r:0.0997, obsmean:1.7571
Daydream330_10m 2.0 d2:0.47, mape:84.3, rms:2.1857
bias:-1.6039, r:0.4069, obsmean:1.7571
NH4 mg m^-3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

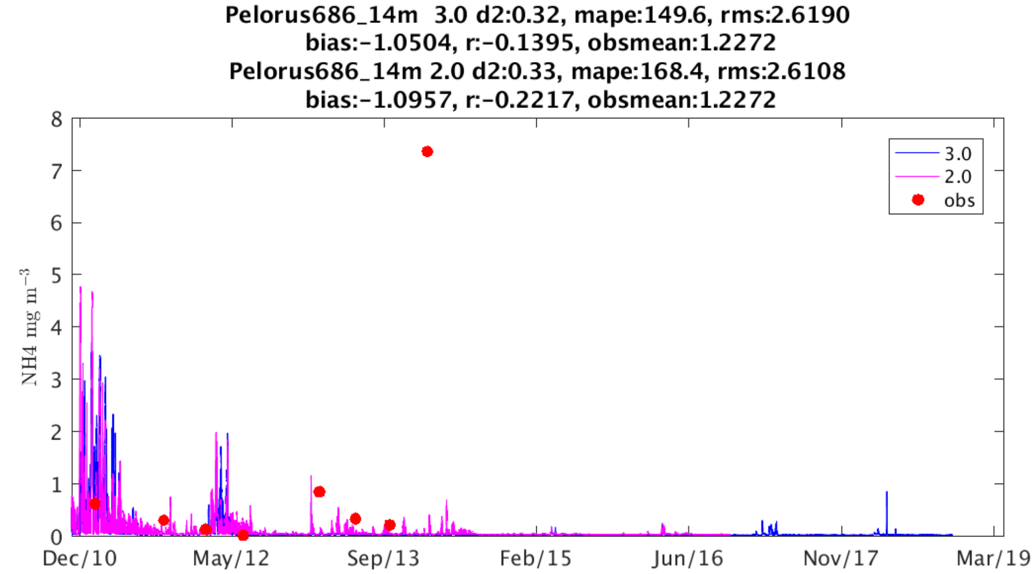

DoubleCone_23m 3.0 d2:0.46, mape:69.5, rms:2.6340
bias:-1.4751, r:0.1709, obsmean:1.6284
DoubleCone_23m 2.0 d2:0.43, mape:124.8, rms:2.6627
bias:-1.4318, r:-0.1811, obsmean:1.6284
NH4 mg m^-3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

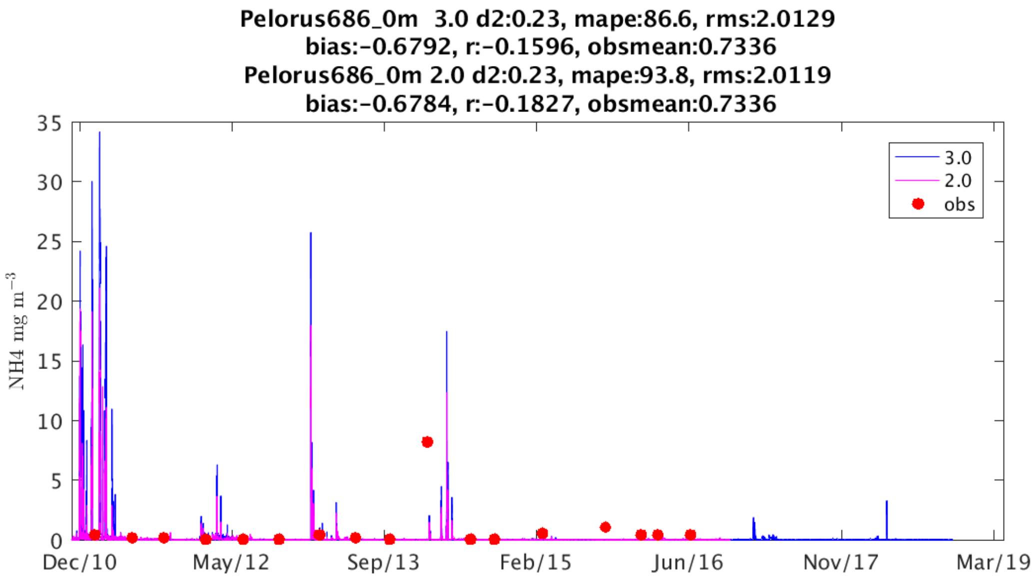

DoubleCone334_10m 3.0 d2:0.34, mape:91.1, rms:1.4248
bias:-0.6778, r:0.2137, obsmean:0.7083
DoubleCone334_10m 2.0 d2:0.34, mape:98.6, rms:1.4186
bias:-0.6597, r:0.0325, obsmean:0.7083
NH4 mg m^-3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


GeoffreyBay336_5m 3.0 d2:0.43, mape:84.7, rms:4.0163
bias:-2.6494, r:-0.1036, obsmean:2.8534
GeoffreyBay336_5m 2.0 d2:0.44, mape:92.7, rms:4.0303
bias:-2.7515, r:-0.0619, obsmean:2.8534
NH4 mg m^-3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

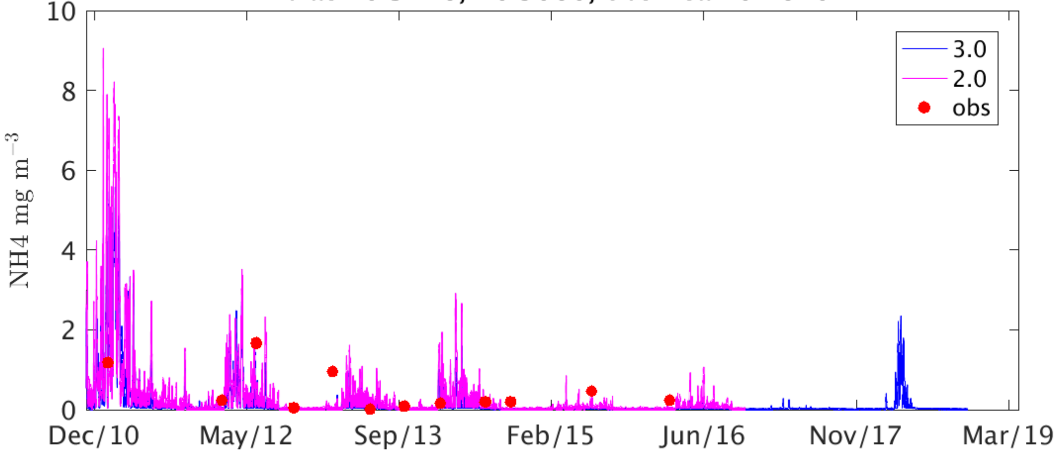

Pandora_5m 3.0 d2:0.46, mape:95.1, rms:1.5375
bias:-1.2436, r:0.3630, obsmean:1.2848
Pandora_5m 2.0 d2:0.46, mape:94.1, rms:1.5451
bias:-1.2437, r:0.0224, obsmean:1.2848
NH4 mg m^-3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


Pelorus686_28m 3.0 d2:0.73, mape:200.4, rms:2.1900
bias:-0.8486, r:0.6116, obsmean:1.4844
Pelorus686_28m 2.0 d2:0.78, mape:456.6, rms:2.1931
bias:-0.5783, r:0.6106, obsmean:1.4844
NH4 mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

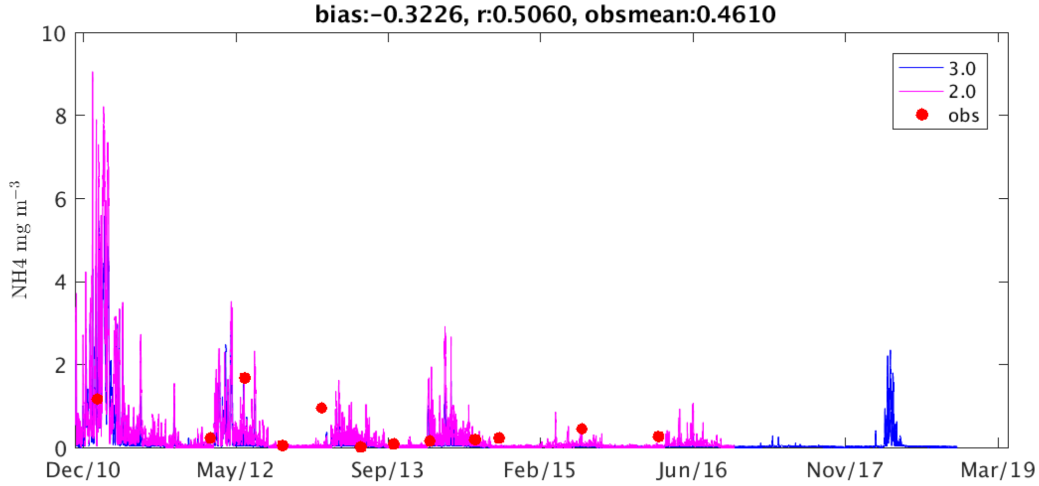

Pelorus686_14m 3.0 d2:0.32, mape:149.6, rms:2.6190
bias:-1.0504, r:-0.1395, obsmean:1.2272
Pelorus686_14m 2.0 d2:0.33, mape:168.4, rms:2.6108
bias:-1.0957, r:-0.2217, obsmean:1.2272
NH4 mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


Pelorus686_0m 3.0 d2:0.23, mape:86.6, rms:2.0129
bias:-0.6792, r:-0.1596, obsmean:0.7336
Pelorus686_0m 2.0 d2:0.23, mape:93.8, rms:2.0119
bias:-0.6784, r:-0.1827, obsmean:0.7336
NH4 mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

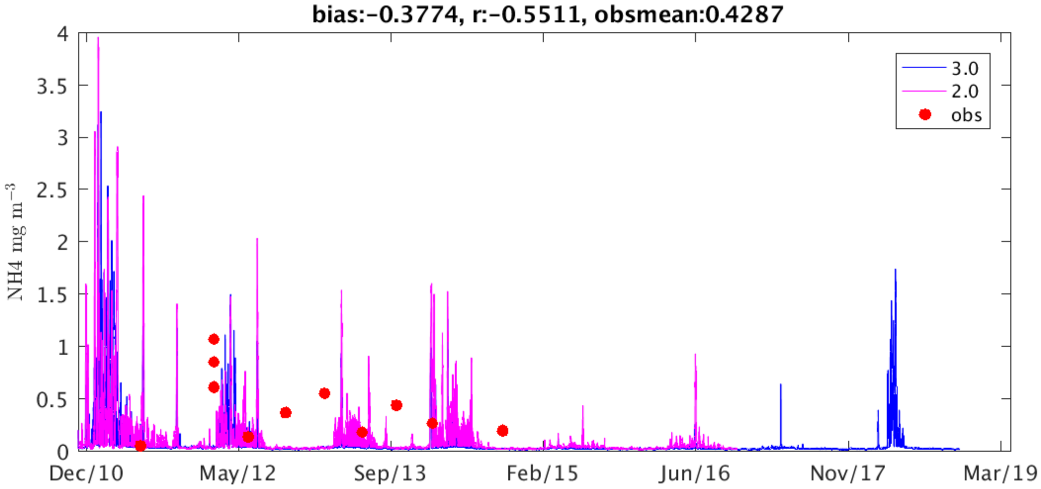
Russell695_20m 3.0 d2:0.67, mape:87.2, rms:0.6295
bias:-0.2208, r:0.4974, obsmean:0.4610
Russell695_20m 2.0 d2:0.58, mape:112.0, rms:0.5415
bias:-0.3226, r:0.5060, obsmean:0.4610



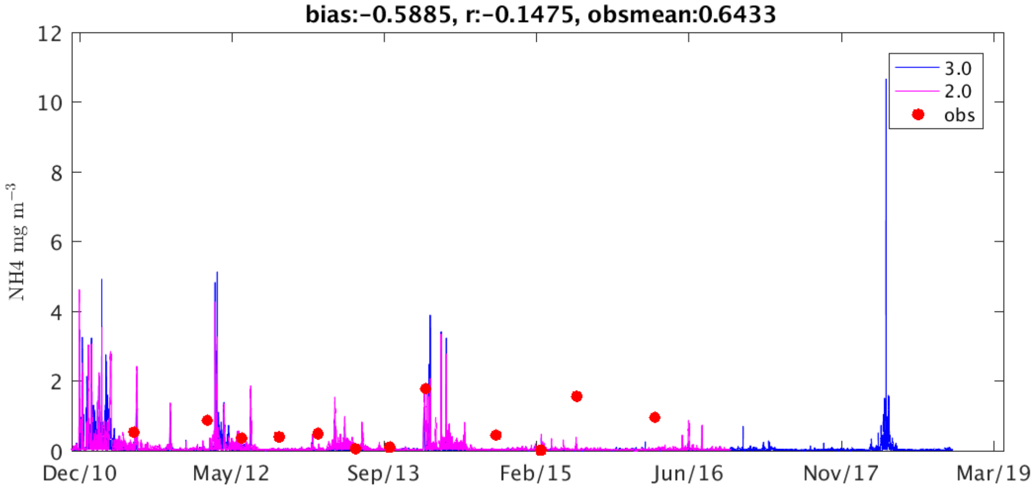
Russell695_20m 3.0 d2:0.67, mape:87.2, rms:0.6295
bias:-0.2208, r:0.4974, obsmean:0.4610
Russell695_20m 2.0 d2:0.58, mape:112.0, rms:0.5415
bias:-0.3226, r:0.5060, obsmean:0.4610



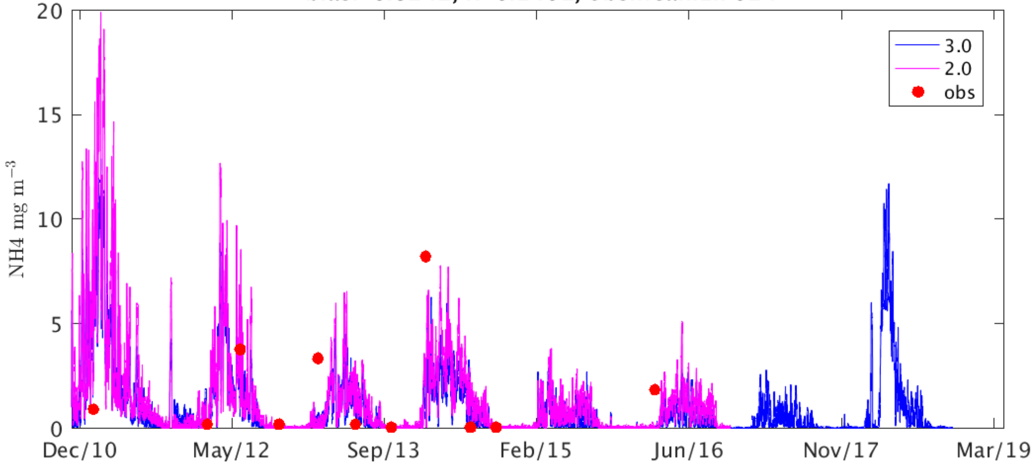
Russell695_10m 3.0 d2:0.40, mape:117.4, rms:0.5050
bias:-0.3828, r:-0.4052, obsmean:0.4287
Russell695_10m 2.0 d2:0.39, mape:112.8, rms:0.5058
bias:-0.3774, r:-0.5511, obsmean:0.4287



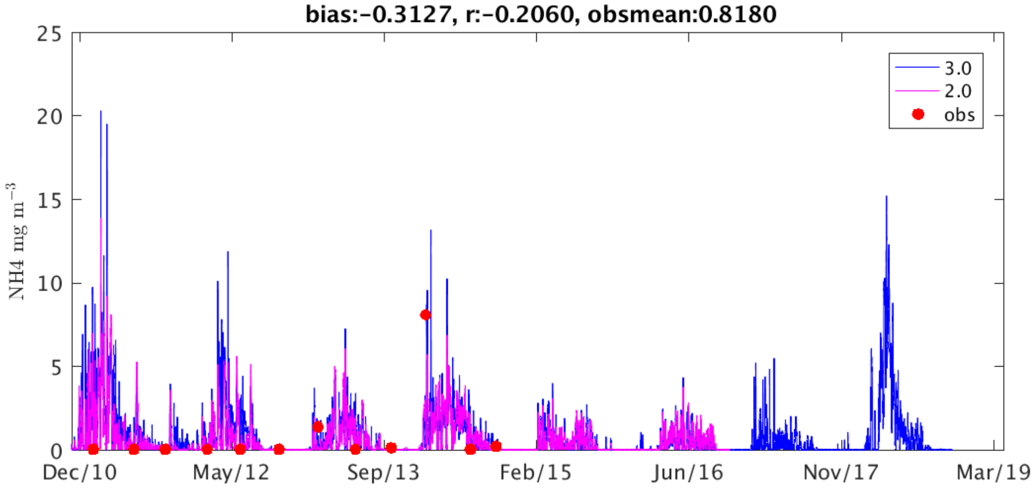
Russell695_0m 3.0 d2:0.45, mape:79.9, rms:0.8126
bias:-0.6032, r:-0.1053, obsmean:0.6433
Russell695_0m 2.0 d2:0.45, mape:82.2, rms:0.8045
bias:-0.5885, r:-0.1475, obsmean:0.6433



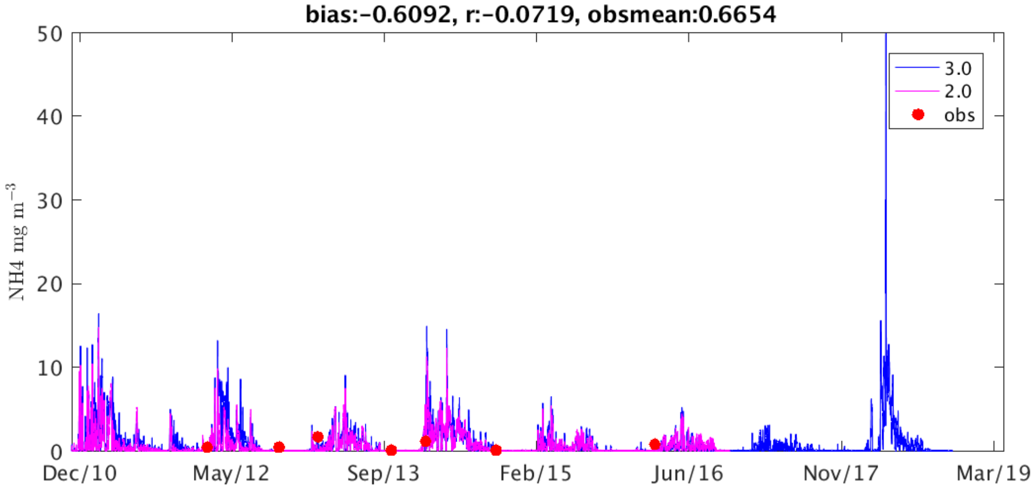
HighI_20m 3.0 d2:0.28, mape:440.4, rms:3.1876
bias:-0.7305, r:-0.1468, obsmean:1.7024
HighI_20m 2.0 d2:0.27, mape:472.2, rms:3.2901
bias:-0.6242, r:-0.1401, obsmean:1.7024



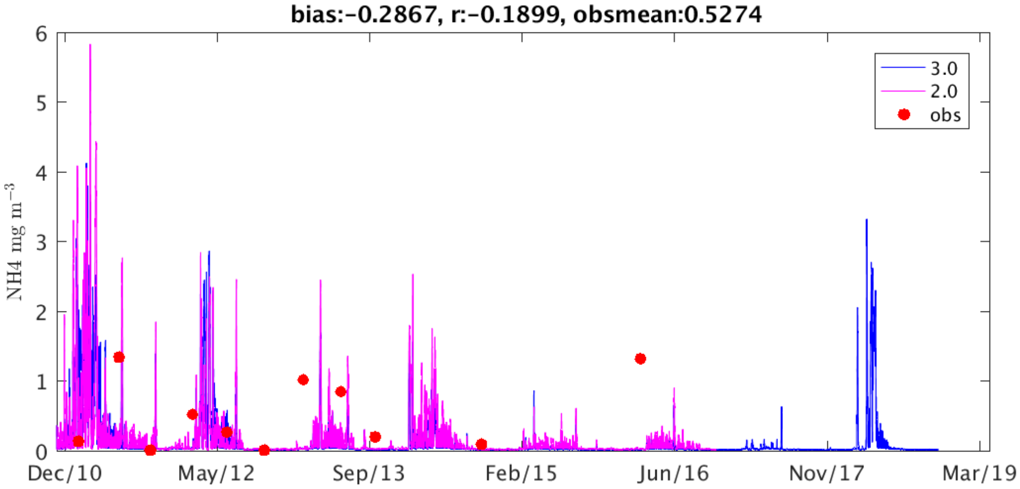
HighI_10m 3.0 d2:0.12, mape:74.1, rms:2.8698
bias:-0.0183, r:-0.1929, obsmean:0.8180
HighI_10m 2.0 d2:0.17, mape:91.2, rms:2.5441
bias:-0.3127, r:-0.2060, obsmean:0.8180



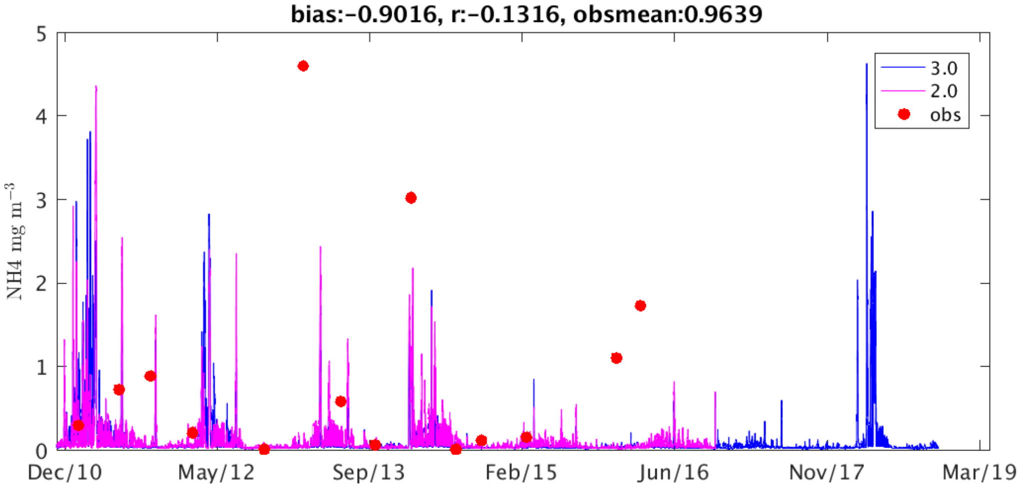
HighI697_0m 3.0 d2:0.45, mape:107.1, rms:0.8318
bias:-0.6026, r:-0.4427, obsmean:0.6654
HighI697_0m 2.0 d2:0.46, mape:121.9, rms:0.8326
bias:-0.6092, r:-0.0719, obsmean:0.6654

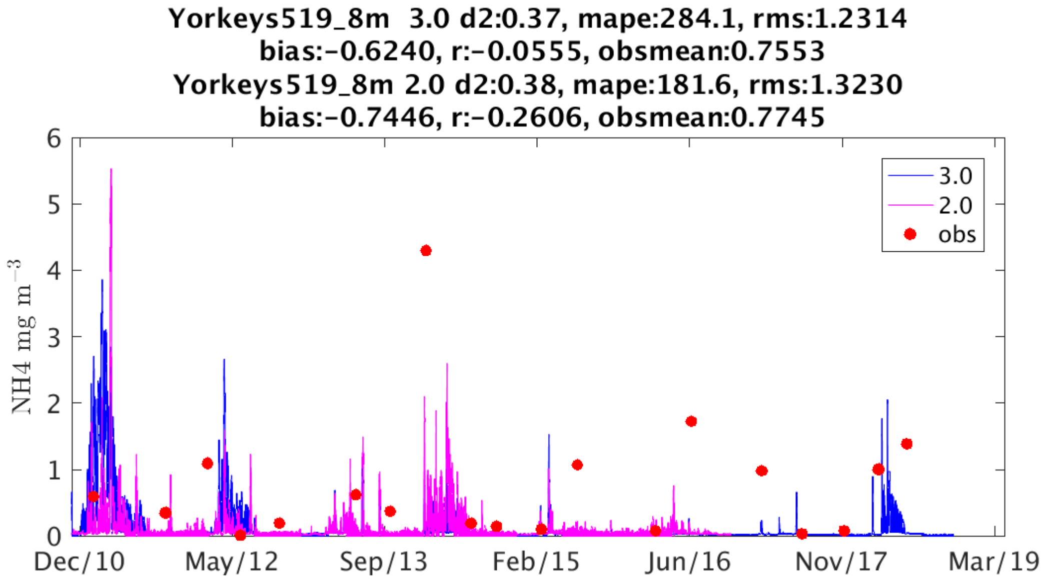


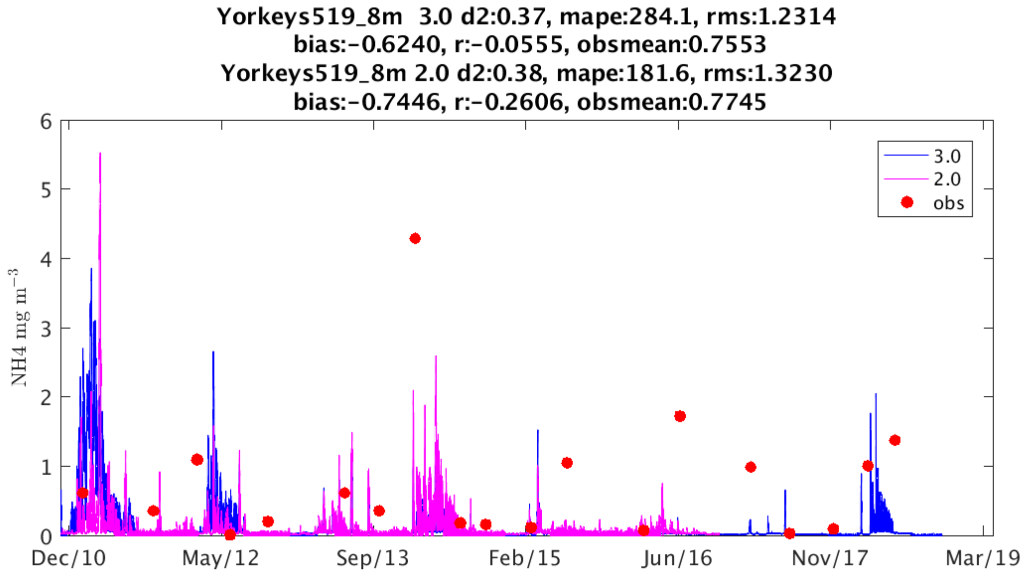
FitzCoral852_15m 3.0 d2:0.25, mape:246.1, rms:1.0254
bias:-0.2191, r:-0.2335, obsmean:0.5274
FitzCoral852_15m 2.0 d2:0.34, mape:203.5, rms:0.8421
bias:-0.2867, r:-0.1899, obsmean:0.5274

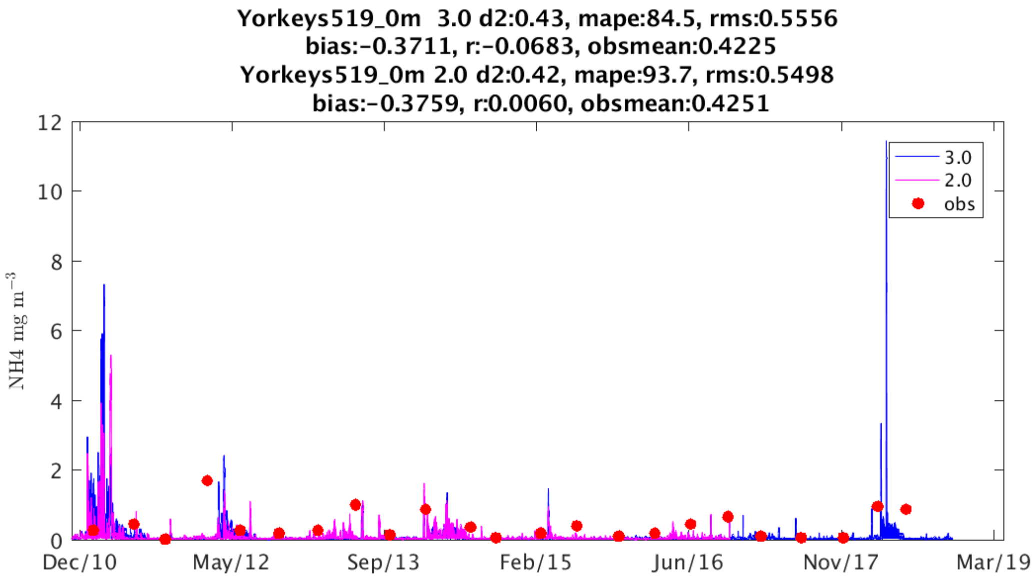


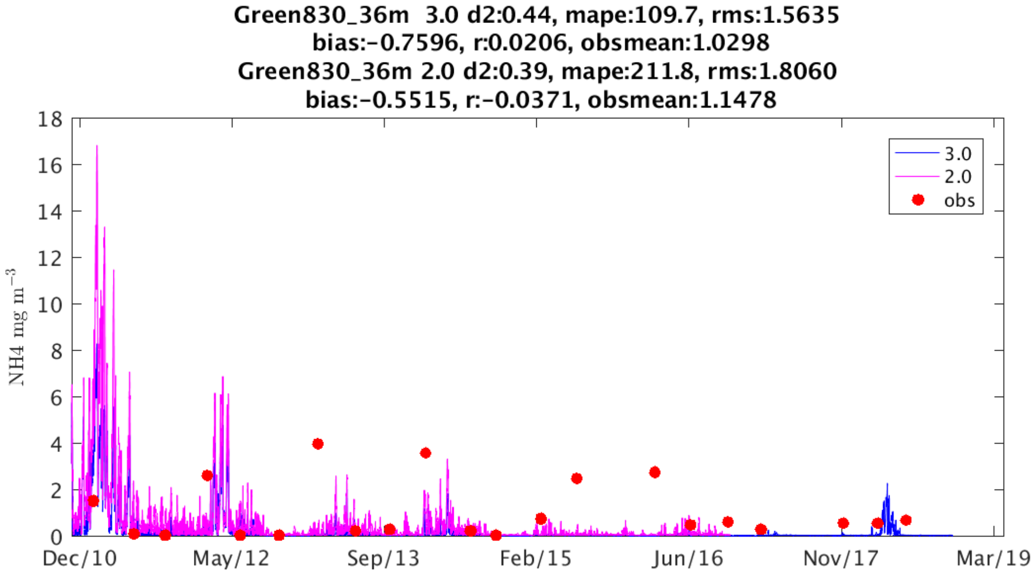
FitzCoral852_0m 3.0 d2:0.38, mape:102.3, rms:1.6010
bias:-0.8564, r:-0.1490, obsmean:0.9639
FitzCoral852_0m 2.0 d2:0.40, mape:82.5, rms:1.5815
bias:-0.9016, r:-0.1316, obsmean:0.9639

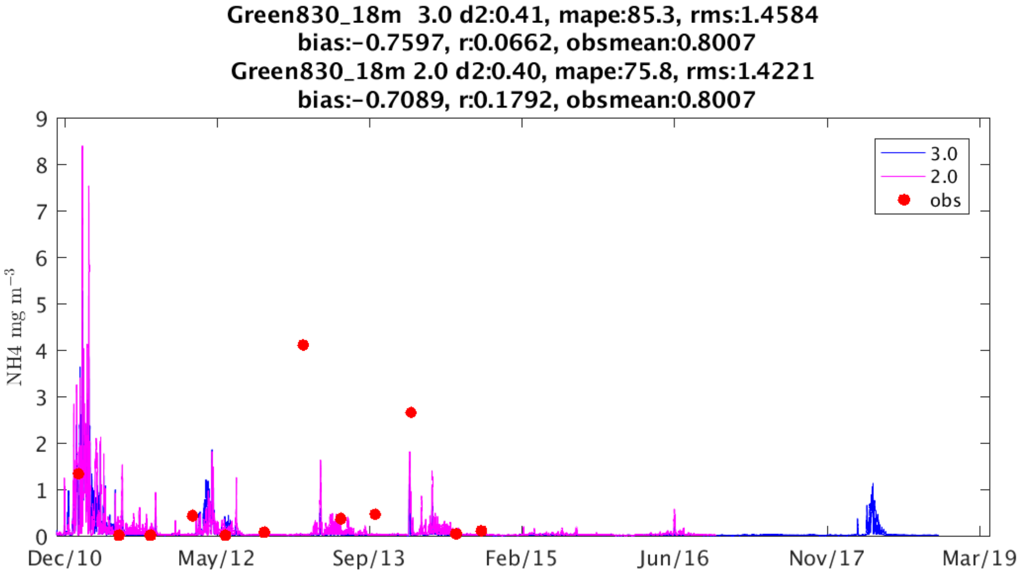


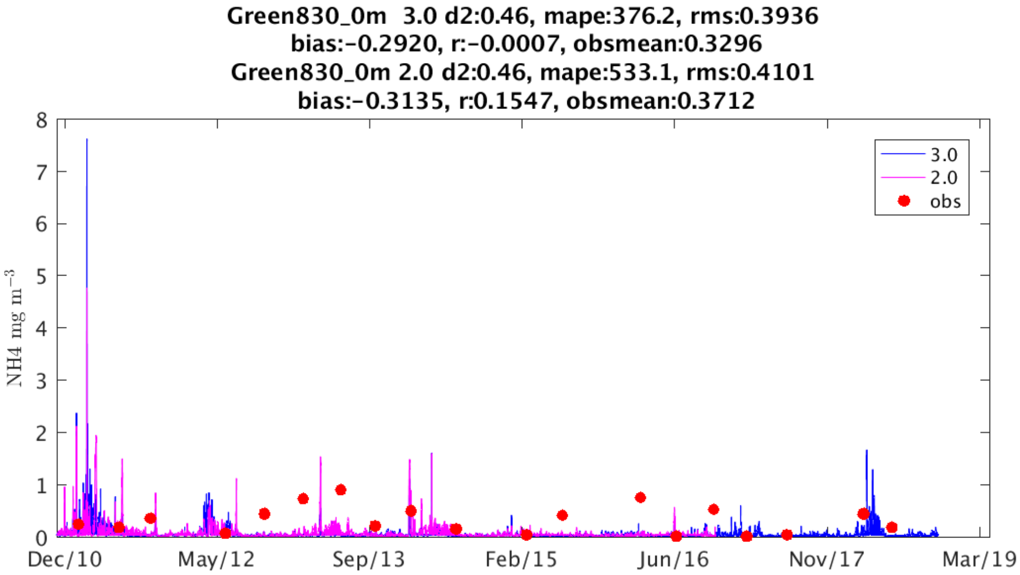

Yorkeys519_8m 3.0 d2:0.37, mape:284.1, rms:1.2314
bias:-0.6240, r:-0.0555, obsmean:0.7553
Yorkeys519_8m 2.0 d2:0.38, mape:181.6, rms:1.3230
bias:-0.7446, r:-0.2606, obsmean:0.7745
NH4 mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


Yorkeys519_8m 3.0 d2:0.37, mape:284.1, rms:1.2314
bias:-0.6240, r:-0.0555, obsmean:0.7553
Yorkeys519_8m 2.0 d2:0.38, mape:181.6, rms:1.3230
bias:-0.7446, r:-0.2606, obsmean:0.7745
NH4 mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

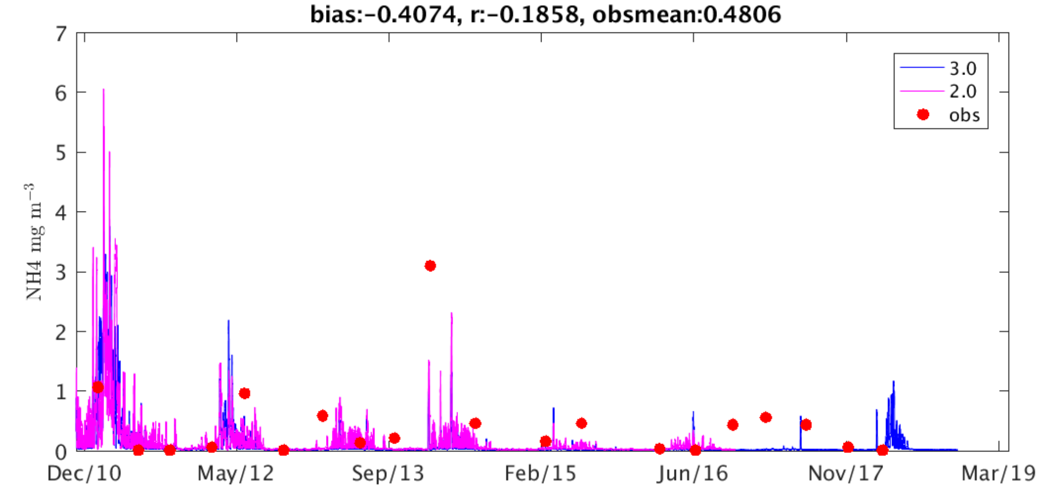

Yorkeys519_0m 3.0 d2:0.43, mape:84.5, rms:0.5556
bias:-0.3711, r:-0.0683, obsmean:0.4225
Yorkeys519_0m 2.0 d2:0.42, mape:93.7, rms:0.5498
bias:-0.3759, r:0.0060, obsmean:0.4251
NH4 mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


Green830_36m 3.0 d2:0.44, mape:109.7, rms:1.5635
bias:-0.7596, r:0.0206, obsmean:1.0298
Green830_36m 2.0 d2:0.39, mape:211.8, rms:1.8060
bias:-0.5515, r:-0.0371, obsmean:1.1478
NH4 mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

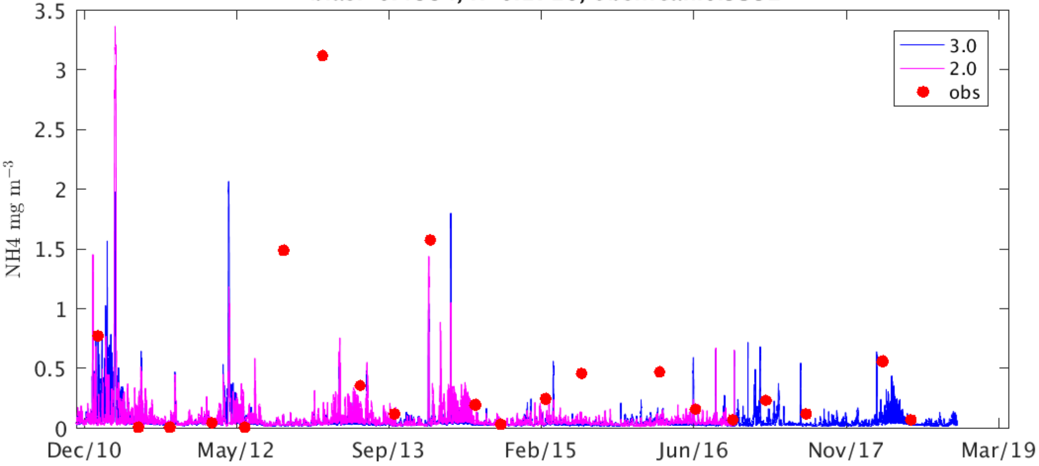

Green830_18m 3.0 d2:0.41, mape:85.3, rms:1.4584
bias:-0.7597, r:0.0662, obsmean:0.8007
Green830_18m 2.0 d2:0.40, mape:75.8, rms:1.4221
bias:-0.7089, r:0.1792, obsmean:0.8007
NH4 mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


Green830_0m 3.0 d2:0.46, mape:376.2, rms:0.3936
bias:-0.2920, r:-0.0007, obsmean:0.3296
Green830_0m 2.0 d2:0.46, mape:533.1, rms:0.4101
bias:-0.3135, r:0.1547, obsmean:0.3712
NH4 mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

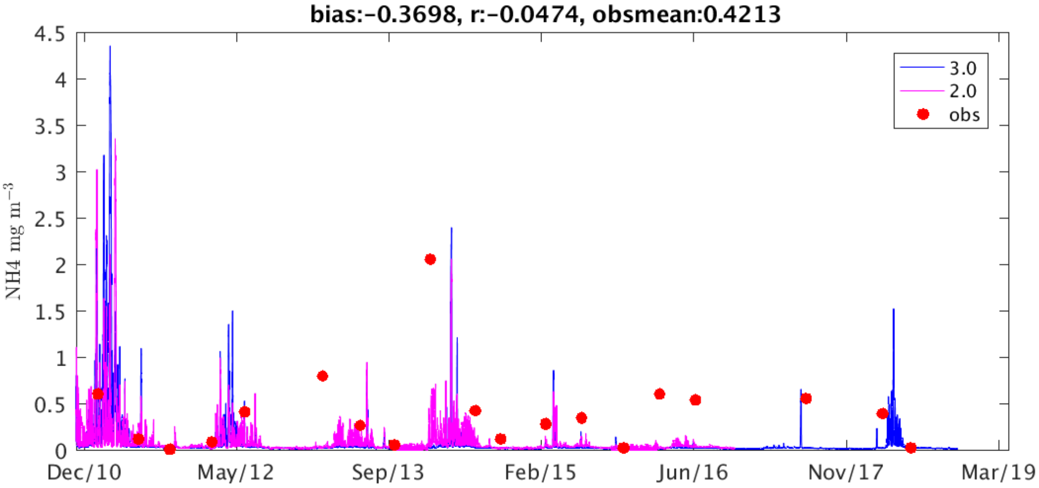
DoubleI520_18m 3.0 d2:0.38, mape:184.1, rms:0.7741
bias:-0.3811, r:0.2004, obsmean:0.4387
DoubleI520_18m 2.0 d2:0.33, mape:310.0, rms:0.8726
bias:-0.4074, r:-0.1858, obsmean:0.4806

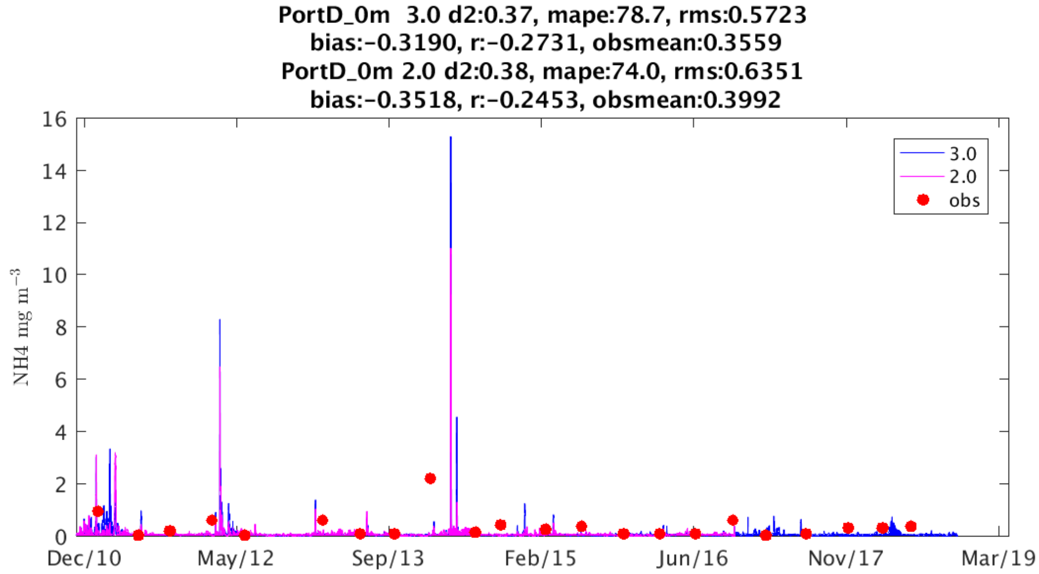


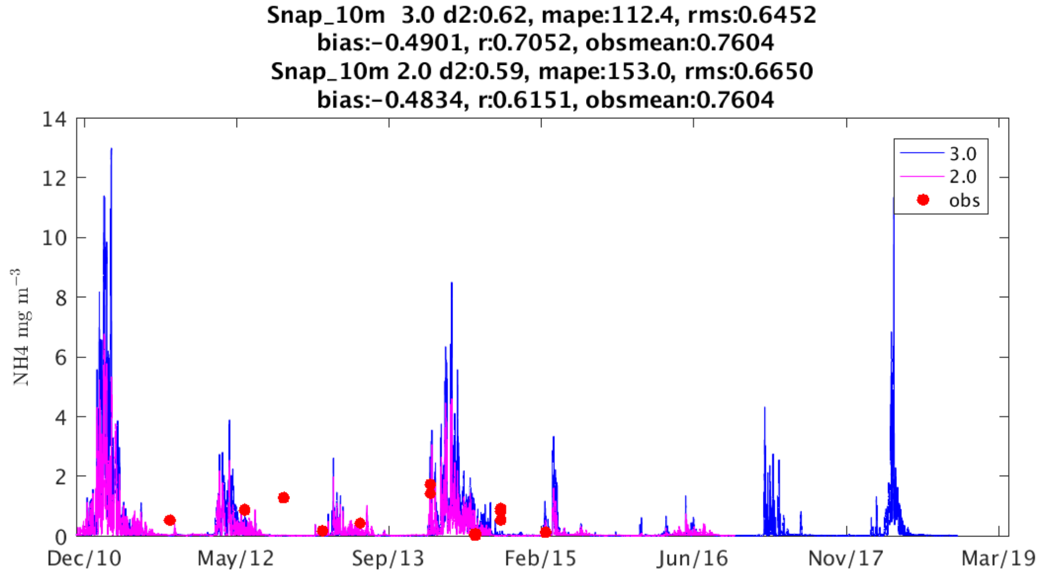
DoubleI520_0m 3.0 d2:0.37, mape:76.4, rms:0.8572
bias:-0.4441, r:-0.0343, obsmean:0.4800
DoubleI520_0m 2.0 d2:0.39, mape:73.3, rms:0.9400
bias:-0.4884, r:-0.1716, obsmean:0.5352

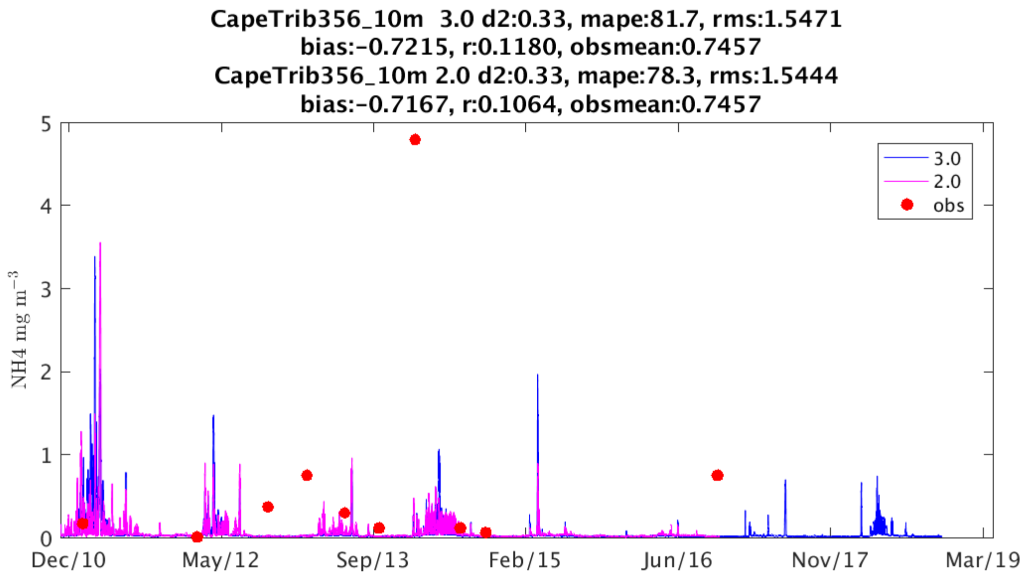


PortD_15m 3.0 d2:0.39, mape:81.6, rms:0.5820
bias:-0.3682, r:0.0638, obsmean:0.4063
PortD_15m 2.0 d2:0.39, mape:79.5, rms:0.6096
bias:-0.3698, r:-0.0474, obsmean:0.4213




PortD_0m 3.0 d2:0.37, mape:78.7, rms:0.5723
bias:-0.3190, r:-0.2731, obsmean:0.3559
PortD_0m 2.0 d2:0.38, mape:74.0, rms:0.6351
bias:-0.3518, r:-0.2453, obsmean:0.3992
NH4 mg m-3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


Snap_10m 3.0 d2:0.62, mape:112.4, rms:0.6452
bias:-0.4901, r:0.7052, obsmean:0.7604
Snap_10m 2.0 d2:0.59, mape:153.0, rms:0.6650
bias:-0.4834, r:0.6151, obsmean:0.7604
NH4 mg m-3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


CapeTrib356_10m 3.0 d2:0.33, mape:81.7, rms:1.5471
bias:-0.7215, r:0.1180, obsmean:0.7457
CapeTrib356_10m 2.0 d2:0.33, mape:78.3, rms:1.5444
bias:-0.7167, r:0.1064, obsmean:0.7457
NH4 mg m-3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

15. Simulated DON assessment against Long Term Monitoring

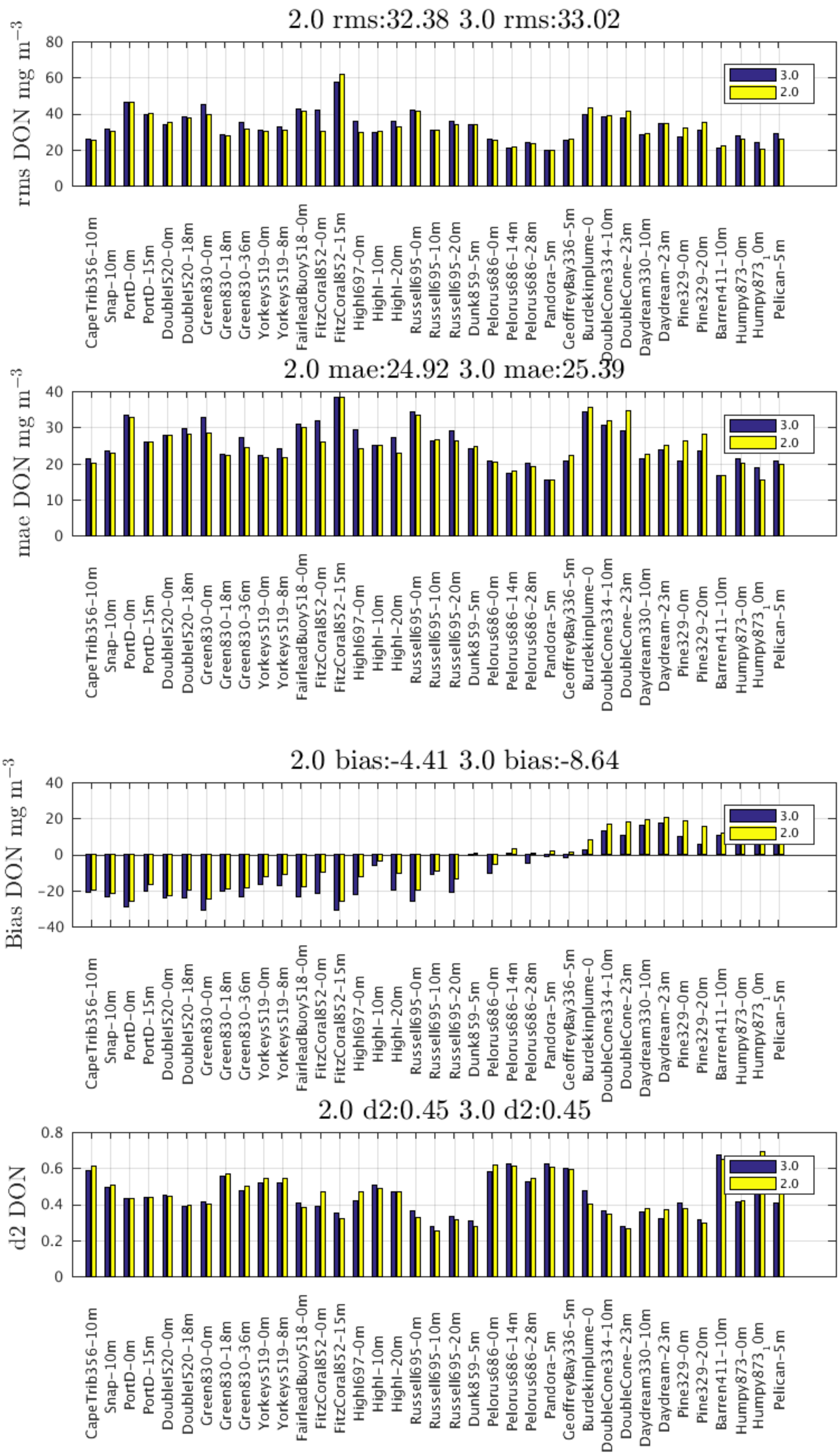
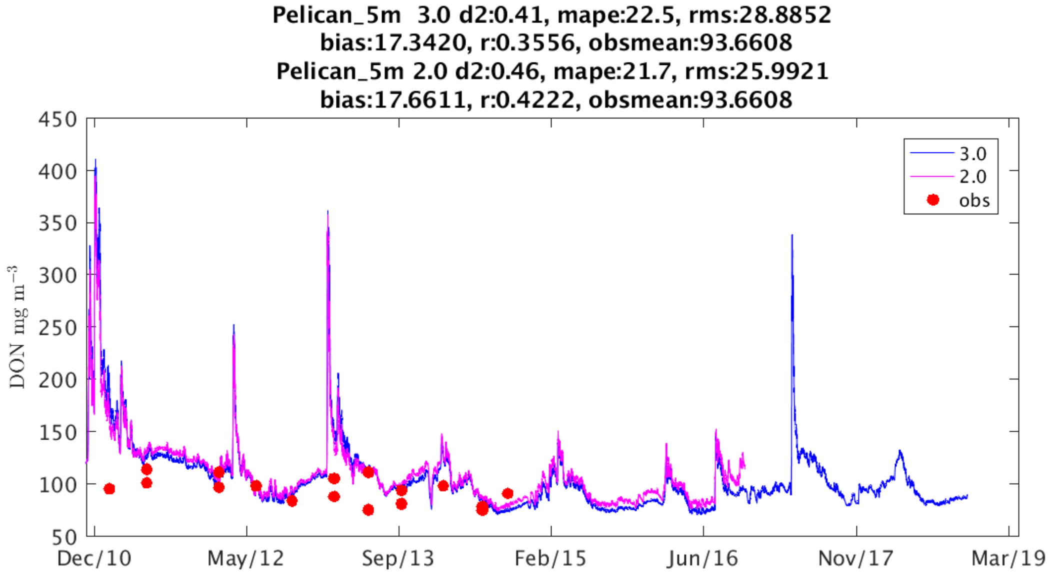
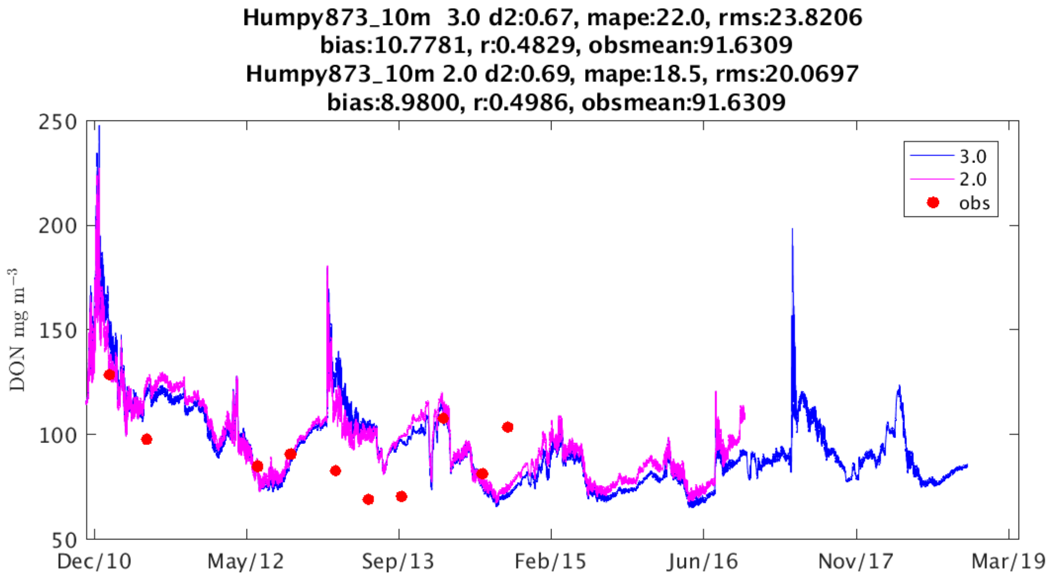
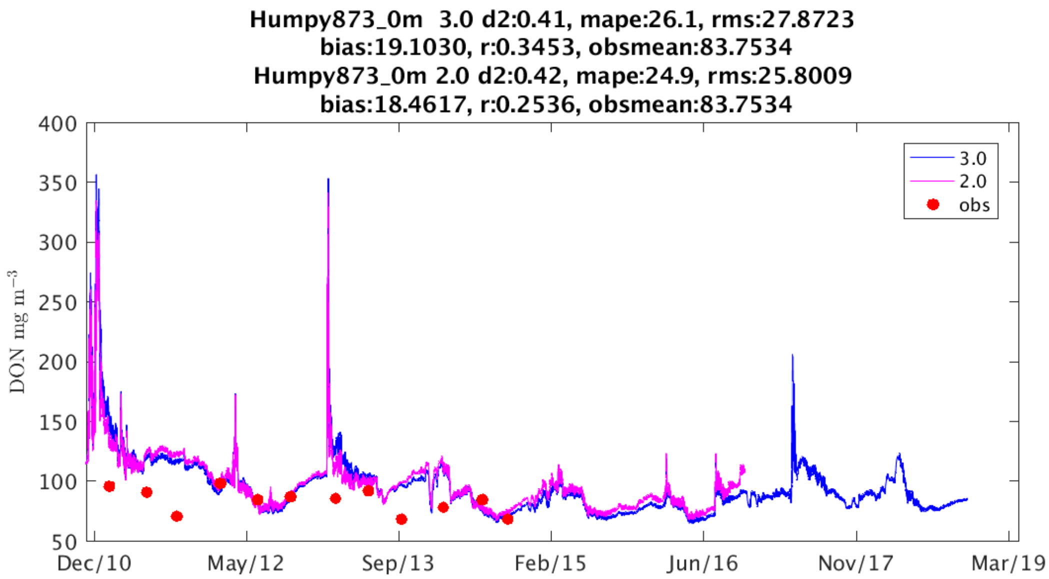


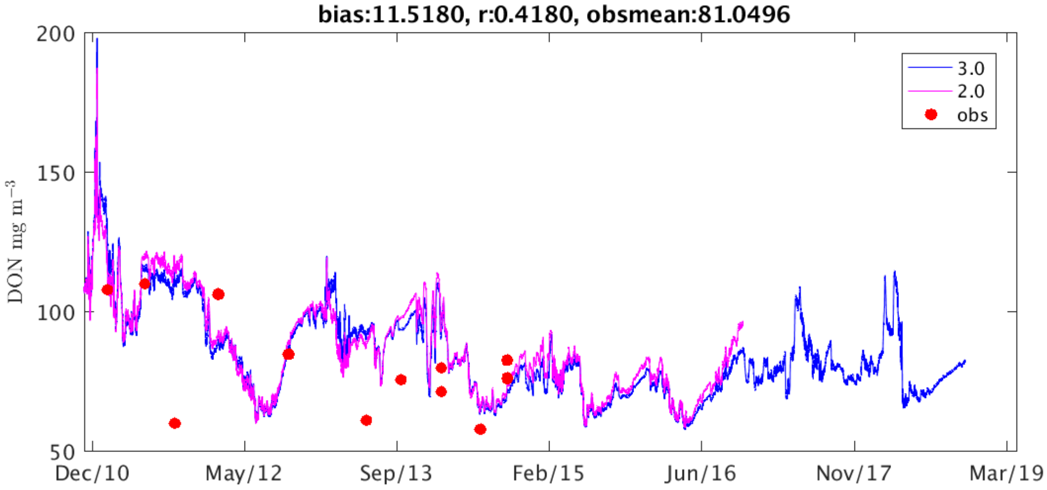
Figure 10 Metrics for Long Term Monitoring sites DON assessment against observations for model version 3p0 and 2p0 d2 = Willmott index see Statistical metric page 27.mae:mean absolute error, rms root mean square


Pelican_5m 3.0 d2:0.41, mape:22.5, rms:28.8852
bias:17.3420, r:0.3556, obsmean:93.6608
Pelican_5m 2.0 d2:0.46, mape:21.7, rms:25.9921
bias:17.6611, r:0.4222, obsmean:93.6608
DON mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

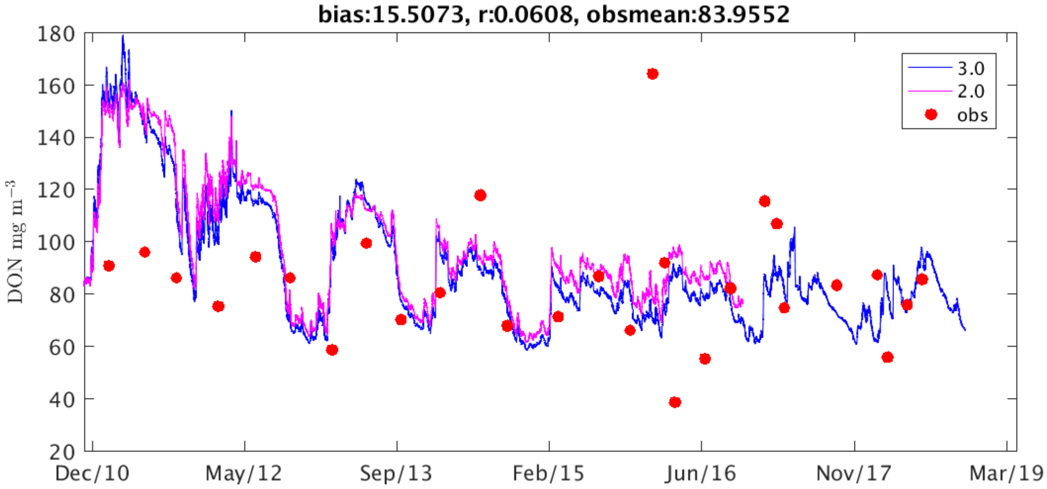

Humpy873_10m 3.0 d2:0.67, mape:22.0, rms:23.8206
bias:10.7781, r:0.4829, obsmean:91.6309
Humpy873_10m 2.0 d2:0.69, mape:18.5, rms:20.0697
bias:8.9800, r:0.4986, obsmean:91.6309
DON mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


Humpy873_0m 3.0 d2:0.41, mape:26.1, rms:27.8723
bias:19.1030, r:0.3453, obsmean:83.7534
Humpy873_0m 2.0 d2:0.42, mape:24.9, rms:25.8009
bias:18.4617, r:0.2536, obsmean:83.7534
DON mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

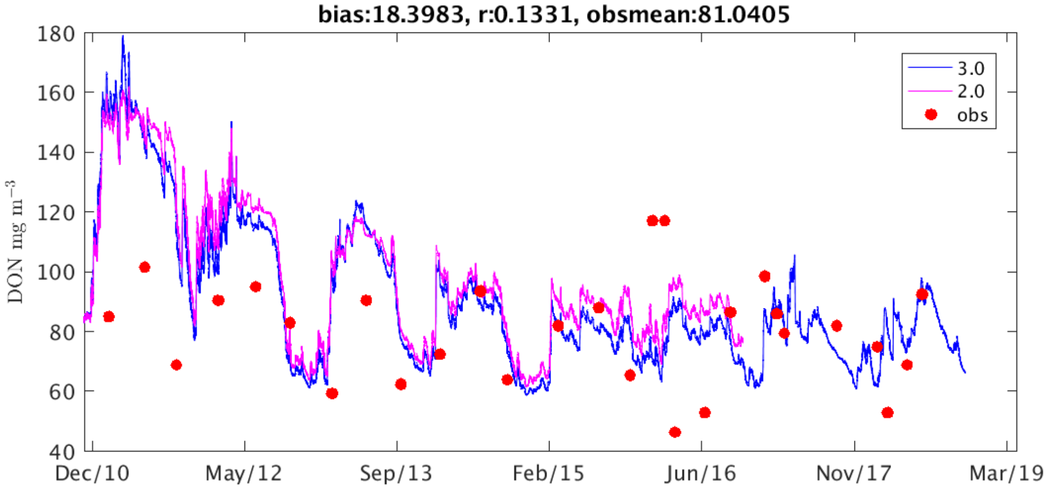
Barren411_10m 3.0 d2:0.67, mape:23.4, rms:21.0593
bias:10.4258, r:0.4532, obsmean:81.0496
Barren411_10m 2.0 d2:0.65, mape:23.7, rms:21.9006
bias:11.5180, r:0.4180, obsmean:81.0496



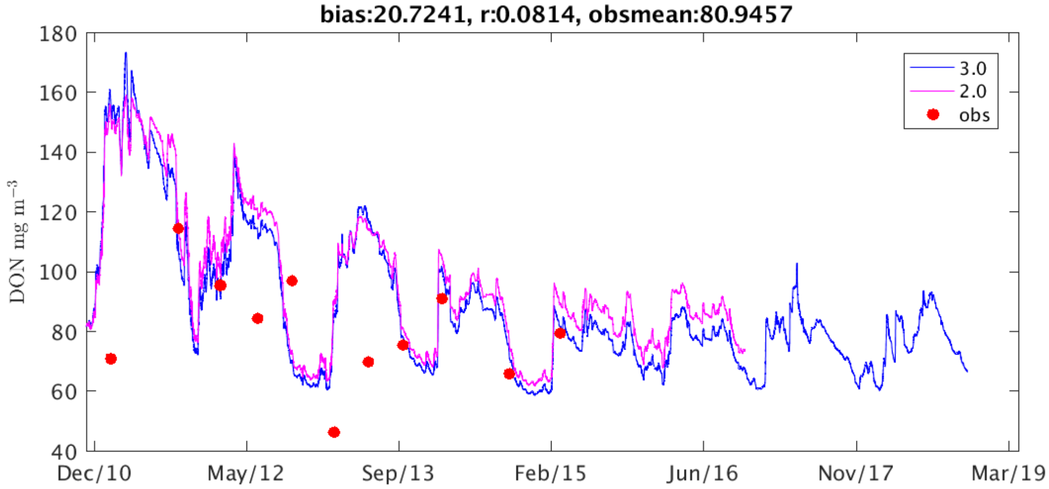
Pine329_20m 3.0 d2:0.32, mape:29.1, rms:30.6085
bias:5.7444, r:0.0798, obsmean:84.4370
Pine329_20m 2.0 d2:0.29, mape:36.8, rms:35.2578
bias:15.5073, r:0.0608, obsmean:83.9552



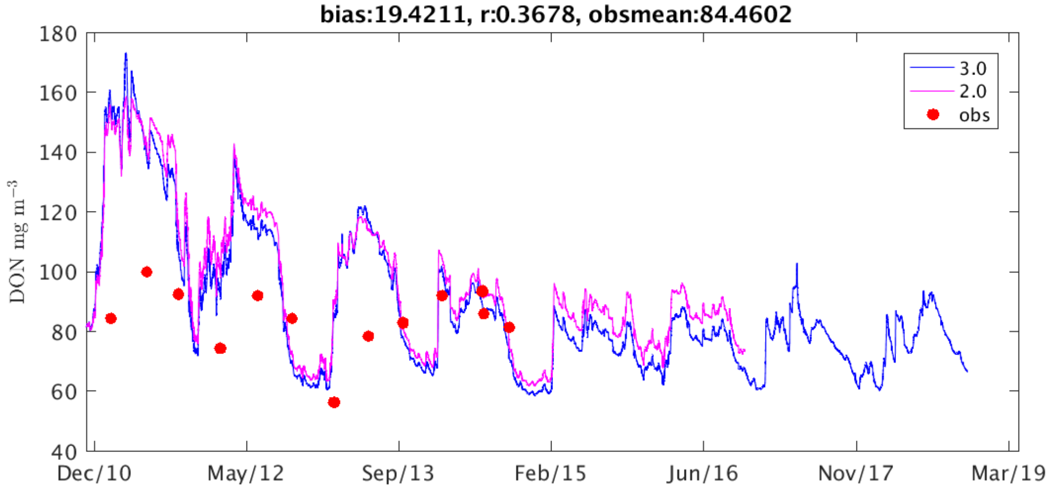
Pine329_0m 3.0 d2:0.41, mape:27.6, rms:26.7687
bias:9.6345, r:0.1666, obsmean:80.5243
Pine329_0m 2.0 d2:0.37, mape:36.1, rms:31.9446
bias:18.3983, r:0.1331, obsmean:81.0405



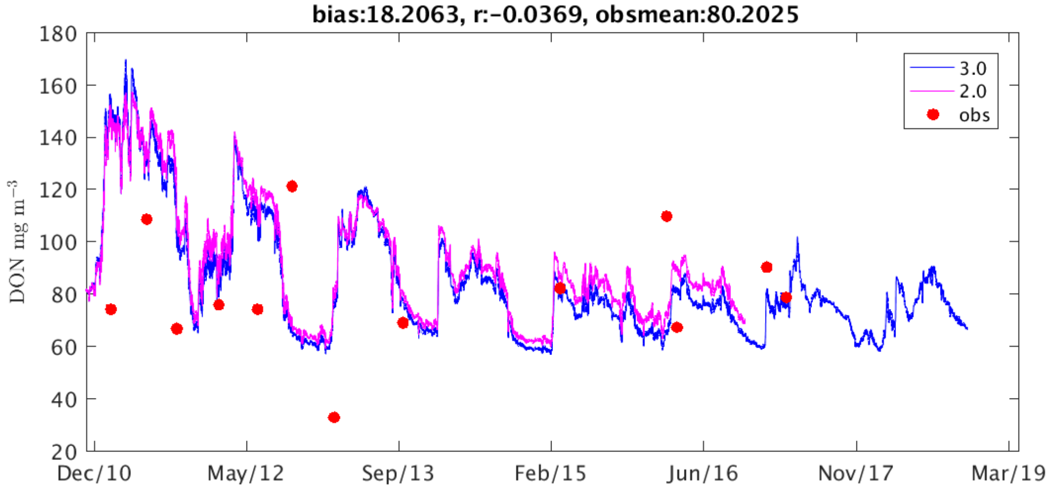
Daydream_23m 3.0 d2:0.32, mape:33.9, rms:34.3948
bias:17.1074, r:0.0127, obsmean:80.9457
Daydream_23m 2.0 d2:0.37, mape:36.1, rms:34.2327
bias:20.7241, r:0.0814, obsmean:80.9457



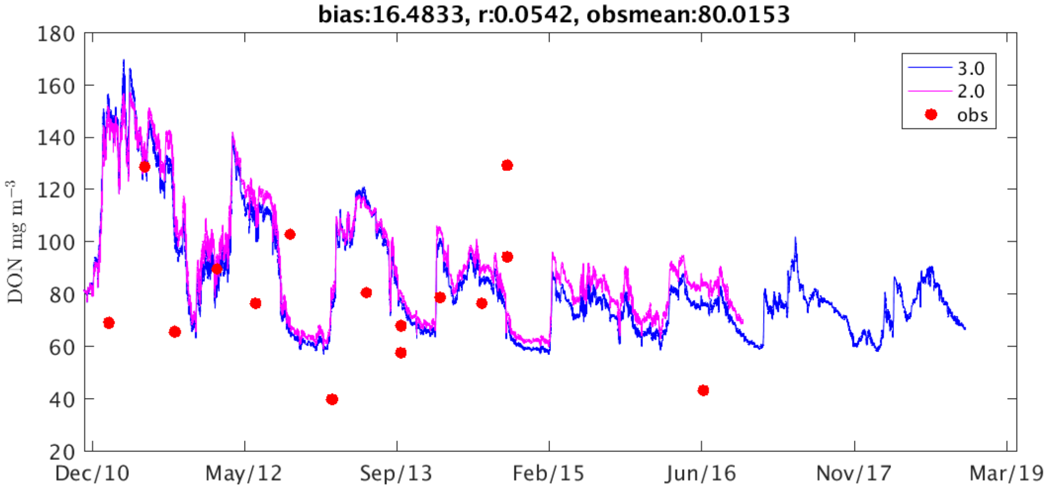
Daydream330_10m 3.0 d2:0.35, mape:26.1, rms:28.4454
bias:16.1303, r:0.3373, obsmean:84.4602
Daydream330_10m 2.0 d2:0.37, mape:27.5, rms:29.0659
bias:19.4211, r:0.3678, obsmean:84.4602



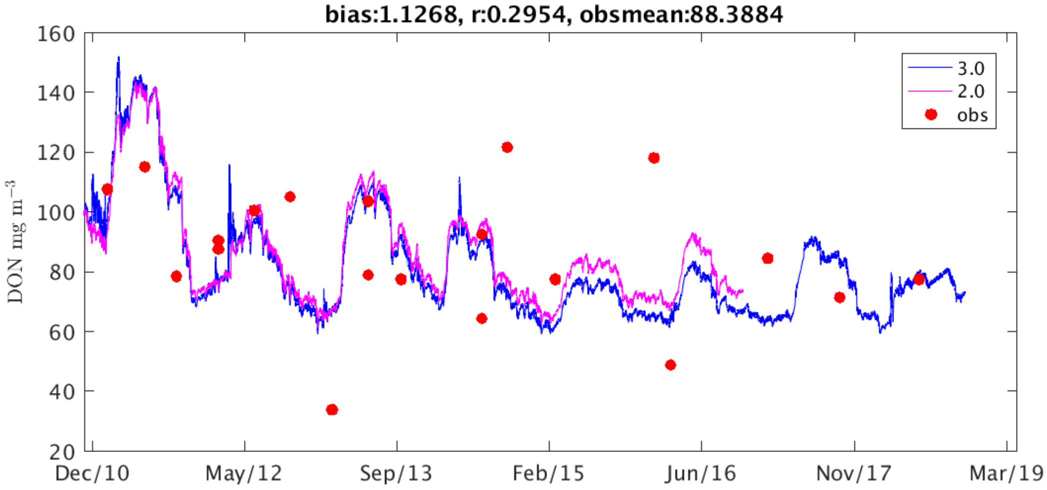
DoubleCone_23m 3.0 d2:0.28, mape:40.1, rms:37.7251
bias:10.4776, r:-0.0423, obsmean:80.8608
DoubleCone_23m 2.0 d2:0.27, mape:49.4, rms:41.0062
bias:18.2063, r:-0.0369, obsmean:80.2025



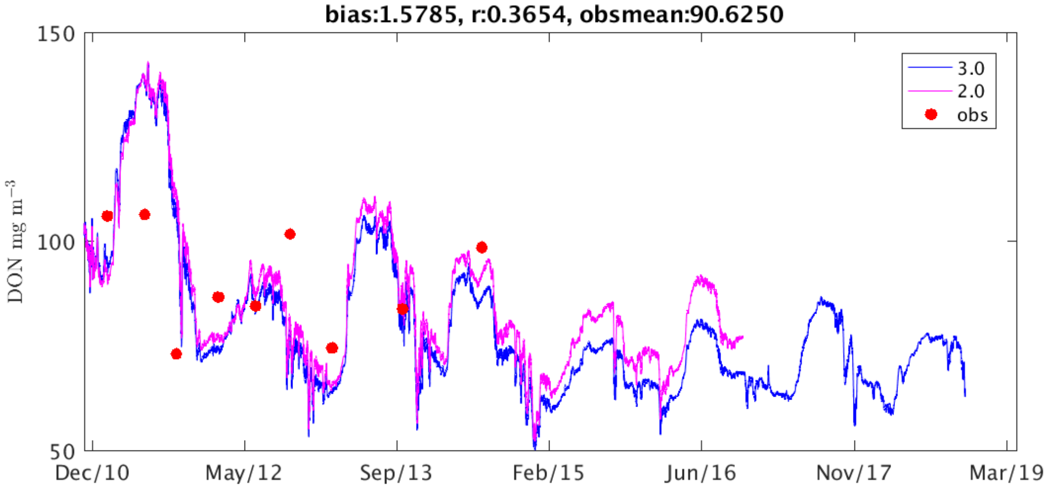
DoubleCone334_10m 3.0 d2:0.36, mape:43.1, rms:38.1129
bias:13.2573, r:0.0655, obsmean:80.0153
DoubleCone334_10m 2.0 d2:0.34, mape:46.1, rms:38.4647
bias:16.4833, r:0.0542, obsmean:80.0153

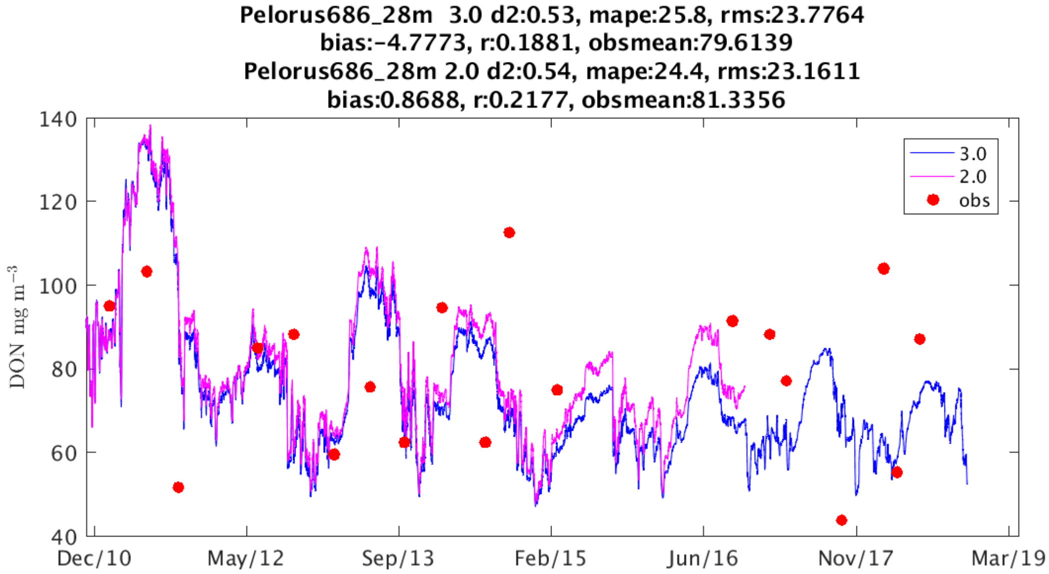


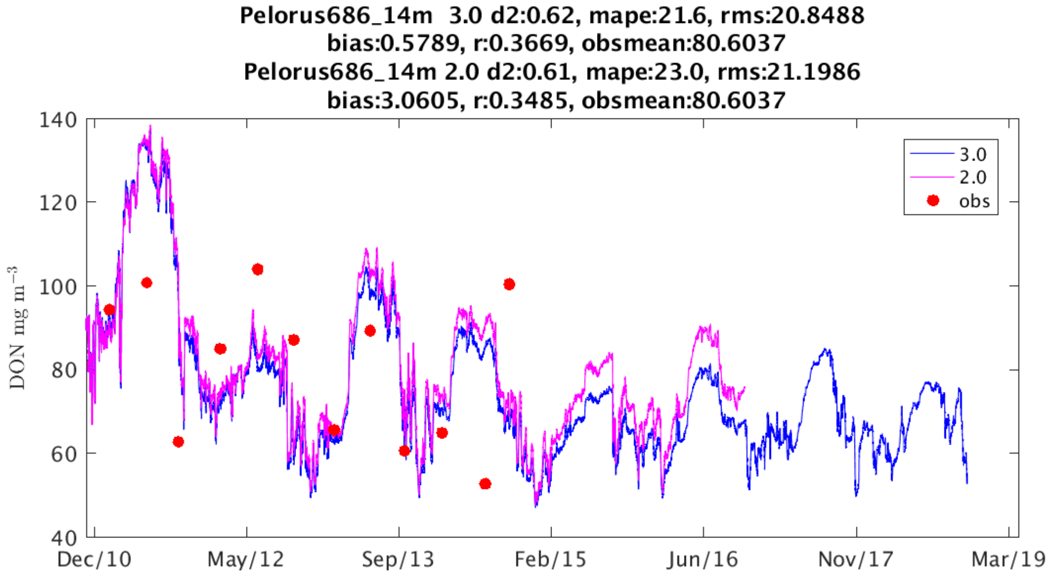
GeoffreyBay336_5m 3.0 d2:0.60, mape:26.5, rms:25.0887
bias:-1.7775, r:0.3018, obsmean:87.2797
GeoffreyBay336_5m 2.0 d2:0.59, mape:28.7, rms:25.7535
bias:1.1268, r:0.2954, obsmean:88.3884

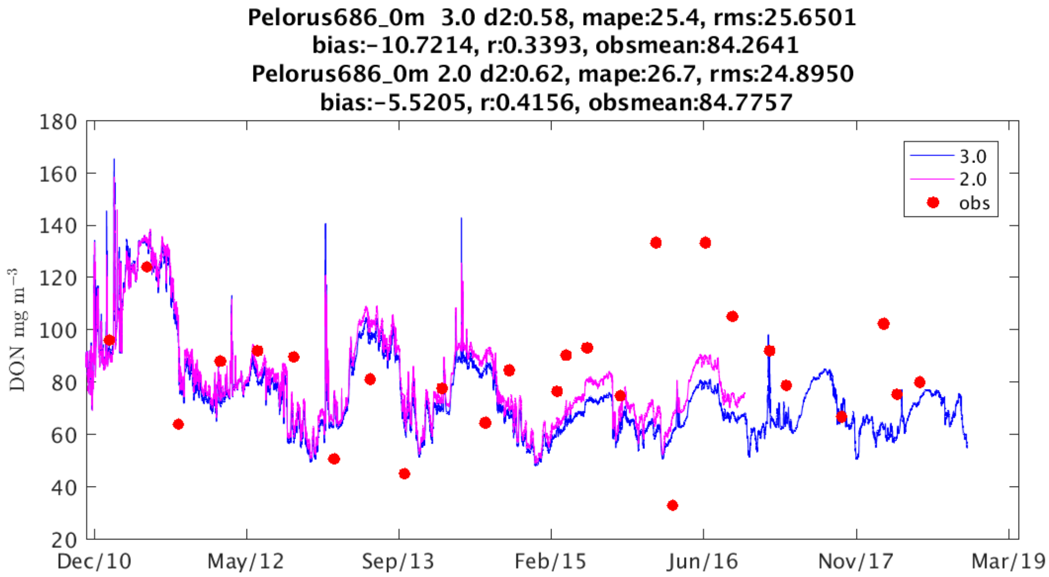


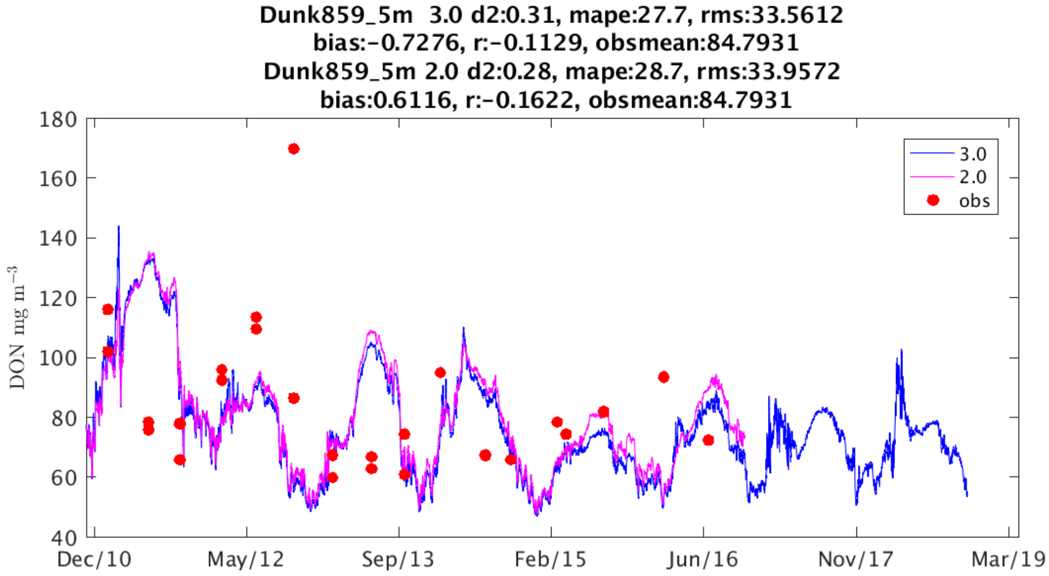
Pandora_5m 3.0 d2:0.63, mape:17.0, rms:19.3077
bias:-0.9496, r:0.4027, obsmean:90.6250
Pandora_5m 2.0 d2:0.60, mape:17.3, rms:19.5210
bias:1.5785, r:0.3654, obsmean:90.6250

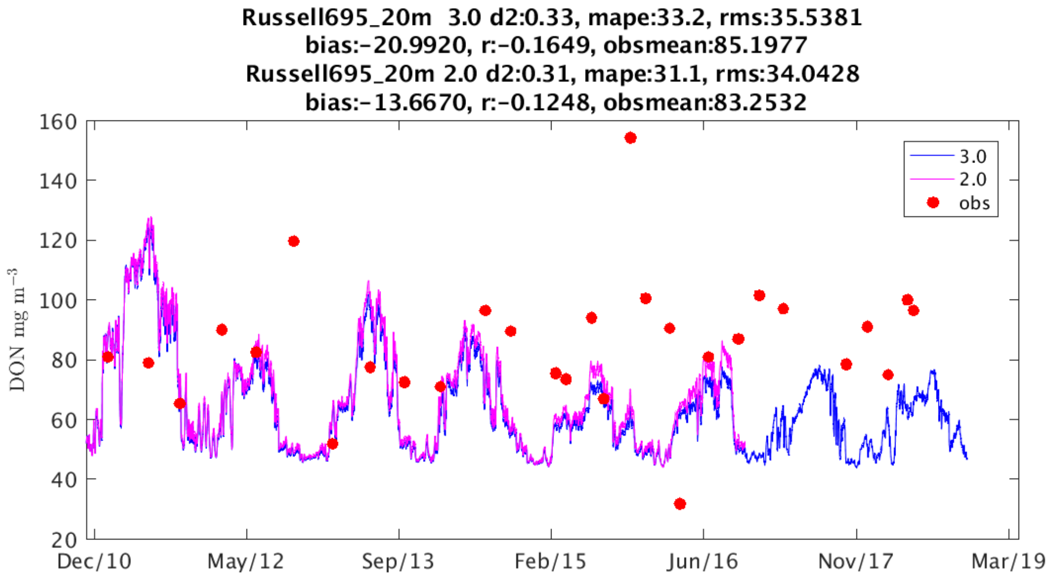


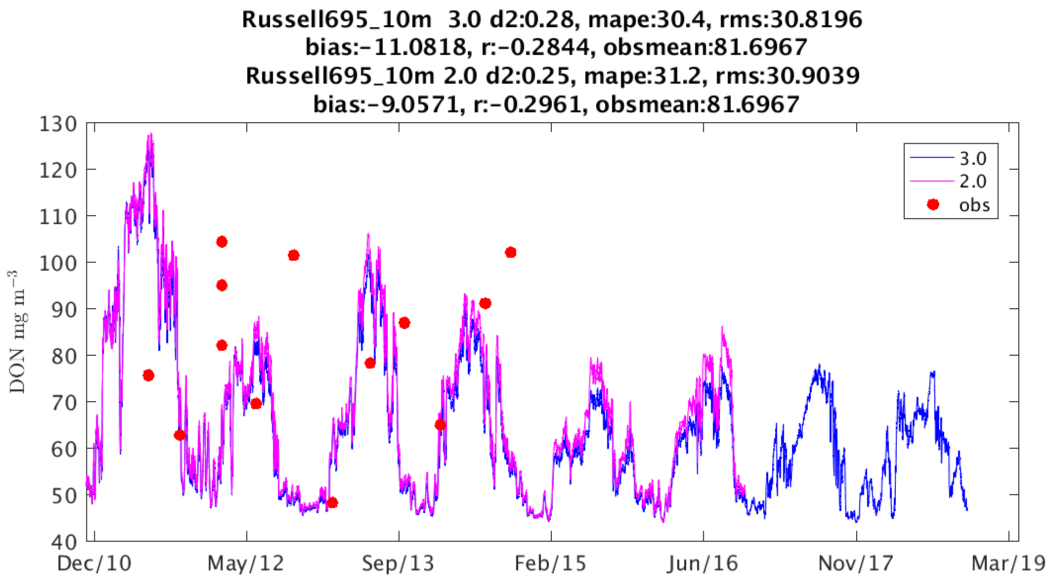

Pelorus686_28m 3.0 d2:0.53, mape:25.8, rms:23.7764
bias:-4.7773, r:0.1881, obsmean:79.6139
Pelorus686_28m 2.0 d2:0.54, mape:24.4, rms:23.1611
bias:0.8688, r:0.2177, obsmean:81.3356
DON mg m^{-3}
140
120
100
80
60
40
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19
3.0
2.0
obs


Pelorus686_14m 3.0 d2:0.62, mape:21.6, rms:20.8488
bias:0.5789, r:0.3669, obsmean:80.6037
Pelorus686_14m 2.0 d2:0.61, mape:23.0, rms:21.1986
bias:3.0605, r:0.3485, obsmean:80.6037
DON mg m^{-3}
140
120
100
80
60
40
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19
3.0
2.0
obs

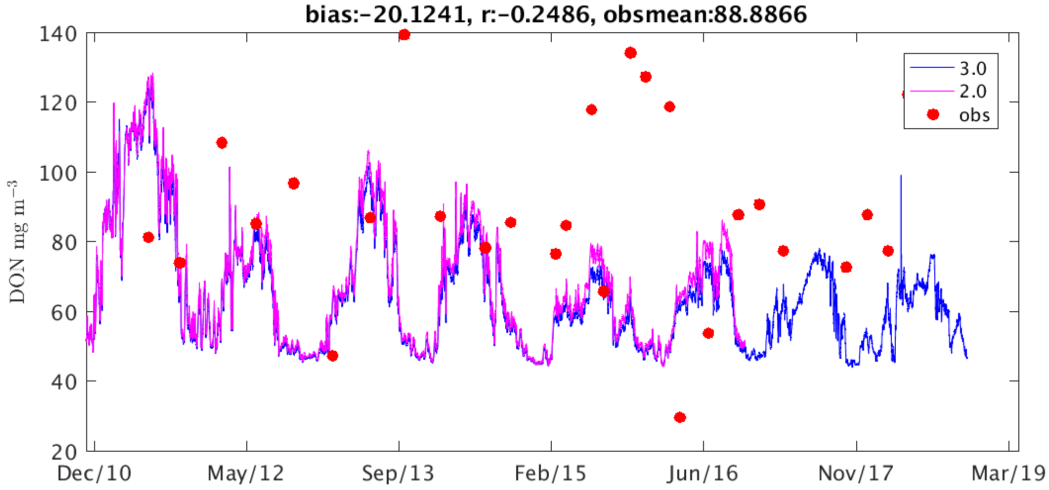

Pelorus686_0m 3.0 d2:0.58, mape:25.4, rms:25.6501
bias:-10.7214, r:0.3393, obsmean:84.2641
Pelorus686_0m 2.0 d2:0.62, mape:26.7, rms:24.8950
bias:-5.5205, r:0.4156, obsmean:84.7757
DON mg m^{-3}
180
160
140
120
100
80
60
40
20
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19
3.0
2.0
obs


Dunk859_5m 3.0 d2:0.31, mape:27.7, rms:33.5612
bias:-0.7276, r:-0.1129, obsmean:84.7931
Dunk859_5m 2.0 d2:0.28, mape:28.7, rms:33.9572
bias:0.6116, r:-0.1622, obsmean:84.7931
DON mg m^-3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

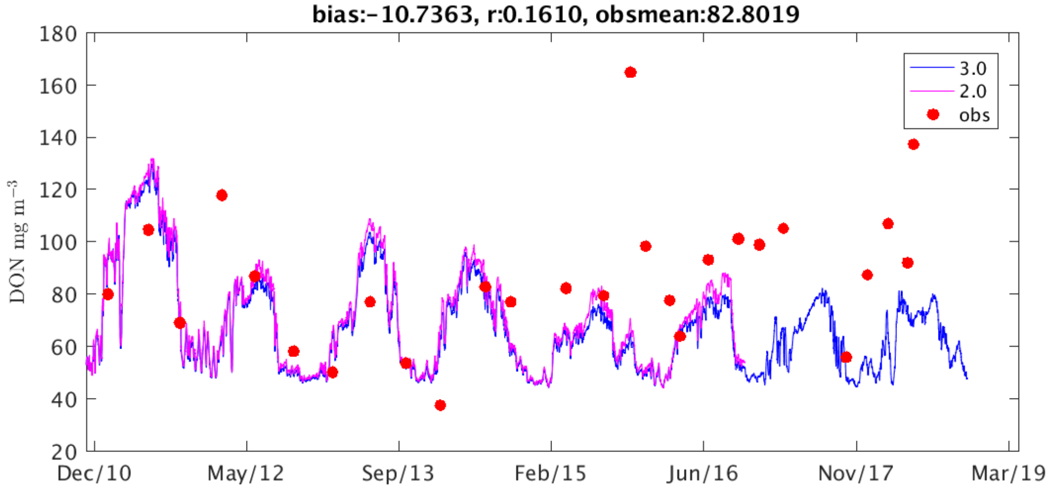

Russell695_20m 3.0 d2:0.33, mape:33.2, rms:35.5381
bias:-20.9920, r:-0.1649, obsmean:85.1977
Russell695_20m 2.0 d2:0.31, mape:31.1, rms:34.0428
bias:-13.6670, r:-0.1248, obsmean:83.2532
DON mg m^-3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


Russell695_10m 3.0 d2:0.28, mape:30.4, rms:30.8196
bias:-11.0818, r:-0.2844, obsmean:81.6967
Russell695_10m 2.0 d2:0.25, mape:31.2, rms:30.9039
bias:-9.0571, r:-0.2961, obsmean:81.6967
DON mg m^-3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

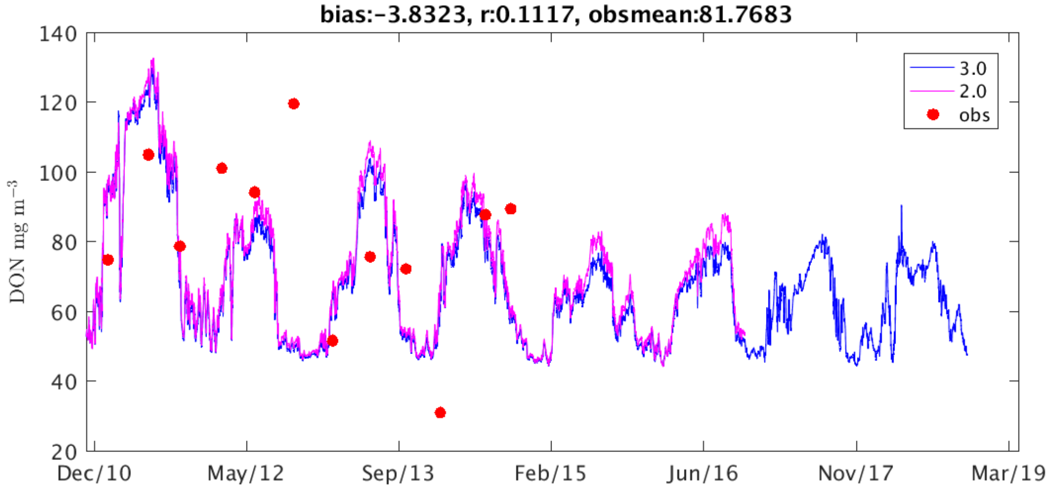
Russell695_0m 3.0 d2:0.36, mape:36.9, rms:41.8686
bias:-25.9955, r:-0.1984, obsmean:90.0550
Russell695_0m 2.0 d2:0.32, mape:37.5, rms:41.4331
bias:-20.1241, r:-0.2486, obsmean:88.8866

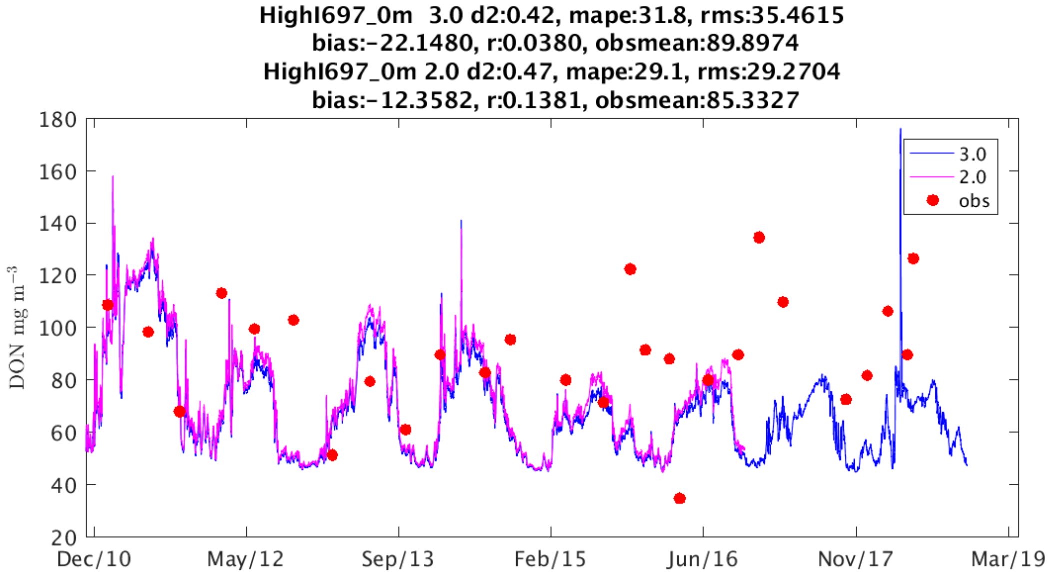


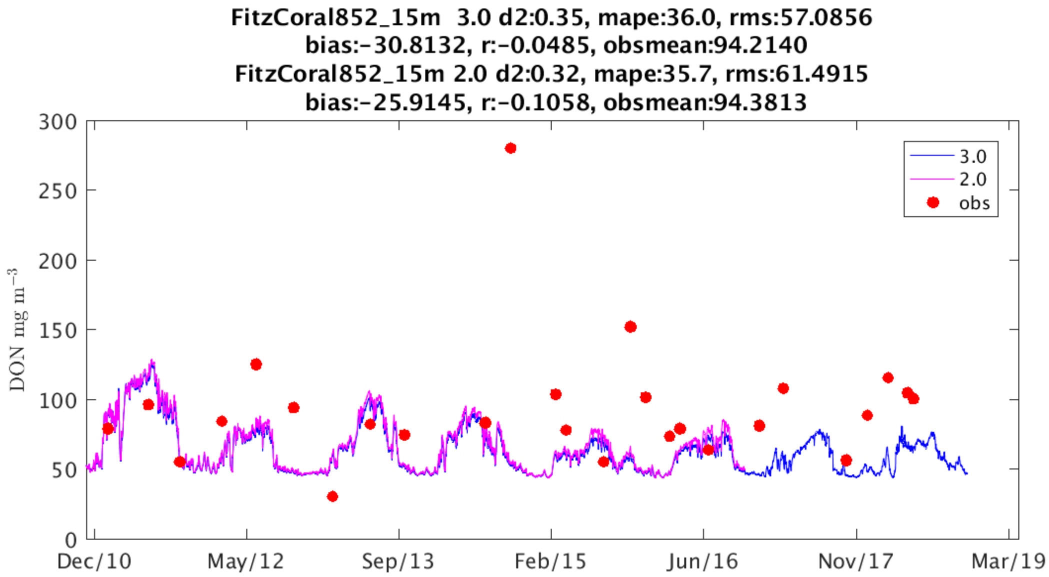
HighI_20m 3.0 d2:0.47, mape:28.8, rms:35.7884
bias:-19.9281, r:0.1298, obsmean:86.6509
HighI_20m 2.0 d2:0.47, mape:25.8, rms:32.3114
bias:-10.7363, r:0.1610, obsmean:82.8019

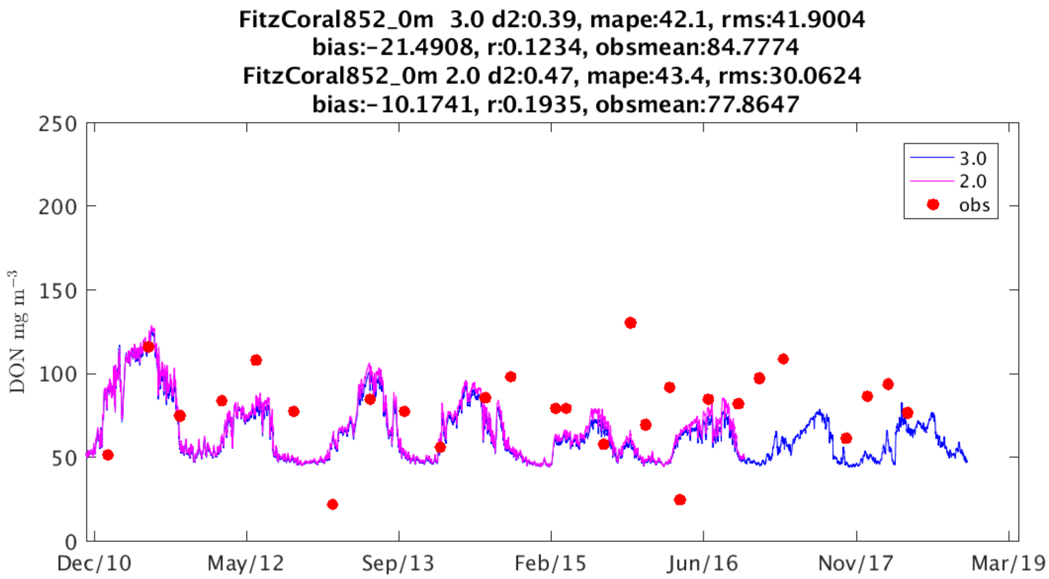


HighI_10m 3.0 d2:0.51, mape:33.5, rms:29.7411
bias:-6.4812, r:0.1271, obsmean:81.7683
HighI_10m 2.0 d2:0.49, mape:34.4, rms:30.0727
bias:-3.8323, r:0.1117, obsmean:81.7683

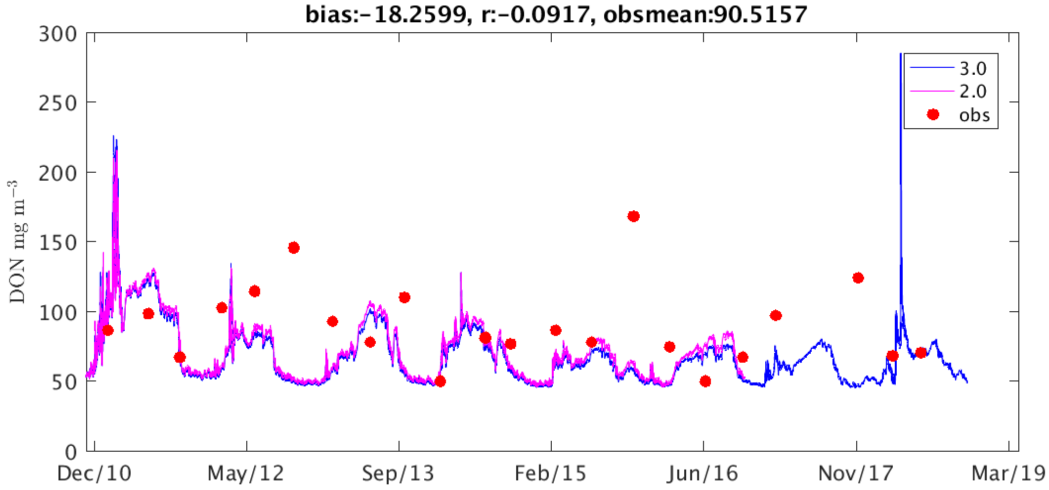



Highl697_0m 3.0 d2:0.42, mape:31.8, rms:35.4615
bias:-22.1480, r:0.0380, obsmean:89.8974
Highl697_0m 2.0 d2:0.47, mape:29.1, rms:29.2704
bias:-12.3582, r:0.1381, obsmean:85.3327
DON mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

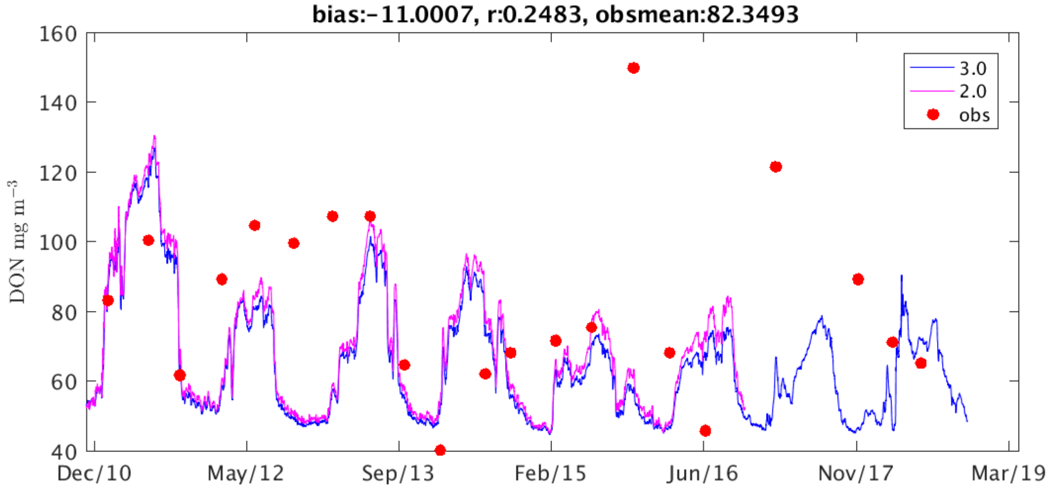

FitzCoral852_15m 3.0 d2:0.35, mape:36.0, rms:57.0856
bias:-30.8132, r:-0.0485, obsmean:94.2140
FitzCoral852_15m 2.0 d2:0.32, mape:35.7, rms:61.4915
bias:-25.9145, r:-0.1058, obsmean:94.3813
DON mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


FitzCoral852_0m 3.0 d2:0.39, mape:42.1, rms:41.9004
bias:-21.4908, r:0.1234, obsmean:84.7774
FitzCoral852_0m 2.0 d2:0.47, mape:43.4, rms:30.0624
bias:-10.1741, r:0.1935, obsmean:77.8647
DON mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

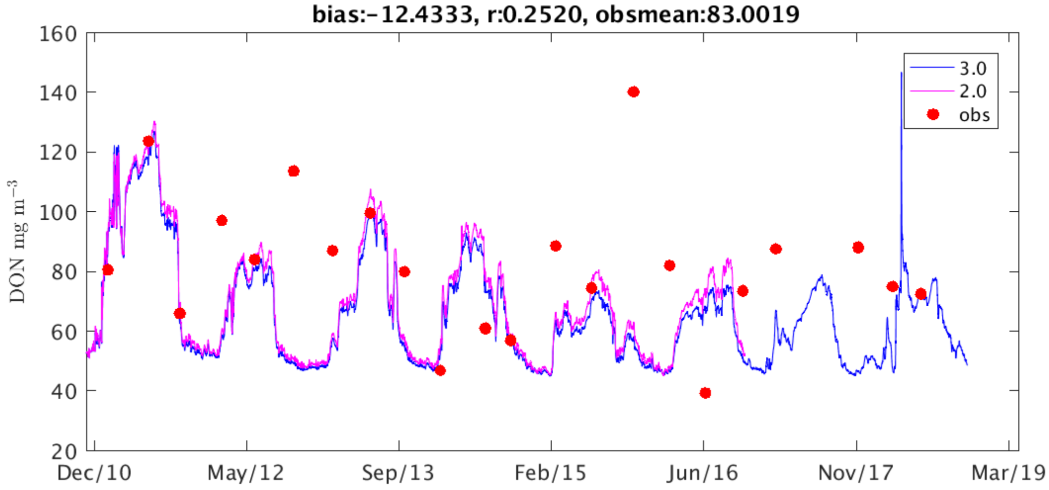
FairleadBuoy518_0m 3.0 d2:0.40, mape:29.8, rms:42.2591
bias:-23.2919, r:-0.1050, obsmean:90.4248
FairleadBuoy518_0m 2.0 d2:0.38, mape:29.4, rms:41.1393
bias:-18.2599, r:-0.0917, obsmean:90.5157

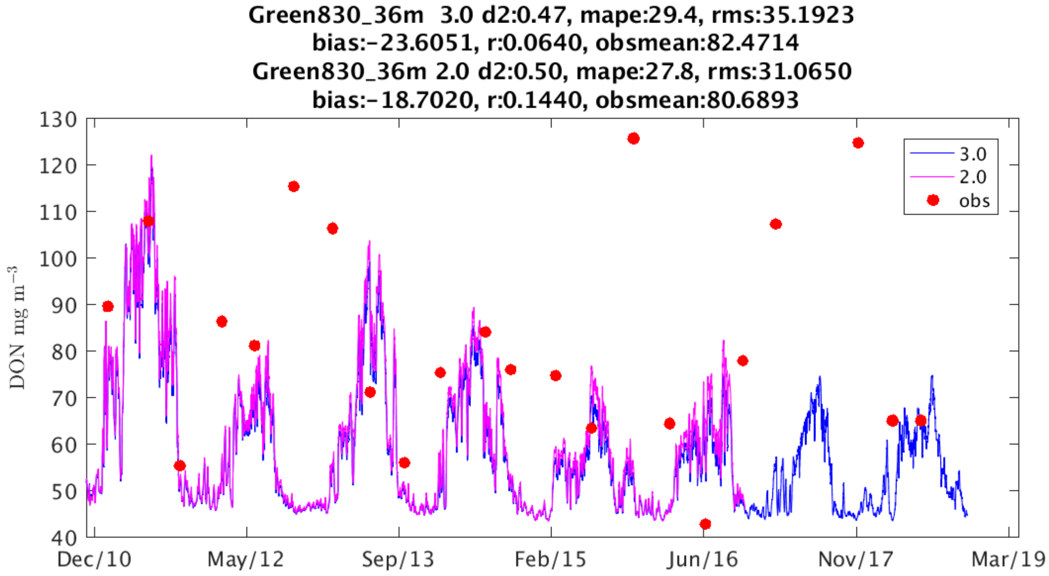


Yorkeys519_8m 3.0 d2:0.52, mape:26.8, rms:32.6685
bias:-17.1162, r:0.2130, obsmean:83.1736
Yorkeys519_8m 2.0 d2:0.54, mape:25.1, rms:30.4703
bias:-11.0007, r:0.2483, obsmean:82.3493

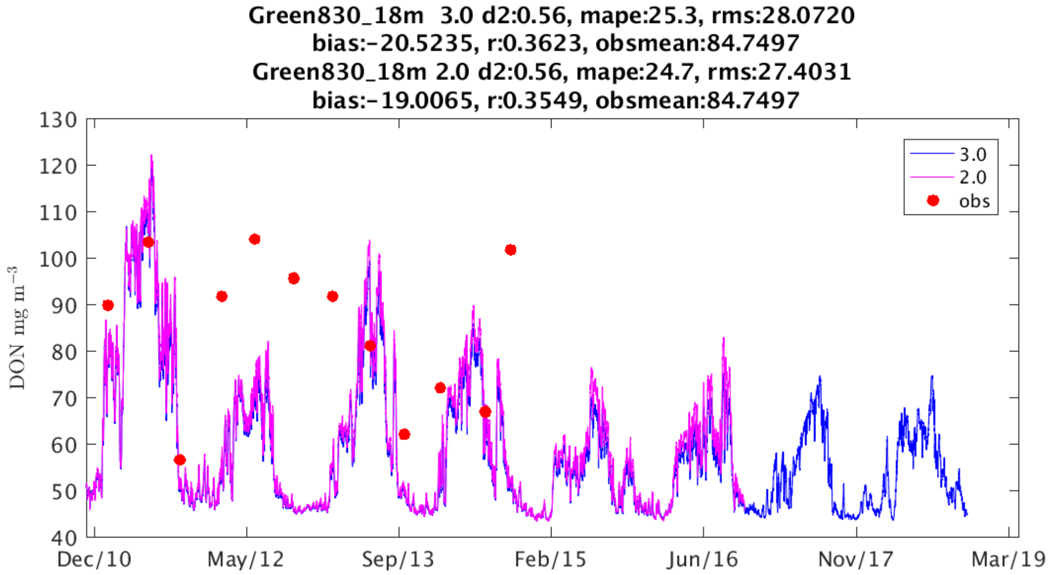


Yorkeys519_0m 3.0 d2:0.52, mape:25.9, rms:30.4519
bias:-16.8809, r:0.2419, obsmean:82.5698
Yorkeys519_0m 2.0 d2:0.54, mape:25.8, rms:30.0757
bias:-12.4333, r:0.2520, obsmean:83.0019

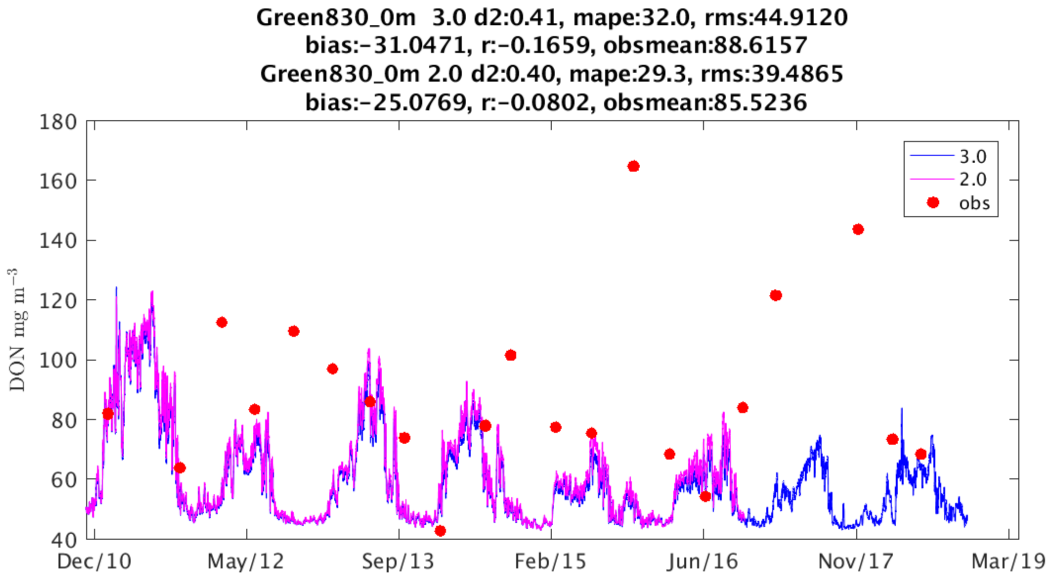




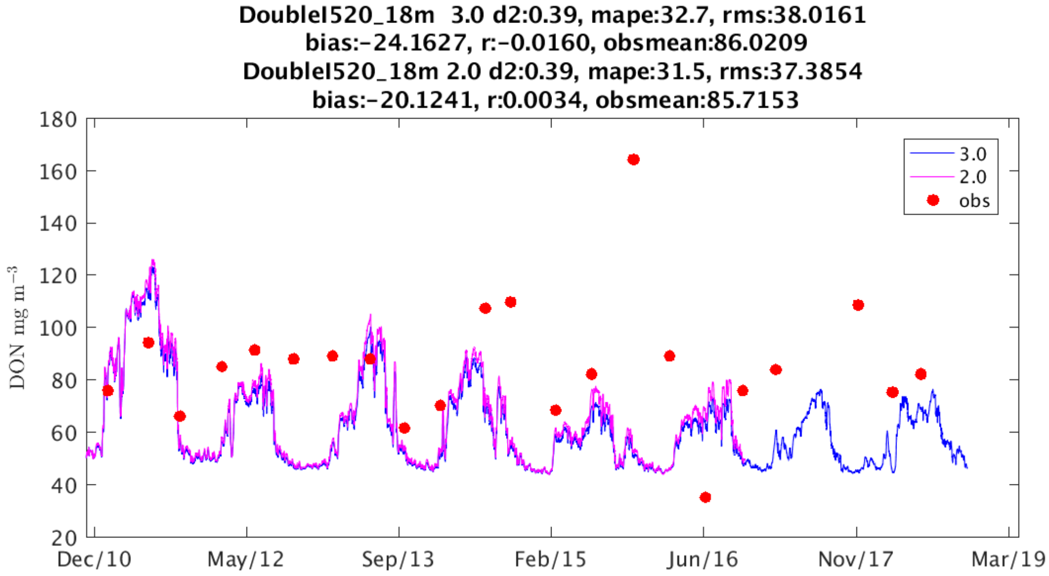
Green830_36m 3.0 d2:0.47, mape:29.4, rms:35.1923
bias:-23.6051, r:0.0640, obsmean:82.4714
Green830_36m 2.0 d2:0.50, mape:27.8, rms:31.0650
bias:-18.7020, r:0.1440, obsmean:80.6893
DON mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

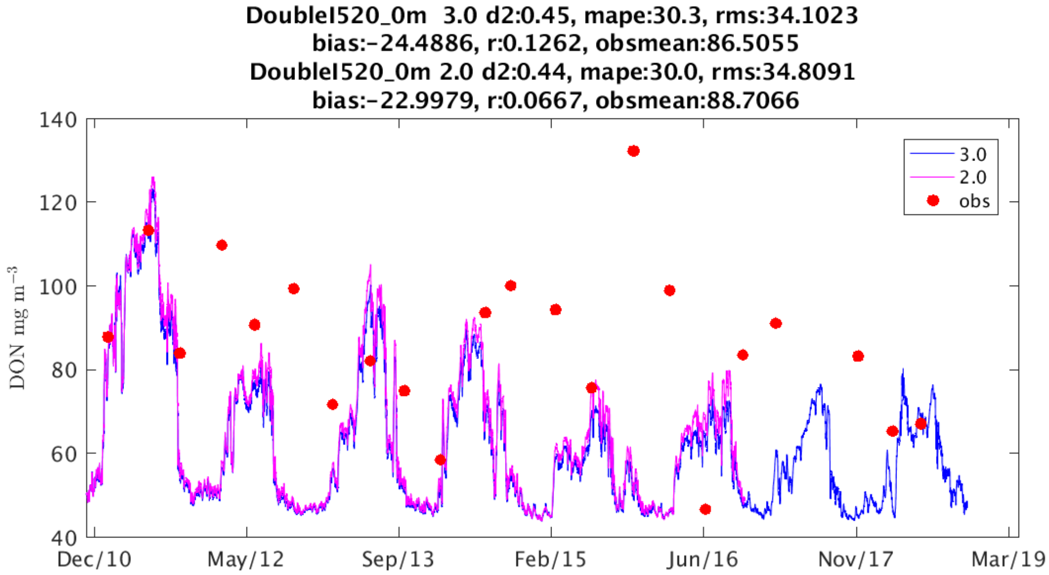


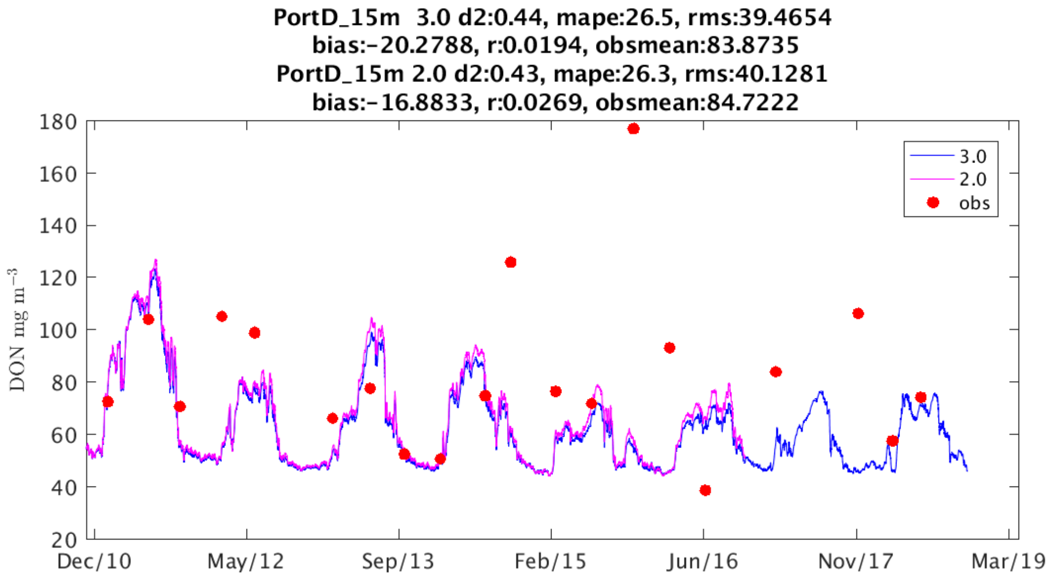
Green830_18m 3.0 d2:0.56, mape:25.3, rms:28.0720
bias:-20.5235, r:0.3623, obsmean:84.7497
Green830_18m 2.0 d2:0.56, mape:24.7, rms:27.4031
bias:-19.0065, r:0.3549, obsmean:84.7497
DON mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

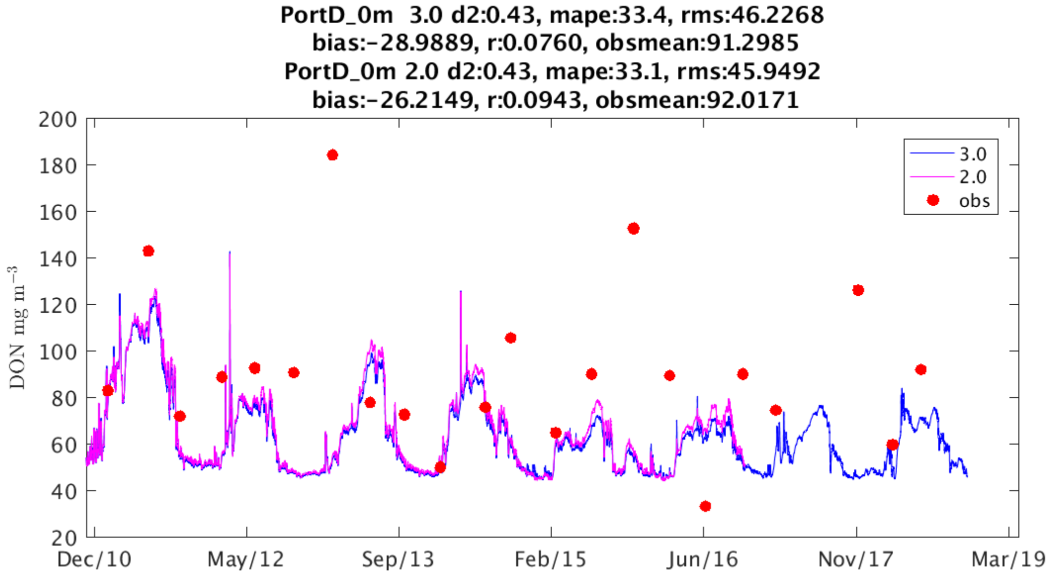


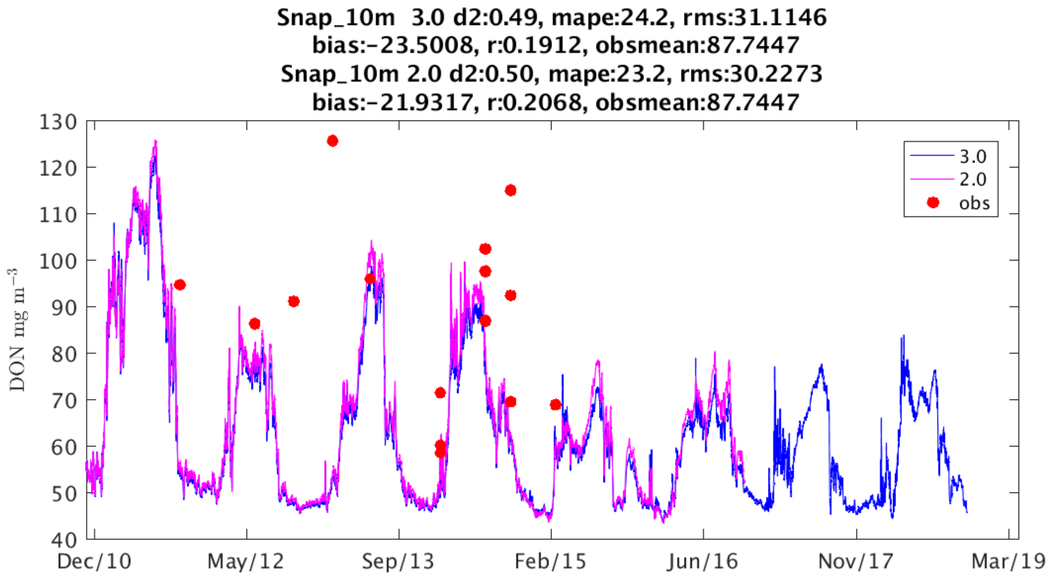
Green830_0m 3.0 d2:0.41, mape:32.0, rms:44.9120
bias:-31.0471, r:-0.1659, obsmean:88.6157
Green830_0m 2.0 d2:0.40, mape:29.3, rms:39.4865
bias:-25.0769, r:-0.0802, obsmean:85.5236
DON mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

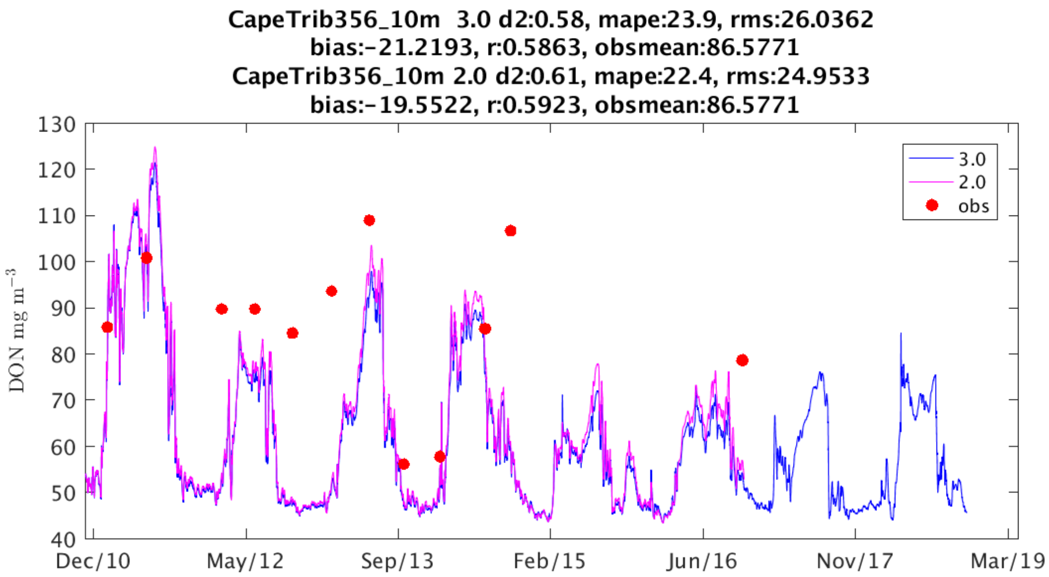

DoubleI520_18m 3.0 d2:0.39, mape:32.7, rms:38.0161
bias:-24.1627, r:-0.0160, obsmean:86.0209
DoubleI520_18m 2.0 d2:0.39, mape:31.5, rms:37.3854
bias:-20.1241, r:0.0034, obsmean:85.7153
DON mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


DoubleI520_0m 3.0 d2:0.45, mape:30.3, rms:34.1023
bias:-24.4886, r:0.1262, obsmean:86.5055
DoubleI520_0m 2.0 d2:0.44, mape:30.0, rms:34.8091
bias:-22.9979, r:0.0667, obsmean:88.7066
DON mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


PortD_15m 3.0 d2:0.44, mape:26.5, rms:39.4654
bias:-20.2788, r:0.0194, obsmean:83.8735
PortD_15m 2.0 d2:0.43, mape:26.3, rms:40.1281
bias:-16.8833, r:0.0269, obsmean:84.7222
DON mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


PortD_0m 3.0 d2:0.43, mape:33.4, rms:46.2268
bias:-28.9889, r:0.0760, obsmean:91.2985
PortD_0m 2.0 d2:0.43, mape:33.1, rms:45.9492
bias:-26.2149, r:0.0943, obsmean:92.0171
DON mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


Snap_10m 3.0 d2:0.49, mape:24.2, rms:31.1146
bias:-23.5008, r:0.1912, obsmean:87.7447
Snap_10m 2.0 d2:0.50, mape:23.2, rms:30.2273
bias:-21.9317, r:0.2068, obsmean:87.7447
DON mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


CapeTrib356_10m 3.0 d2:0.58, mape:23.9, rms:26.0362
bias:-21.2193, r:0.5863, obsmean:86.5771
CapeTrib356_10m 2.0 d2:0.61, mape:22.4, rms:24.9533
bias:-19.5522, r:0.5923, obsmean:86.5771
DON mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

16. Simulated DOP assessment against Long Term Monitoring

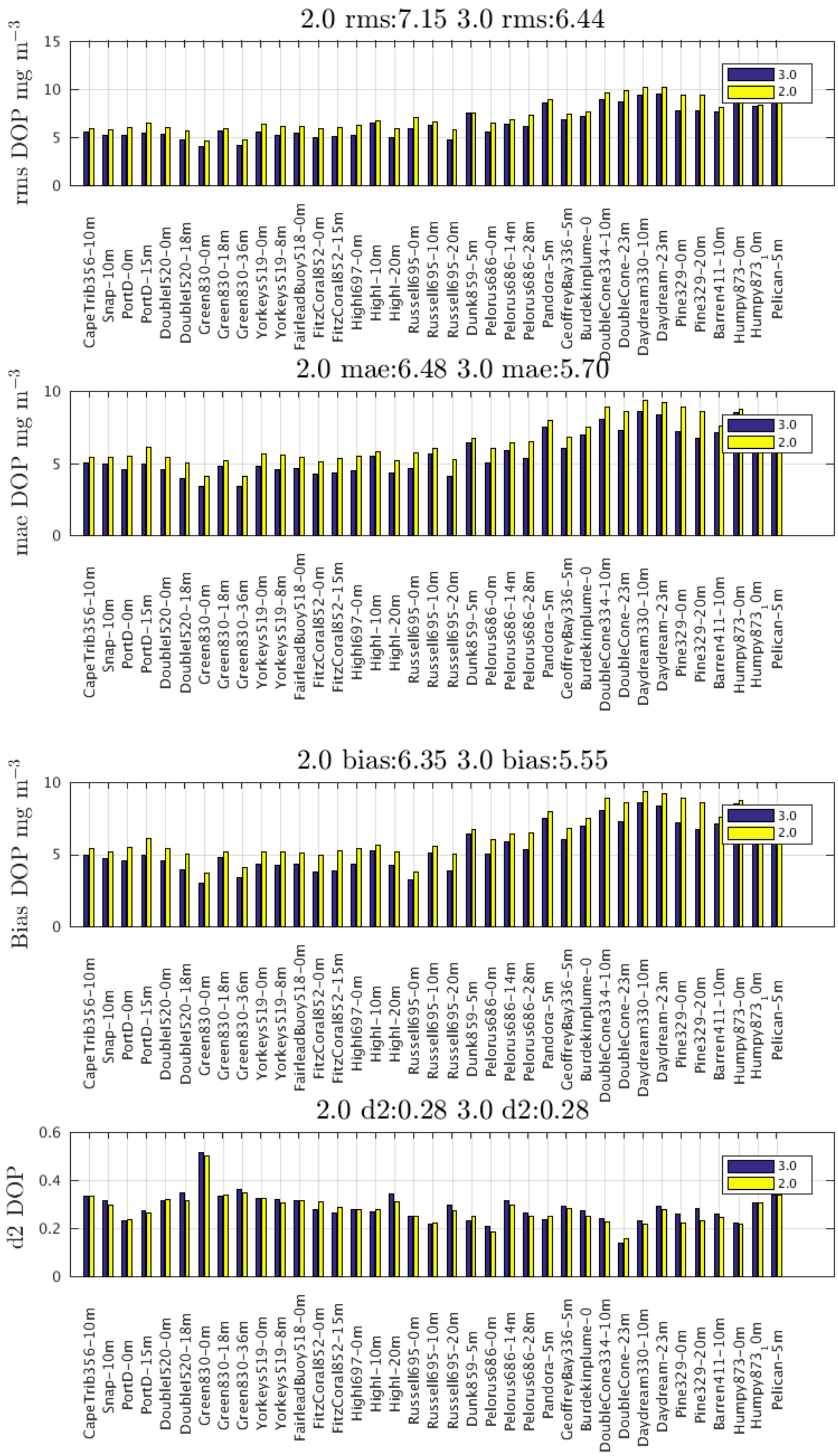
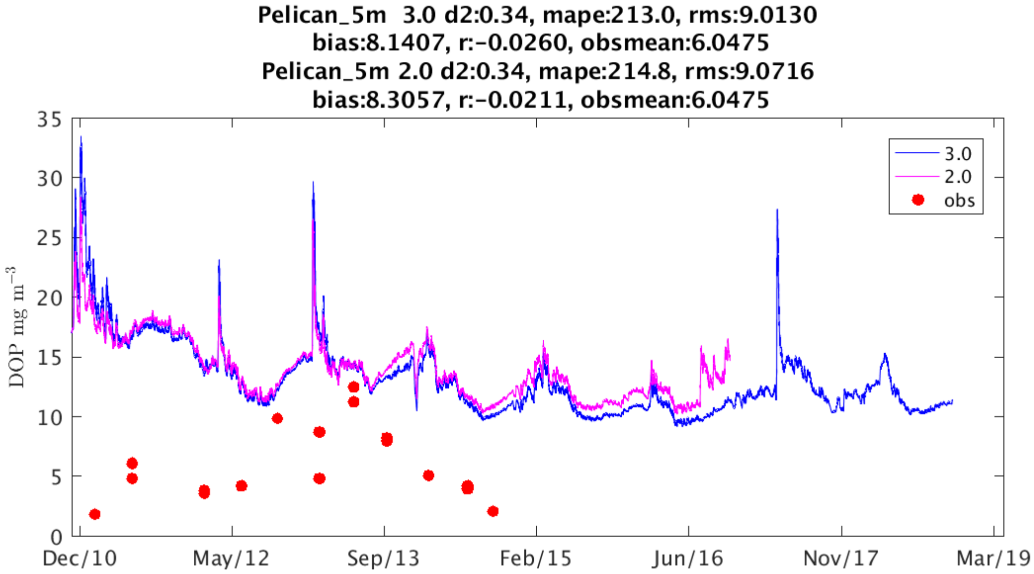
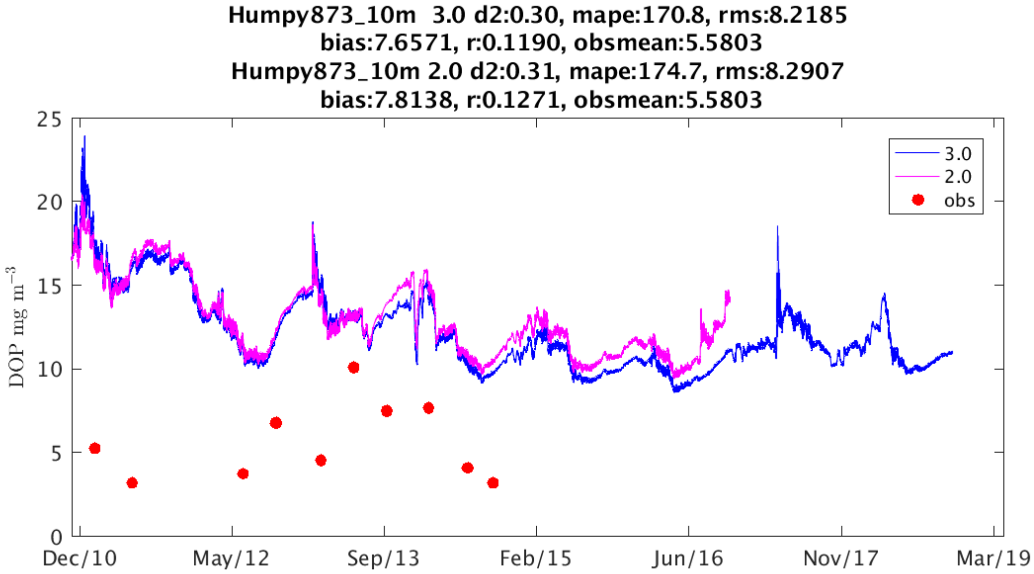
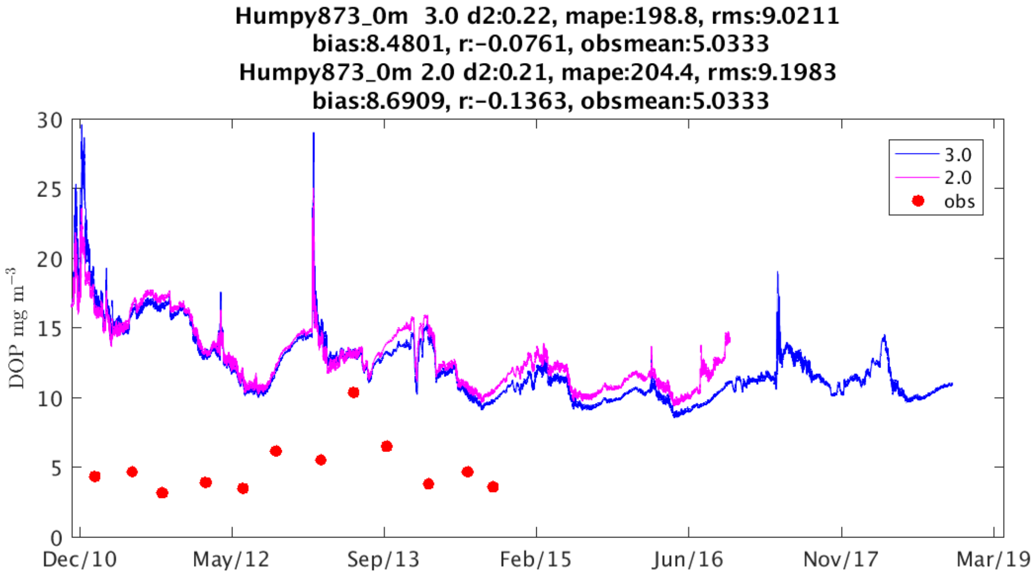
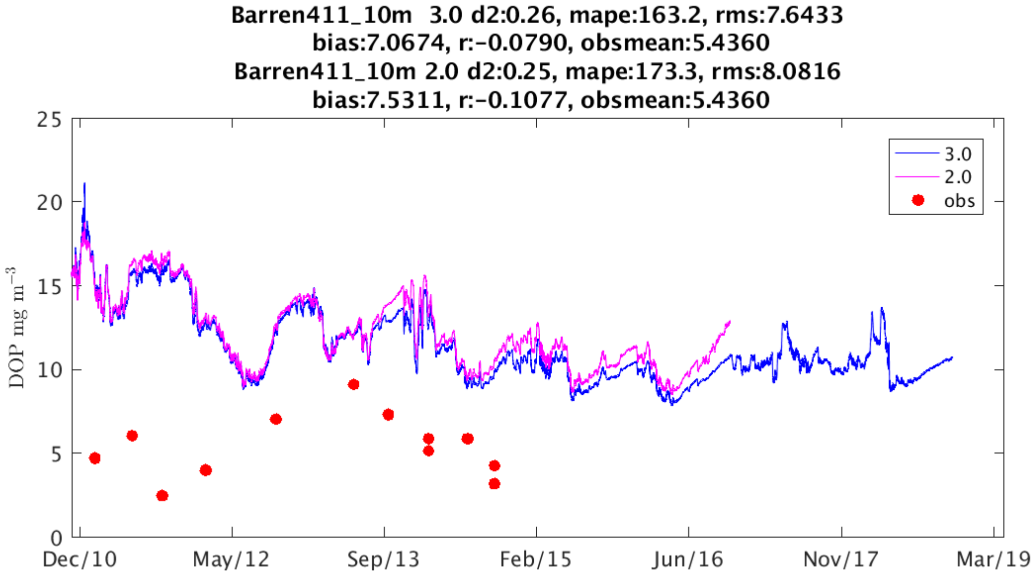


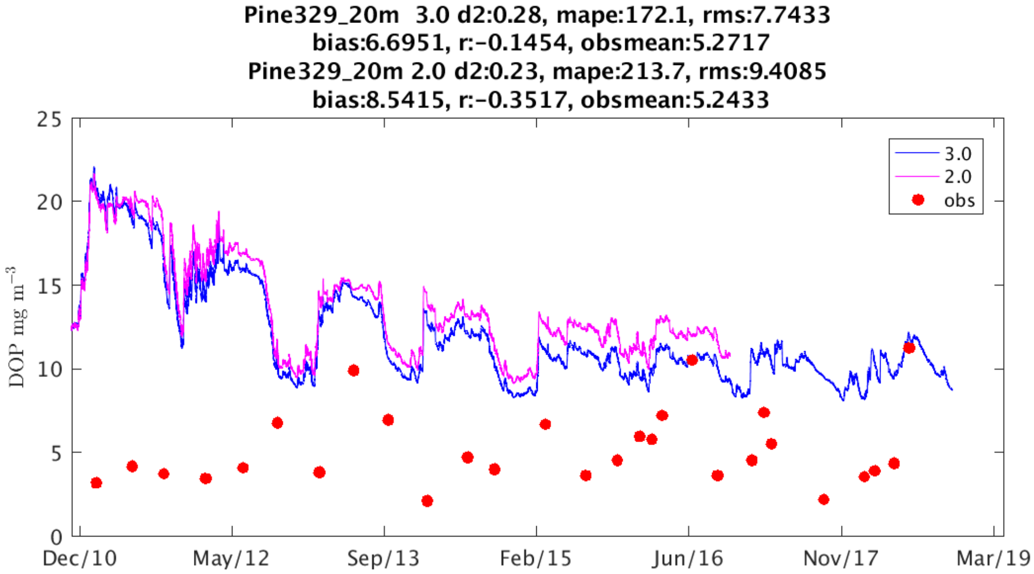
Figure 11 Metrics for Long Term Monitoring sites DOP assessment against observations for model version 3p0 and 2p0 d2 = Willmott index see Statistical metric page 27.mae:mean absolute error, rms root mean square

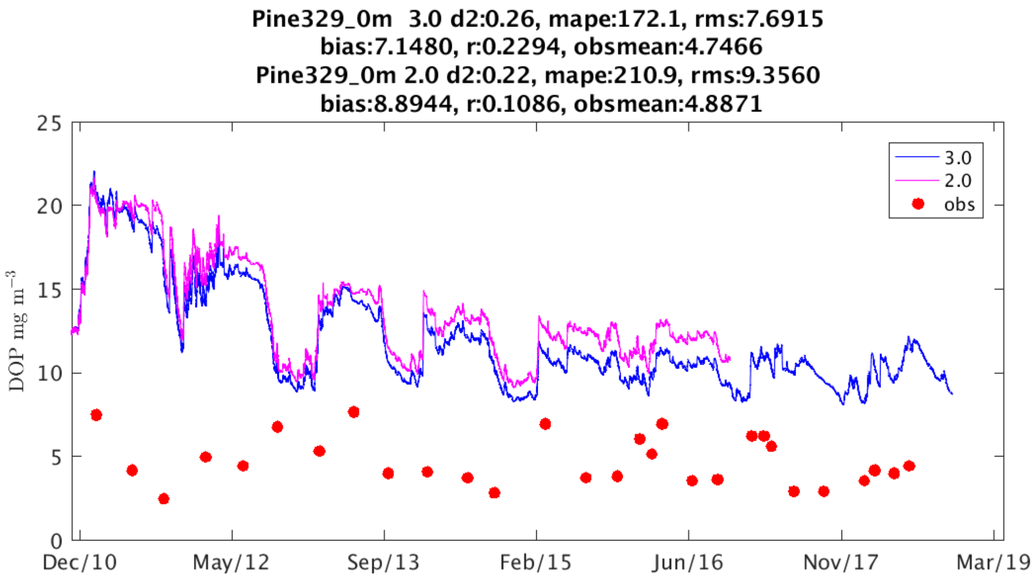

Pelican_5m 3.0 d2:0.34, mape:213.0, rms:9.0130
bias:8.1407, r:−0.0260, obsmean:6.0475
Pelican_5m 2.0 d2:0.34, mape:214.8, rms:9.0716
bias:8.3057, r:−0.0211, obsmean:6.0475
DOP mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


Humpy873_10m 3.0 d2:0.30, mape:170.8, rms:8.2185
bias:7.6571, r:0.1190, obsmean:5.5803
Humpy873_10m 2.0 d2:0.31, mape:174.7, rms:8.2907
bias:7.8138, r:0.1271, obsmean:5.5803
DOP mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

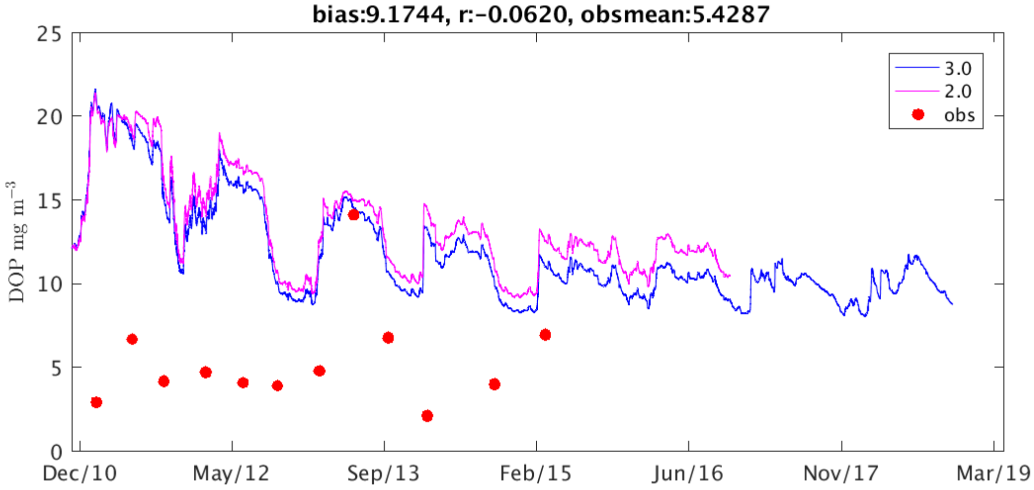

Humpy873_0m 3.0 d2:0.22, mape:198.8, rms:9.0211
bias:8.4801, r:−0.0761, obsmean:5.0333
Humpy873_0m 2.0 d2:0.21, mape:204.4, rms:9.1983
bias:8.6909, r:−0.1363, obsmean:5.0333
DOP mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


Barren411_10m 3.0 d2:0.26, mape:163.2, rms:7.6433
bias:7.0674, r:-0.0790, obsmean:5.4360
Barren411_10m 2.0 d2:0.25, mape:173.3, rms:8.0816
bias:7.5311, r:-0.1077, obsmean:5.4360
DOP mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

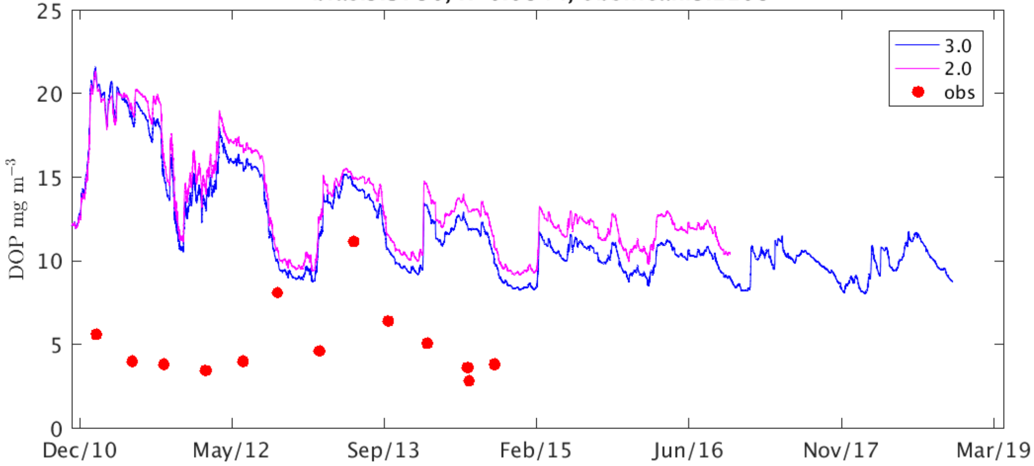

Pine329_20m 3.0 d2:0.28, mape:172.1, rms:7.7433
bias:6.6951, r:-0.1454, obsmean:5.2717
Pine329_20m 2.0 d2:0.23, mape:213.7, rms:9.4085
bias:8.5415, r:-0.3517, obsmean:5.2433
DOP mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


Pine329_0m 3.0 d2:0.26, mape:172.1, rms:7.6915
bias:7.1480, r:0.2294, obsmean:4.7466
Pine329_0m 2.0 d2:0.22, mape:210.9, rms:9.3560
bias:8.8944, r:0.1086, obsmean:4.8871
DOP mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

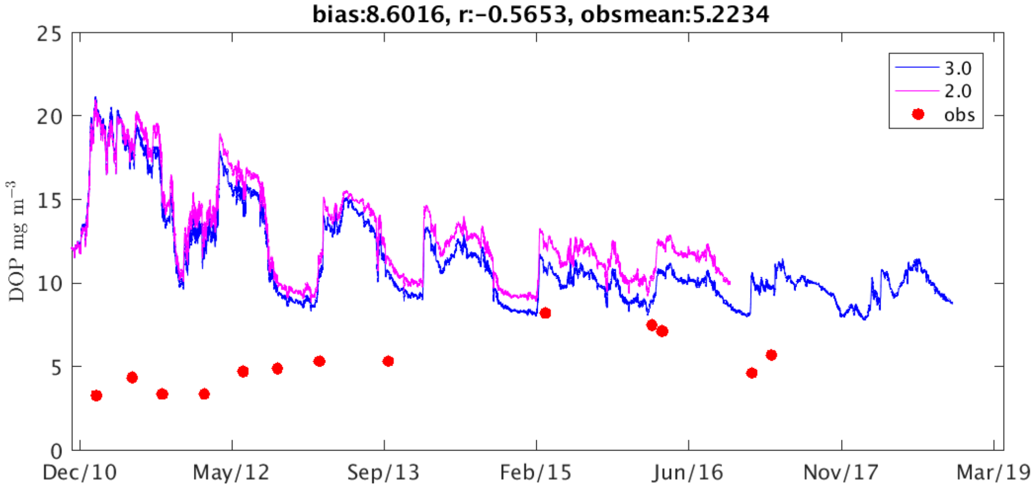
Daydream_23m 3.0 d2:0.29, mape:219.6, rms:9.4972
bias:8.3270, r:-0.0435, obsmean:5.4287
Daydream_23m 2.0 d2:0.28, mape:238.7, rms:10.1751
bias:9.1744, r:-0.0620, obsmean:5.4287



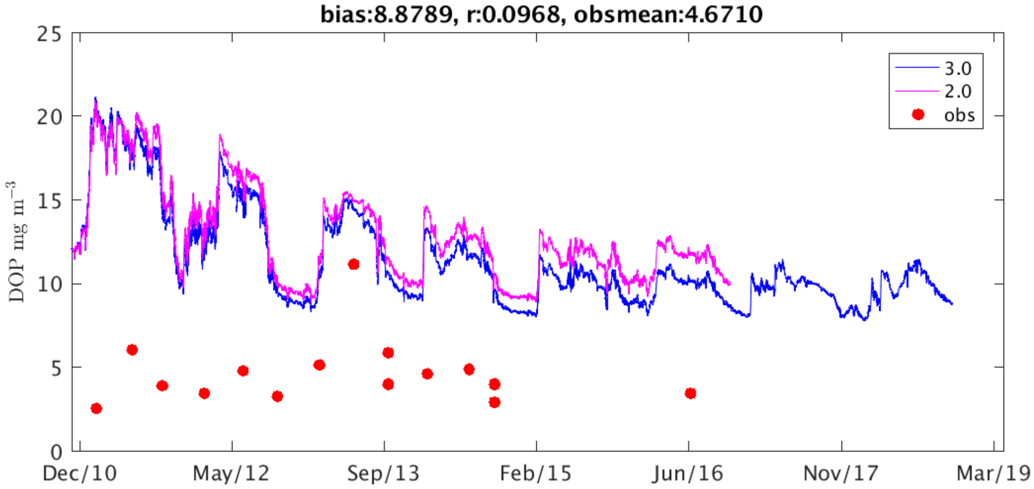
Daydream330_10m 3.0 d2:0.23, mape:204.1, rms:9.4104
bias:8.5508, r:-0.0255, obsmean:5.1108
Daydream330_10m 2.0 d2:0.22, mape:223.8, rms:10.1279
bias:9.3750, r:-0.0844, obsmean:5.1108



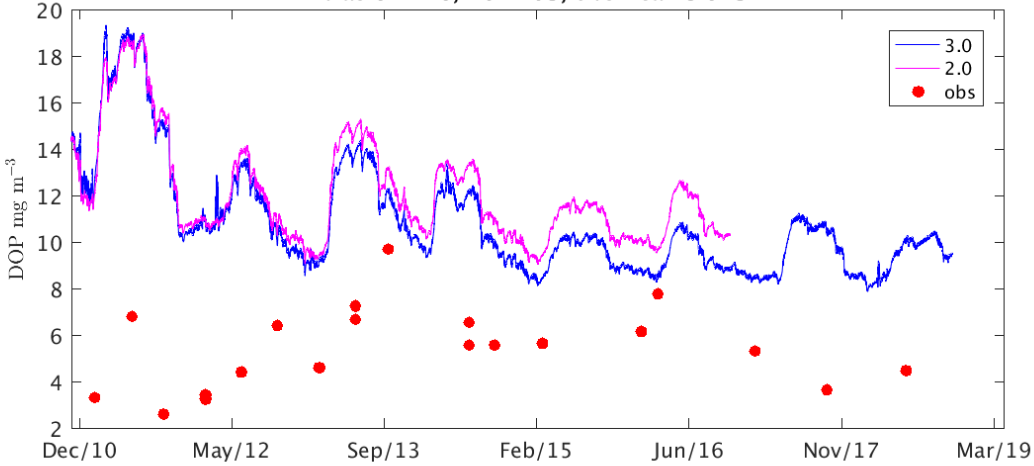
DoubleCone_23m 3.0 d2:0.14, mape:173.9, rms:8.6765
bias:7.2336, r:-0.5813, obsmean:5.2107
DoubleCone_23m 2.0 d2:0.15, mape:205.1, rms:9.7844
bias:8.6016, r:-0.5653, obsmean:5.2234



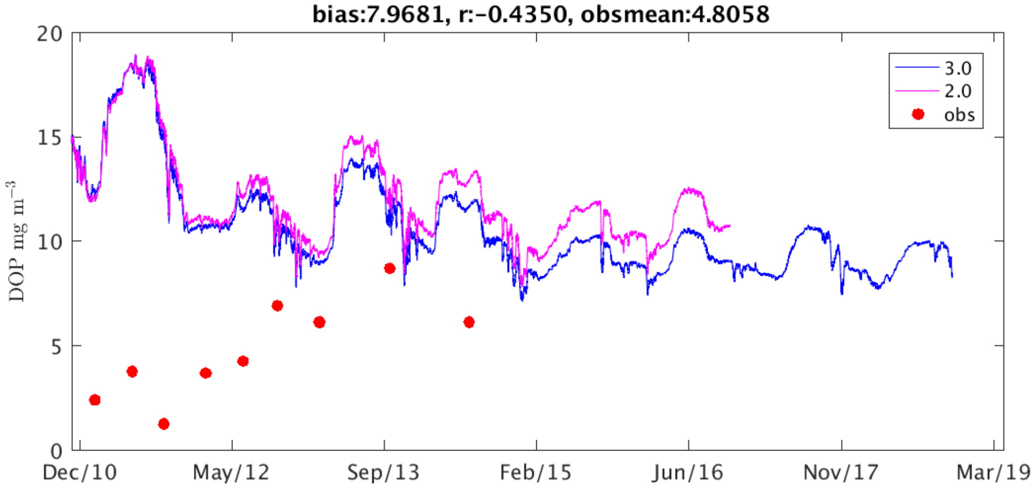
DoubleCone334_10m 3.0 d2:0.24, mape:209.7, rms:8.8998
bias:8.0449, r:0.0996, obsmean:4.6710
DoubleCone334_10m 2.0 d2:0.22, mape:229.3, rms:9.5831
bias:8.8789, r:0.0968, obsmean:4.6710



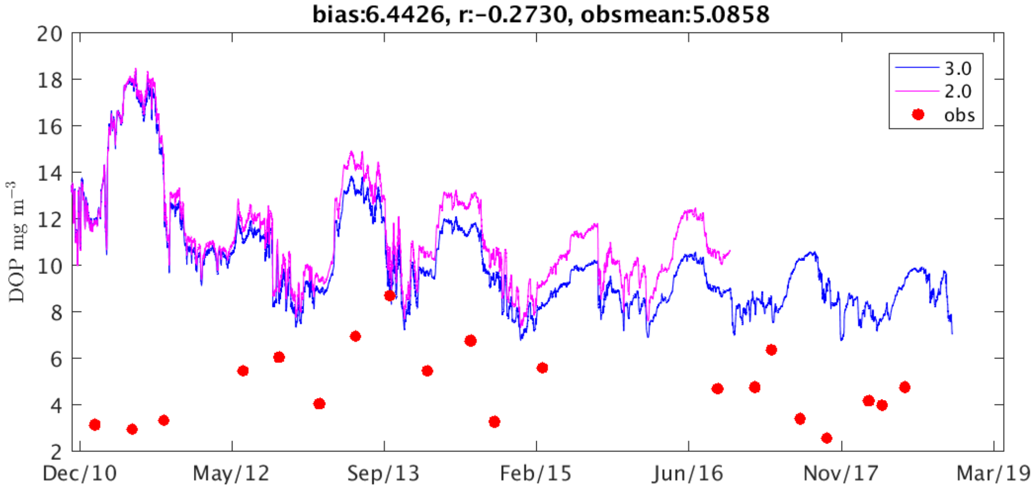
GeoffreyBay336_5m 3.0 d2:0.29, mape:135.0, rms:6.7514
bias:6.0107, r:0.0362, obsmean:5.5183
GeoffreyBay336_5m 2.0 d2:0.28, mape:147.1, rms:7.3647
bias:6.7776, r:0.1103, obsmean:5.6437



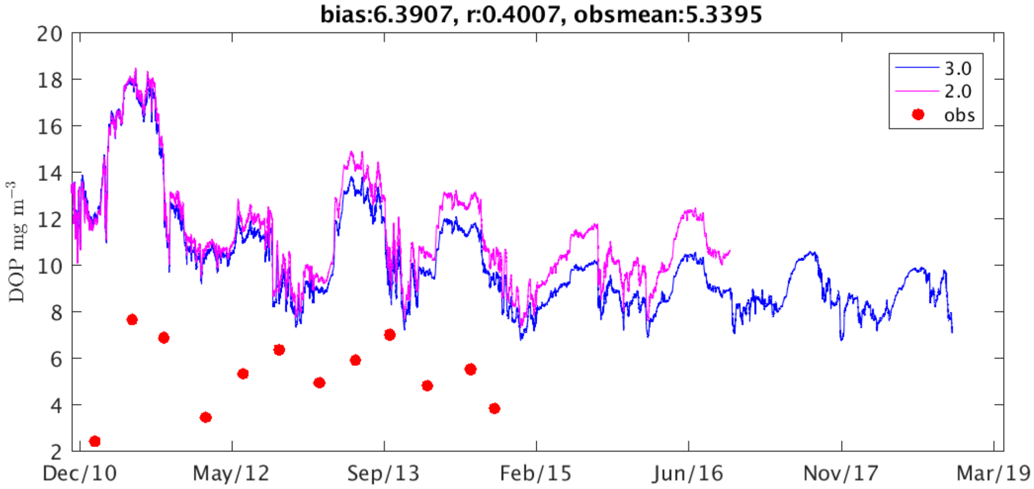
Pandora_5m 3.0 d2:0.24, mape:272.9, rms:8.5729
bias:7.4558, r:-0.5241, obsmean:4.8058
Pandora_5m 2.0 d2:0.25, mape:284.1, rms:8.9209
bias:7.9681, r:-0.4350, obsmean:4.8058



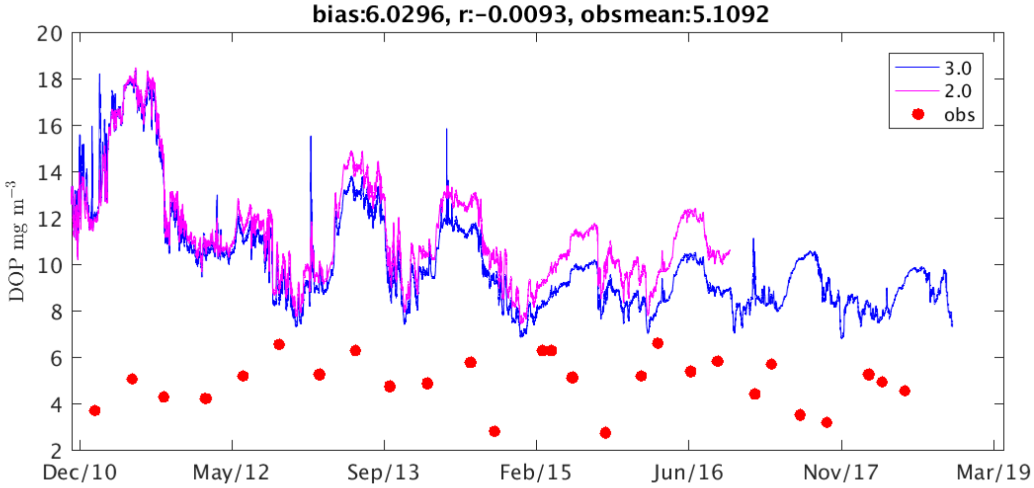
Pelorus686_28m 3.0 d2:0.26, mape:137.9, rms:6.1082
bias:5.3106, r:−0.1849, obsmean:4.7959
Pelorus686_28m 2.0 d2:0.25, mape:159.4, rms:7.2164
bias:6.4426, r:−0.2730, obsmean:5.0858

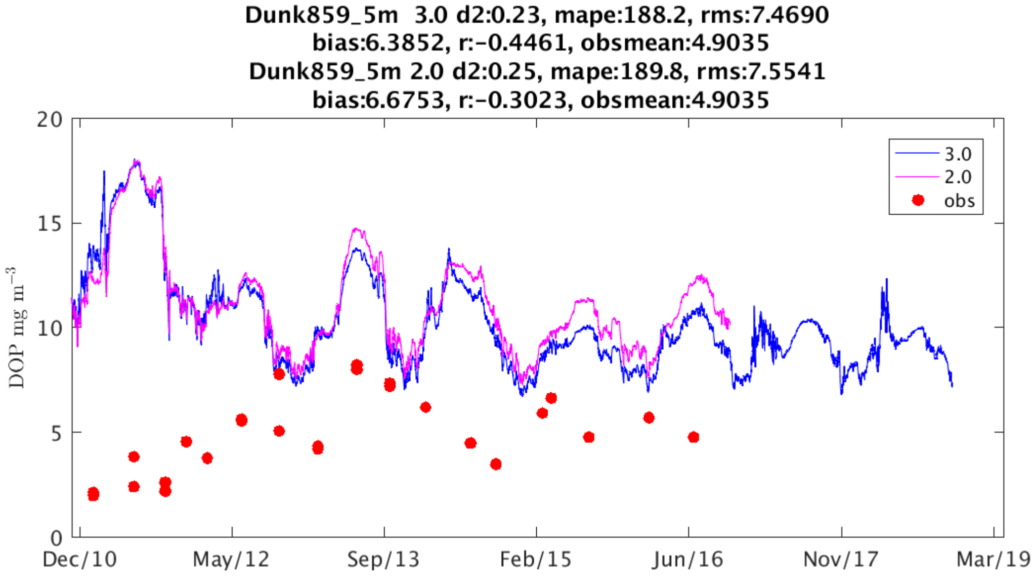


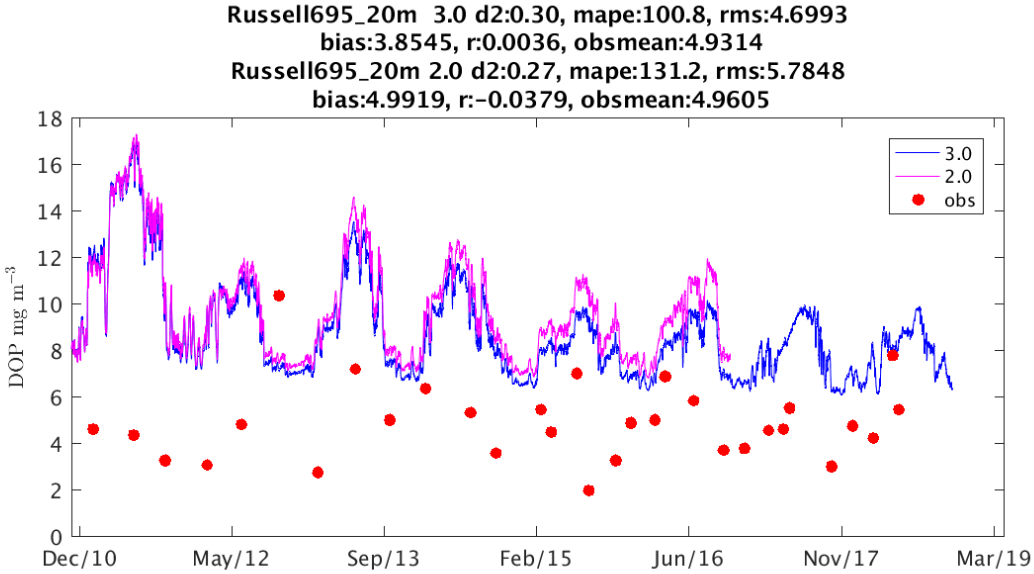
Pelorus686_14m 3.0 d2:0.31, mape:129.0, rms:6.2975
bias:5.8324, r:0.3558, obsmean:5.3395
Pelorus686_14m 2.0 d2:0.30, mape:139.3, rms:6.7673
bias:6.3907, r:0.4007, obsmean:5.3395

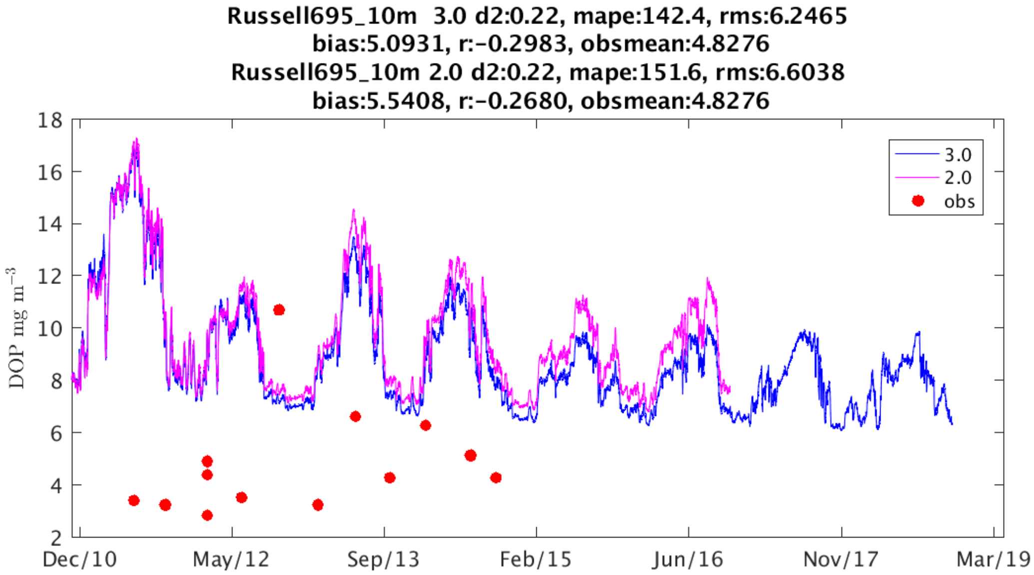


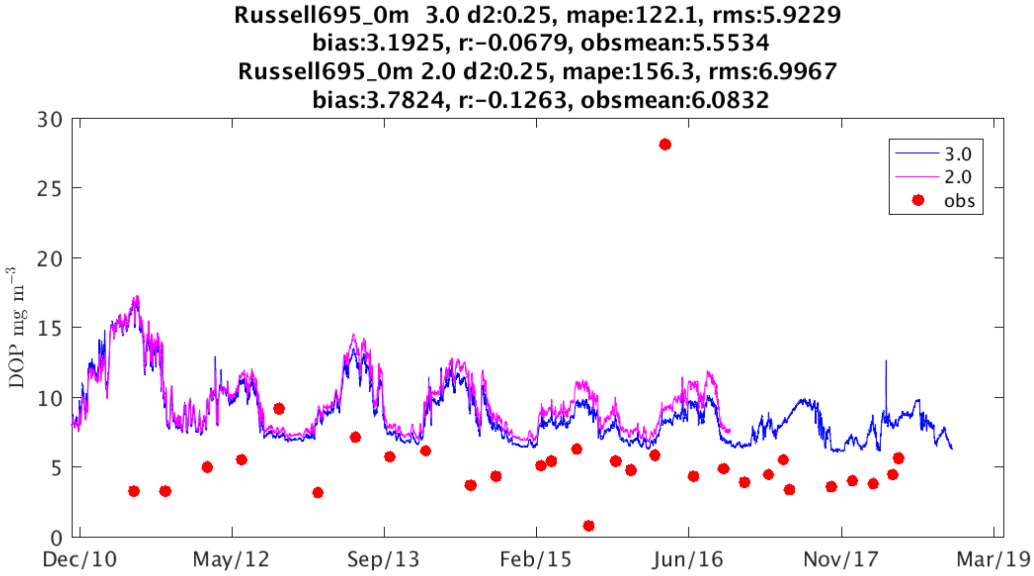
Pelorus686_0m 3.0 d2:0.21, mape:111.8, rms:5.4889
bias:4.9645, r:−0.0405, obsmean:4.9517
Pelorus686_0m 2.0 d2:0.18, mape:130.7, rms:6.4608
bias:6.0296, r:−0.0093, obsmean:5.1092



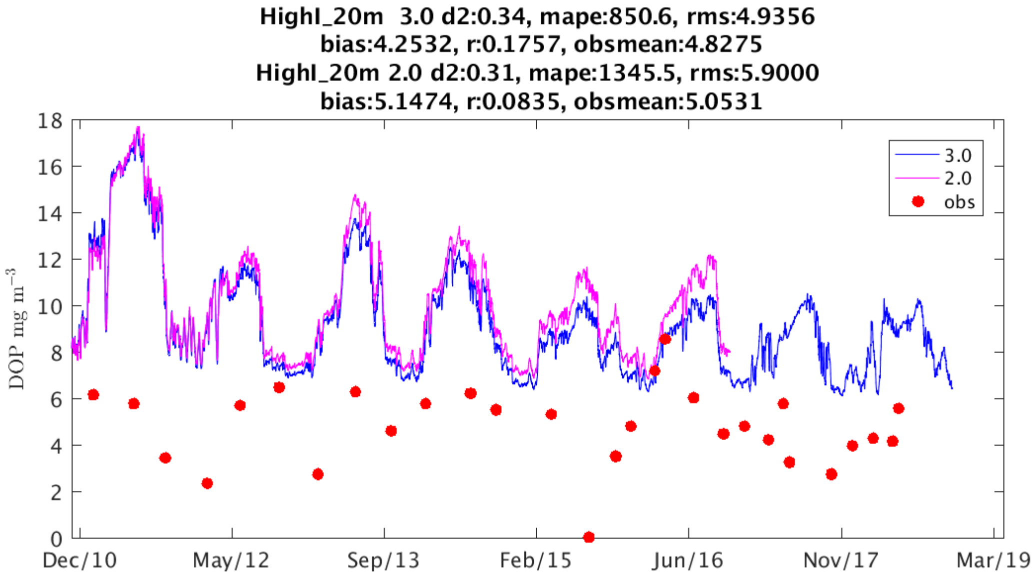

Dunk859_5m 3.0 d2:0.23, mape:188.2, rms:7.4690
bias:6.3852, r:-0.4461, obsmean:4.9035
Dunk859_5m 2.0 d2:0.25, mape:189.8, rms:7.5541
bias:6.6753, r:-0.3023, obsmean:4.9035
DOP mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


Russell695_20m 3.0 d2:0.30, mape:100.8, rms:4.6993
bias:3.8545, r:0.0036, obsmean:4.9314
Russell695_20m 2.0 d2:0.27, mape:131.2, rms:5.7848
bias:4.9919, r:-0.0379, obsmean:4.9605
DOP mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

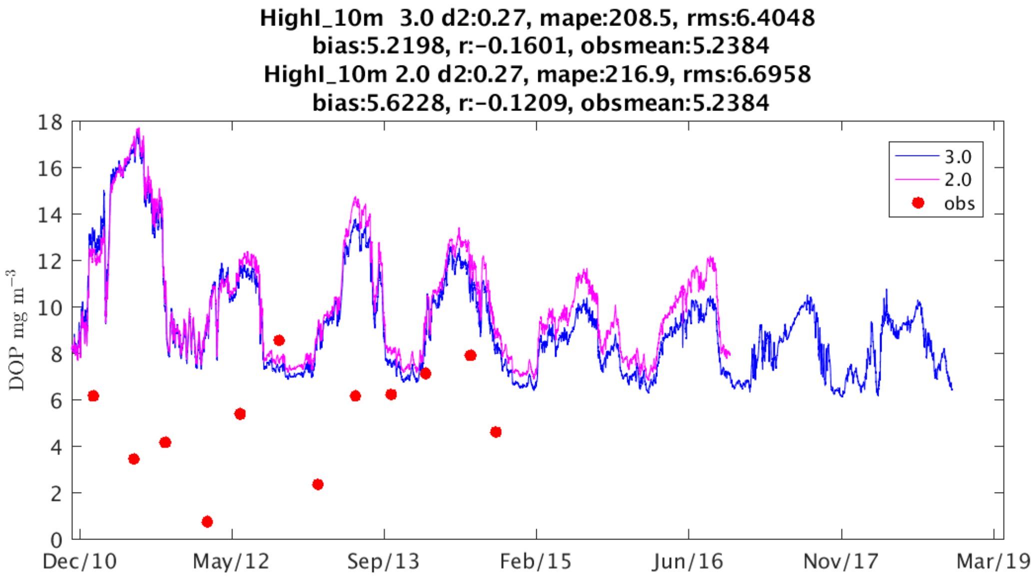

Russell695_10m 3.0 d2:0.22, mape:142.4, rms:6.2465
bias:5.0931, r:-0.2983, obsmean:4.8276
Russell695_10m 2.0 d2:0.22, mape:151.6, rms:6.6038
bias:5.5408, r:-0.2680, obsmean:4.8276
DOP mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19



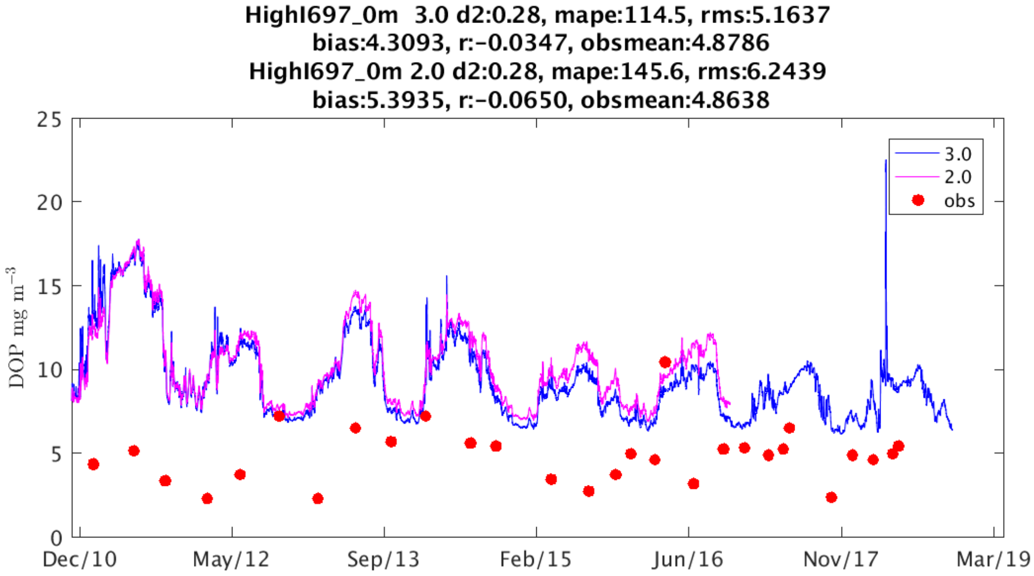
Russell695_0m 3.0 d2:0.25, mape:122.1, rms:5.9229
bias:3.1925, r:−0.0679, obsmean:5.5534
Russell695_0m 2.0 d2:0.25, mape:156.3, rms:6.9967
bias:3.7824, r:−0.1263, obsmean:6.0832
DOP mg m⁻³
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

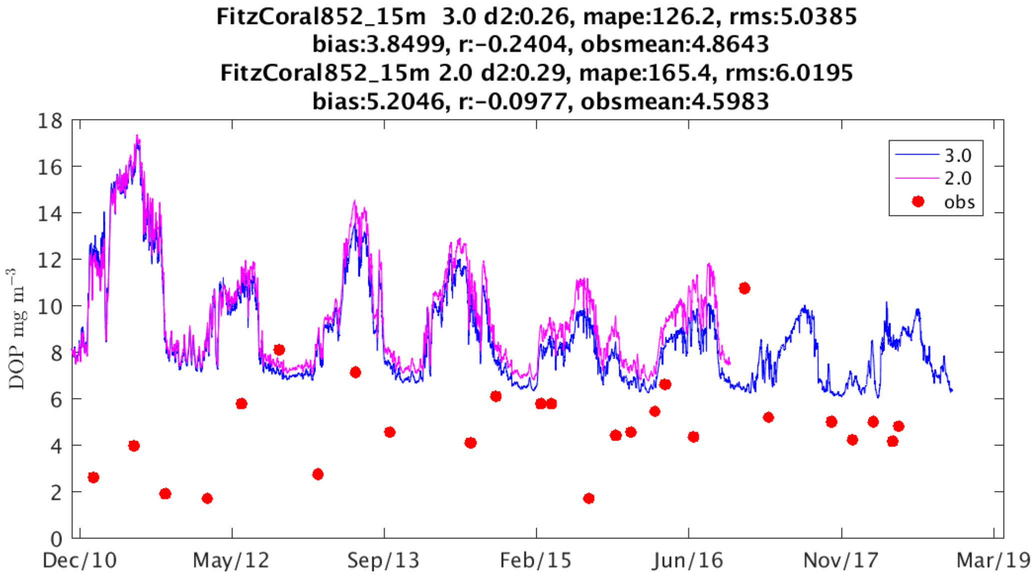


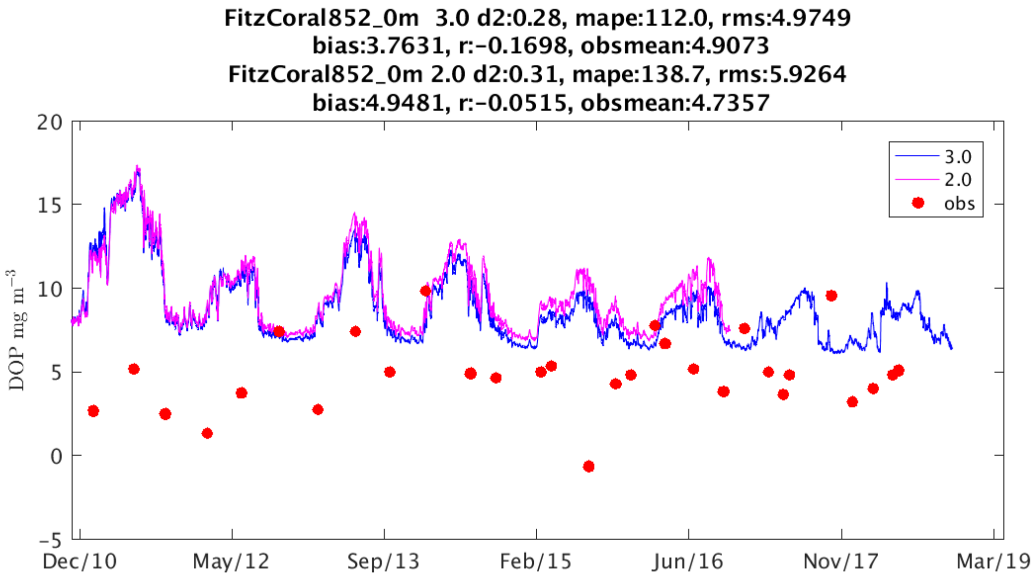
HighI_20m 3.0 d2:0.34, mape:850.6, rms:4.9356
bias:4.2532, r:0.1757, obsmean:4.8275
HighI_20m 2.0 d2:0.31, mape:1345.5, rms:5.9000
bias:5.1474, r:0.0835, obsmean:5.0531
DOP mg m⁻³
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

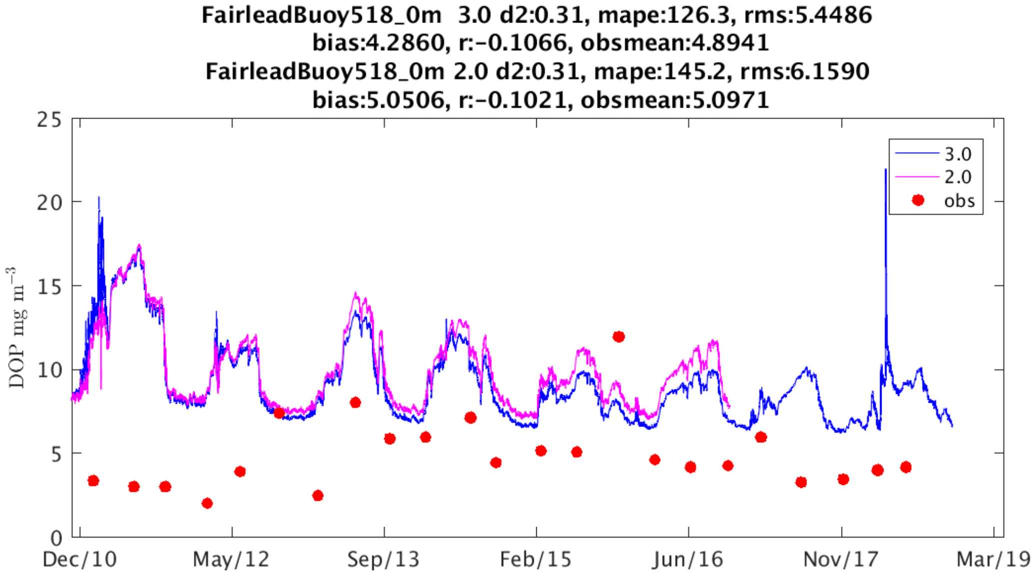


HighI_10m 3.0 d2:0.27, mape:208.5, rms:6.4048
bias:5.2198, r:−0.1601, obsmean:5.2384
HighI_10m 2.0 d2:0.27, mape:216.9, rms:6.6958
bias:5.6228, r:−0.1209, obsmean:5.2384
DOP mg m⁻³
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

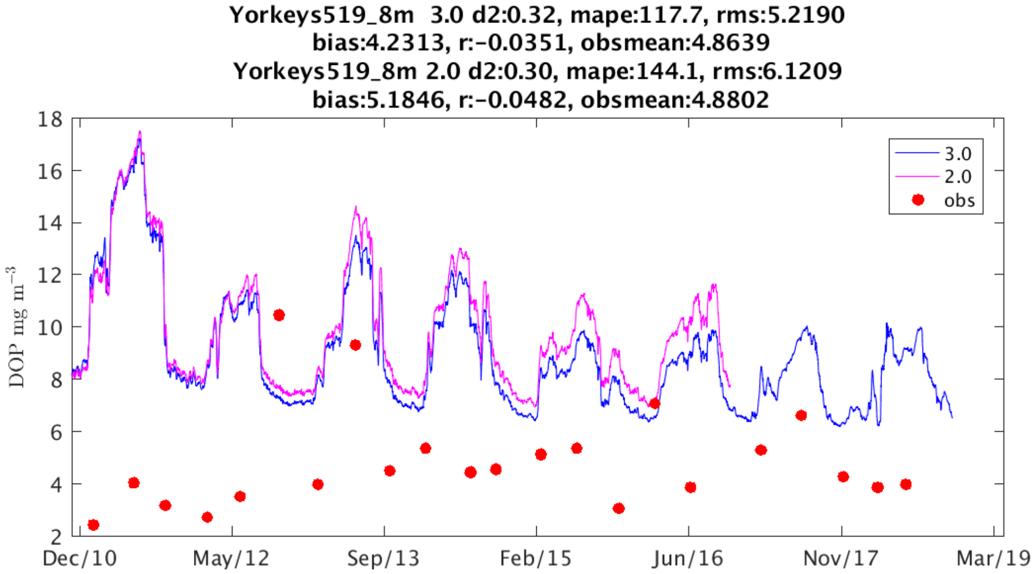

HighI697_0m 3.0 d2:0.28, mape:114.5, rms:5.1637
bias:4.3093, r:-0.0347, obsmean:4.8786
HighI697_0m 2.0 d2:0.28, mape:145.6, rms:6.2439
bias:5.3935, r:-0.0650, obsmean:4.8638
DOP mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


FitzCoral852_15m 3.0 d2:0.26, mape:126.2, rms:5.0385
bias:3.8499, r:-0.2404, obsmean:4.8643
FitzCoral852_15m 2.0 d2:0.29, mape:165.4, rms:6.0195
bias:5.2046, r:-0.0977, obsmean:4.5983
DOP mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

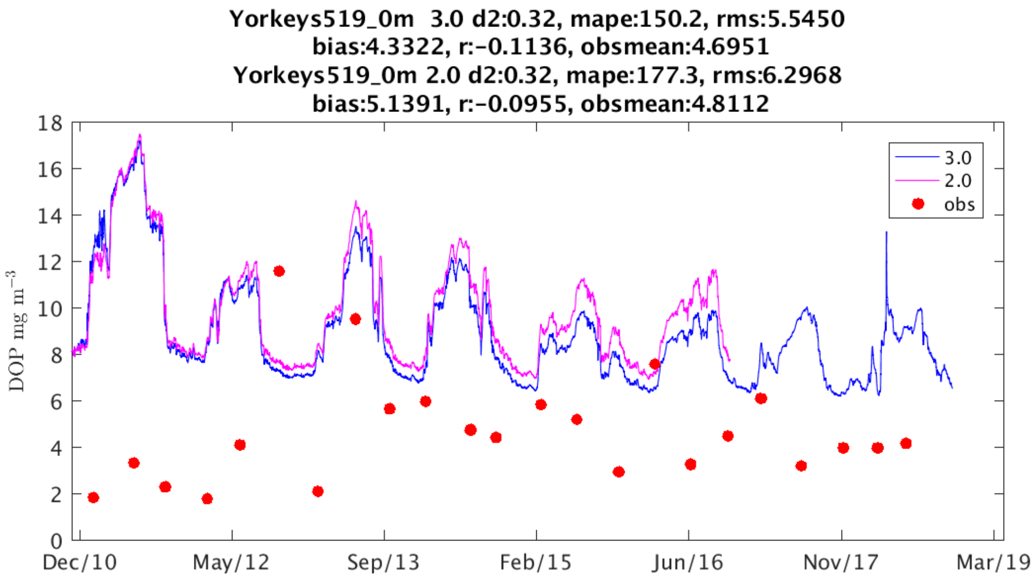

FitzCoral852_0m 3.0 d2:0.28, mape:112.0, rms:4.9749
bias:3.7631, r:-0.1698, obsmean:4.9073
FitzCoral852_0m 2.0 d2:0.31, mape:138.7, rms:5.9264
bias:4.9481, r:-0.0515, obsmean:4.7357
DOP mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19



FairleadBuoy518_0m 3.0 d2:0.31, mape:126.3, rms:5.4486
bias:4.2860, r:-0.1066, obsmean:4.8941
FairleadBuoy518_0m 2.0 d2:0.31, mape:145.2, rms:6.1590
bias:5.0506, r:-0.1021, obsmean:5.0971
DOP mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

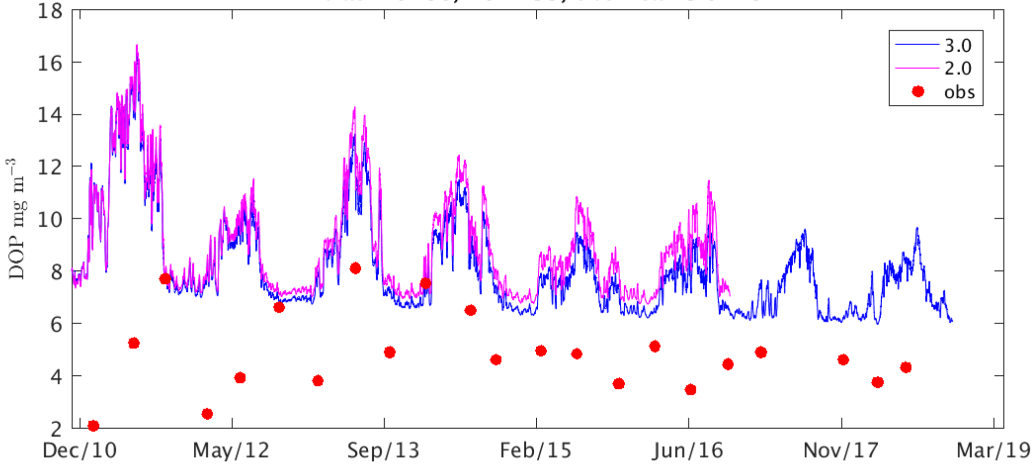


Yorkeys519_8m 3.0 d2:0.32, mape:117.7, rms:5.2190
bias:4.2313, r:-0.0351, obsmean:4.8639
Yorkeys519_8m 2.0 d2:0.30, mape:144.1, rms:6.1209
bias:5.1846, r:-0.0482, obsmean:4.8802
DOP mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

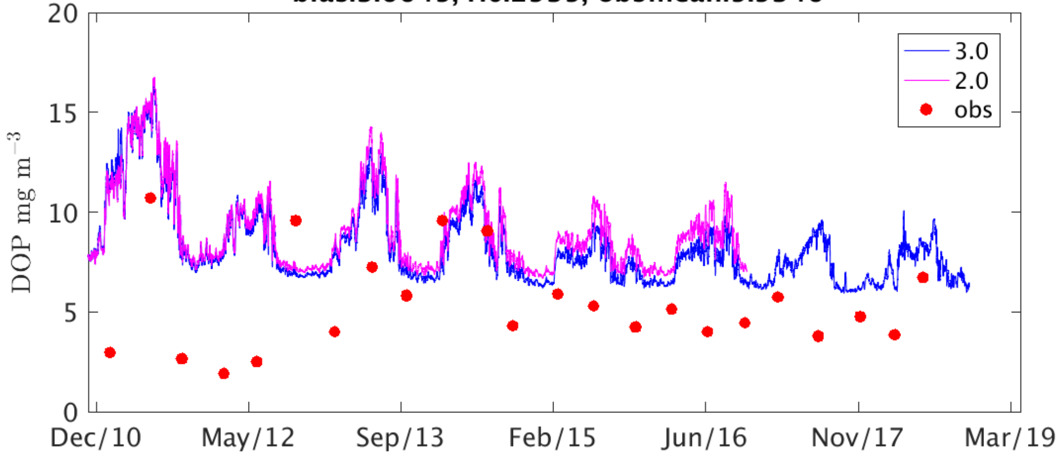


Yorkeys519_0m 3.0 d2:0.32, mape:150.2, rms:5.5450
bias:4.3322, r:-0.1136, obsmean:4.6951
Yorkeys519_0m 2.0 d2:0.32, mape:177.3, rms:6.2968
bias:5.1391, r:-0.0955, obsmean:4.8112
DOP mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

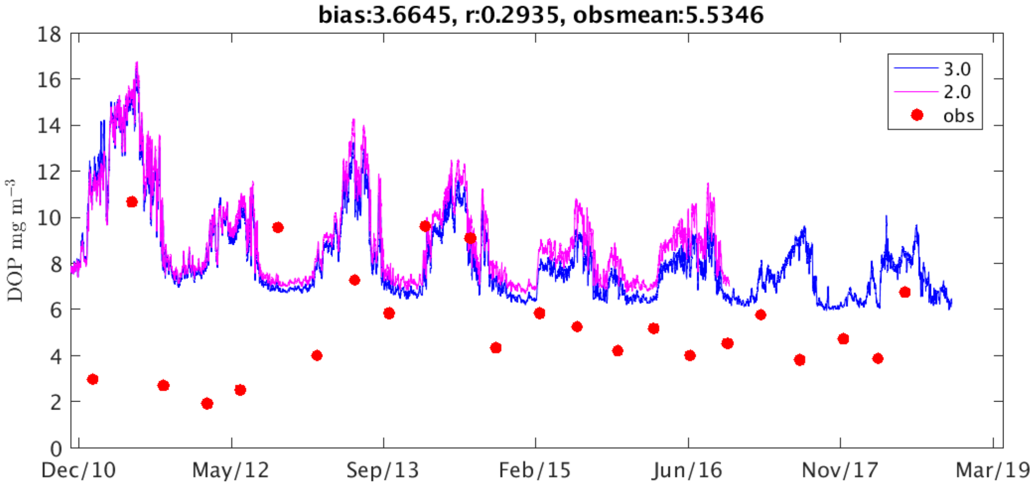
Green830_36m 3.0 d2:0.36, mape:88.0, rms:4.0952
bias:3.3700, r:0.1345, obsmean:4.8995
Green830_36m 2.0 d2:0.35, mape:105.1, rms:4.7621
bias:4.0786, r:0.1239, obsmean:5.0118

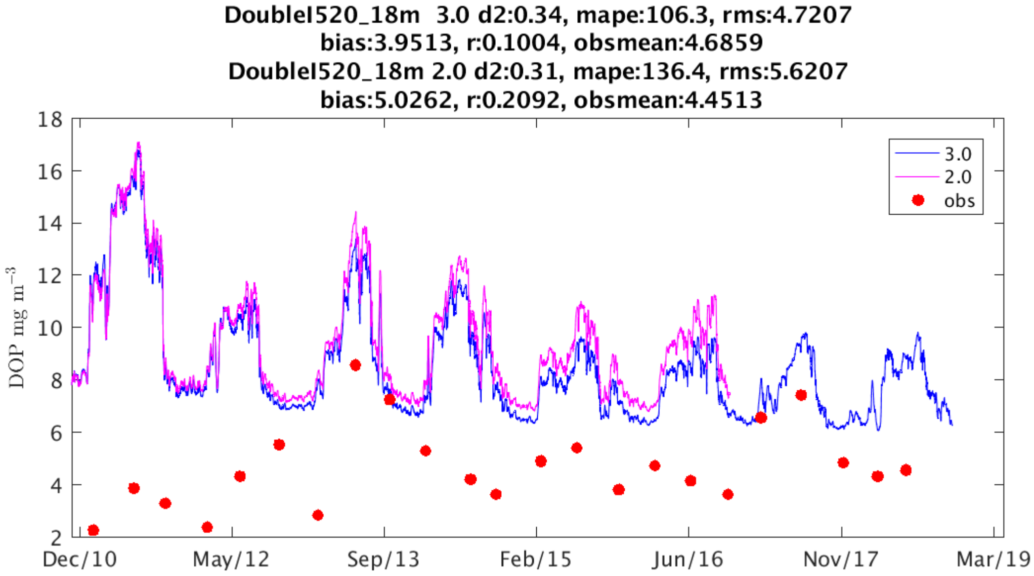


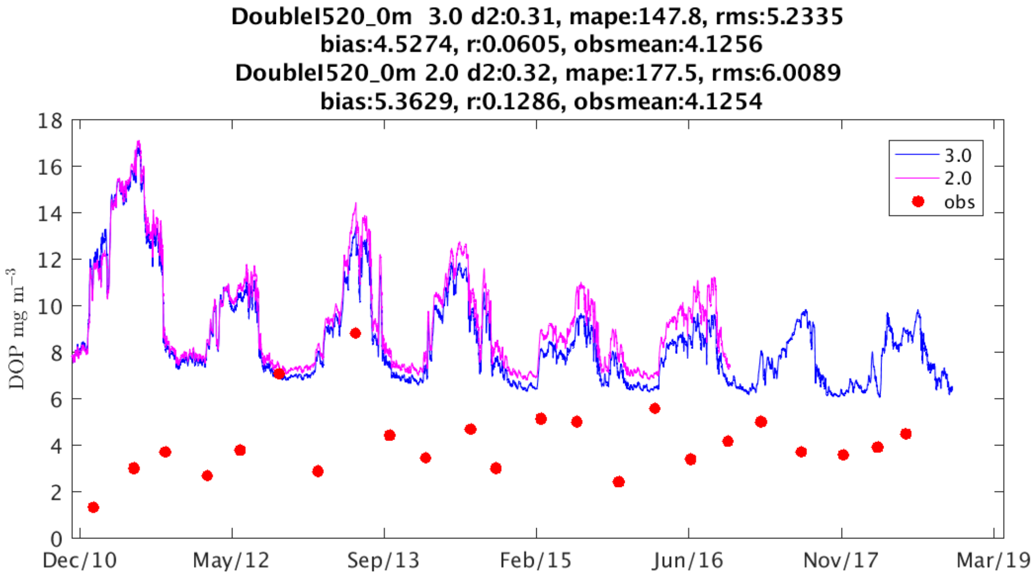
Green830_0m 3.0 d2:0.51, mape:91.0, rms:3.9868
bias:2.9716, r:0.2737, obsmean:5.4175
Green830_0m 2.0 d2:0.50, mape:109.9, rms:4.6235
bias:3.6645, r:0.2935, obsmean:5.5346

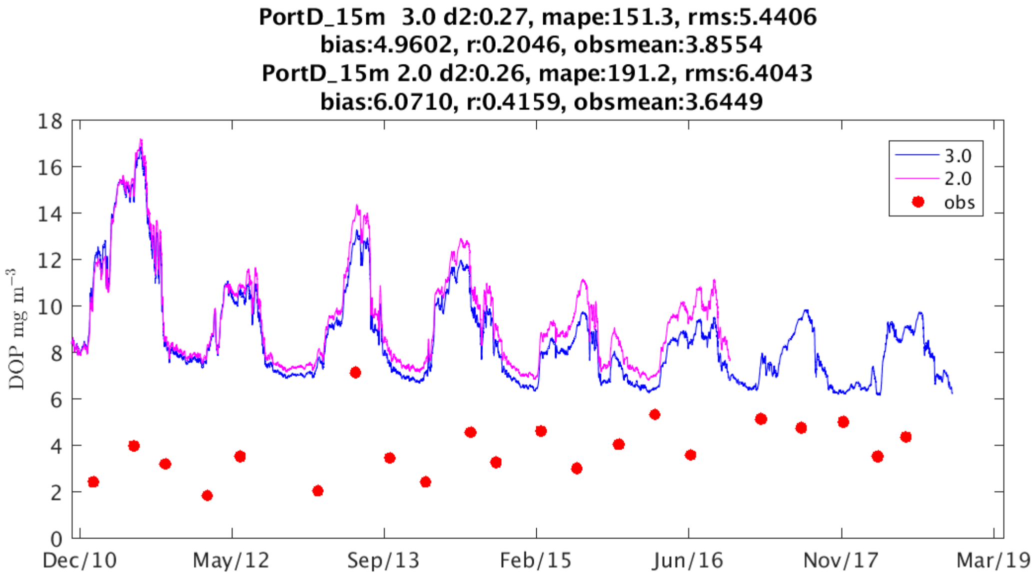


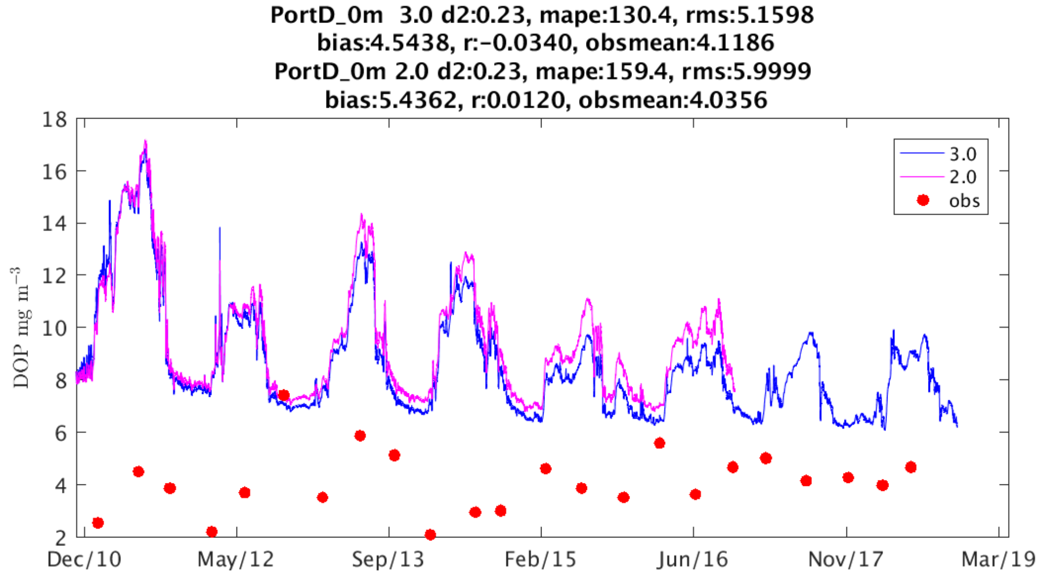
Green830_0m 3.0 d2:0.51, mape:91.0, rms:3.9868
bias:2.9716, r:0.2737, obsmean:5.4175
Green830_0m 2.0 d2:0.50, mape:109.9, rms:4.6235
bias:3.6645, r:0.2935, obsmean:5.5346

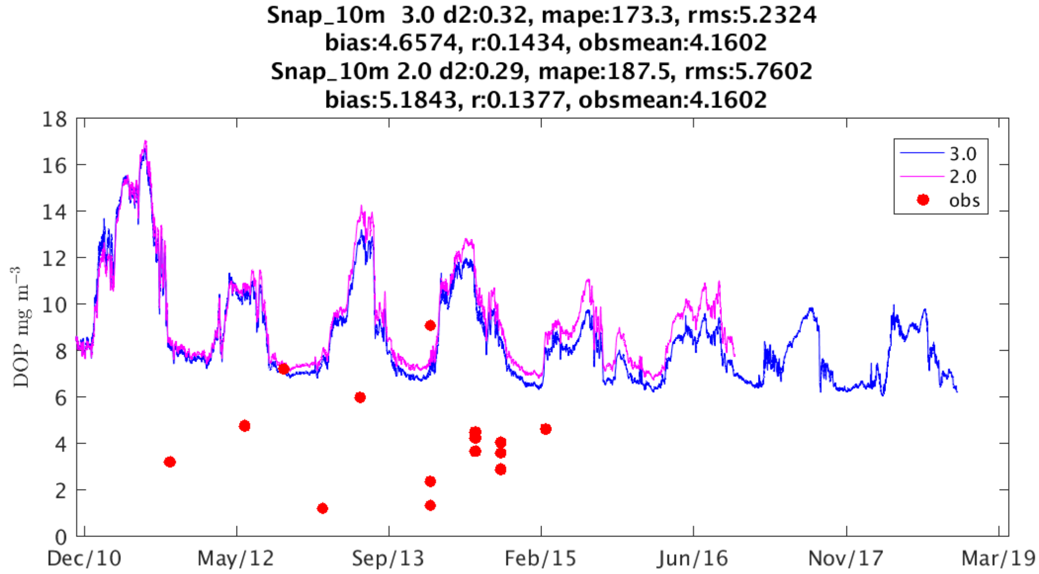


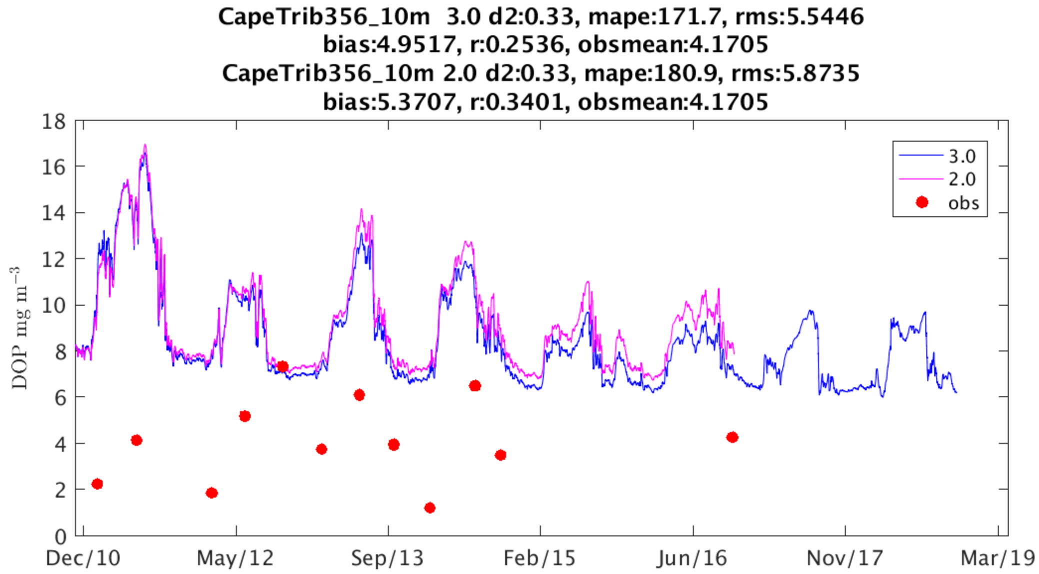

DoubleI520_18m 3.0 d2:0.34, mape:106.3, rms:4.7207
bias:3.9513, r:0.1004, obsmean:4.6859
DoubleI520_18m 2.0 d2:0.31, mape:136.4, rms:5.6207
bias:5.0262, r:0.2092, obsmean:4.4513
DOP mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


DoubleI520_0m 3.0 d2:0.31, mape:147.8, rms:5.2335
bias:4.5274, r:0.0605, obsmean:4.1256
DoubleI520_0m 2.0 d2:0.32, mape:177.5, rms:6.0089
bias:5.3629, r:0.1286, obsmean:4.1254
DOP mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


PortD_15m 3.0 d2:0.27, mape:151.3, rms:5.4406
bias:4.9602, r:0.2046, obsmean:3.8554
PortD_15m 2.0 d2:0.26, mape:191.2, rms:6.4043
bias:6.0710, r:0.4159, obsmean:3.6449
DOP mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


PortD_0m 3.0 d2:0.23, mape:130.4, rms:5.1598
bias:4.5438, r:−0.0340, obsmean:4.1186
PortD_0m 2.0 d2:0.23, mape:159.4, rms:5.9999
bias:5.4362, r:0.0120, obsmean:4.0356
DOP mg m−3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


Snap_10m 3.0 d2:0.32, mape:173.3, rms:5.2324
bias:4.6574, r:0.1434, obsmean:4.1602
Snap_10m 2.0 d2:0.29, mape:187.5, rms:5.7602
bias:5.1843, r:0.1377, obsmean:4.1602
DOP mg m−3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


CapeTrib356_10m 3.0 d2:0.33, mape:171.7, rms:5.5446
bias:4.9517, r:0.2536, obsmean:4.1705
CapeTrib356_10m 2.0 d2:0.33, mape:180.9, rms:5.8735
bias:5.3707, r:0.3401, obsmean:4.1705
DOP mg m−3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

17. Simulated EFI assessment against Long Term Monitoring TSS

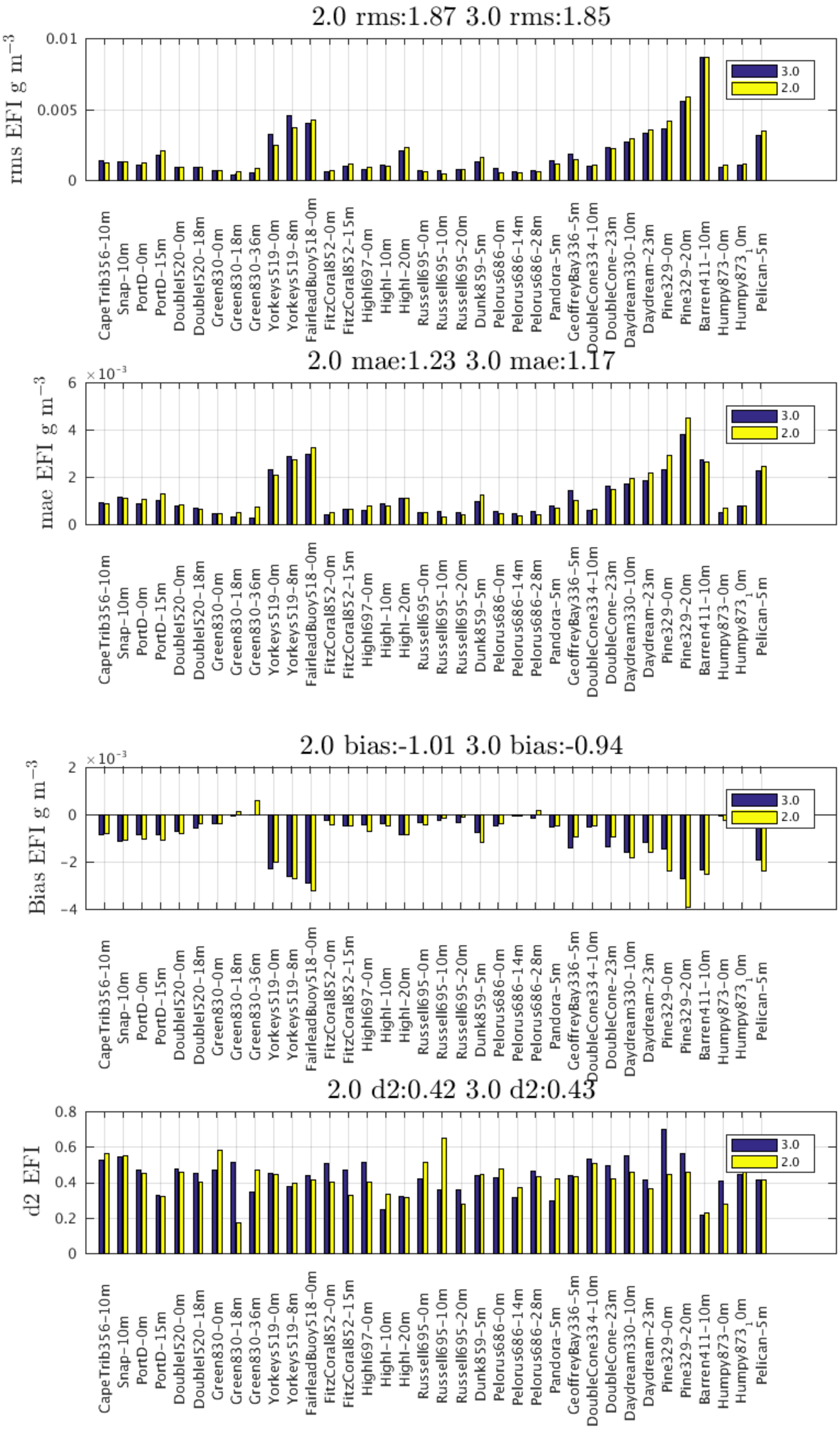
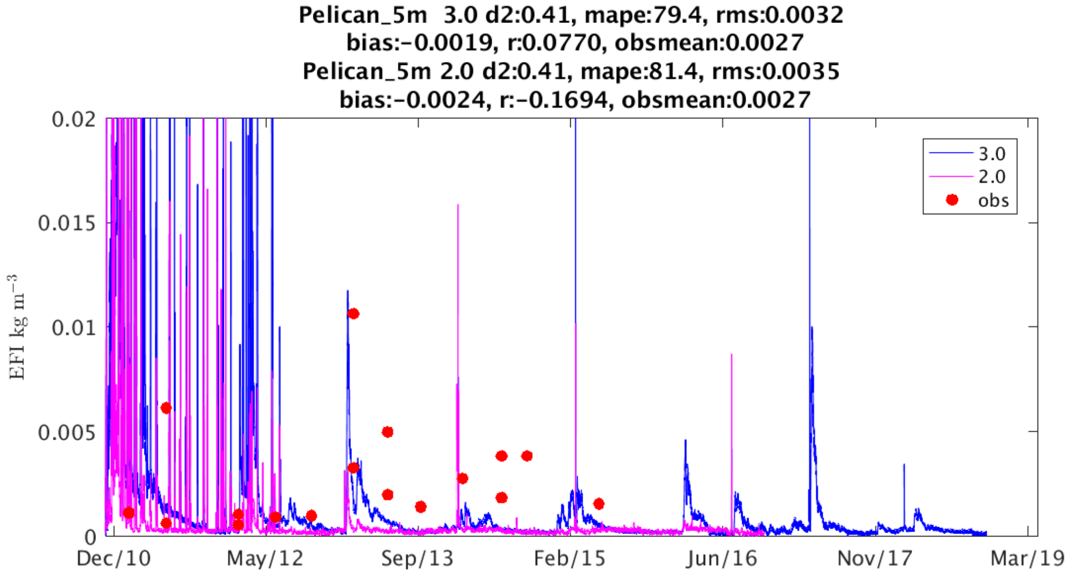
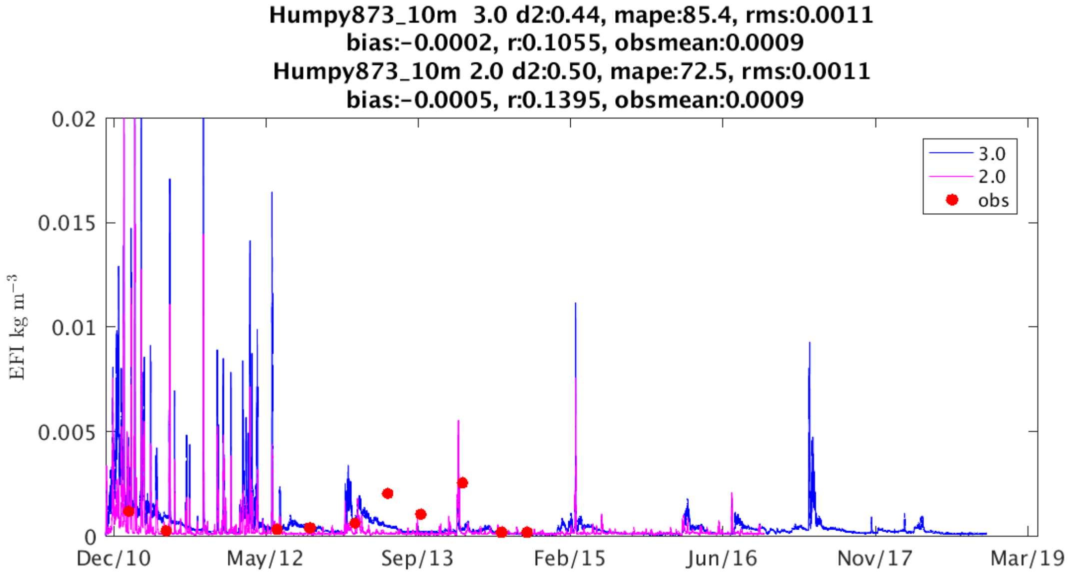


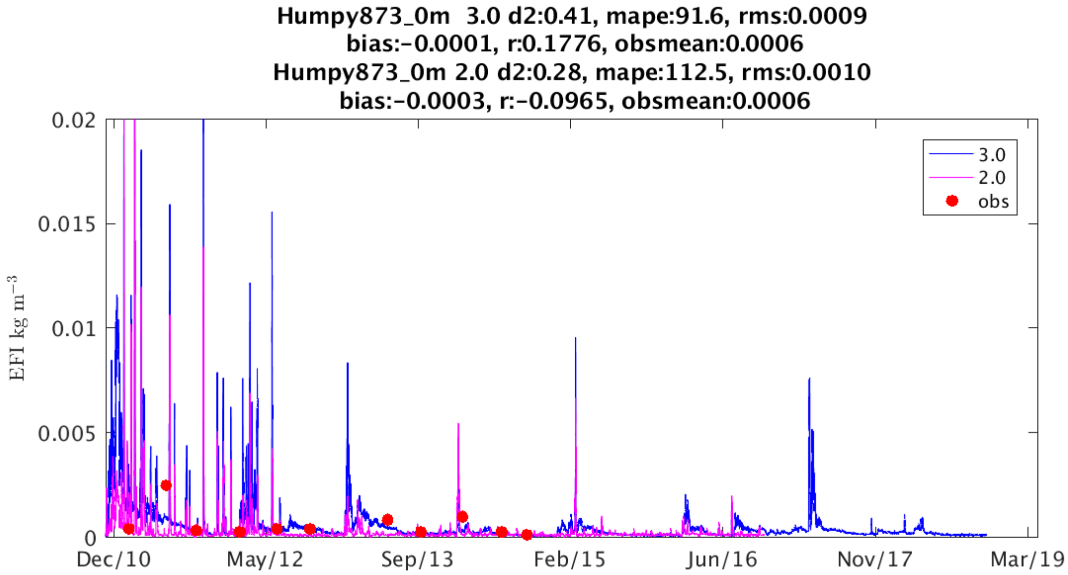
Figure 12 Metrics for Long Term Monitoring sites EFI model assessment against TSS observations for model version 3p0 and 2p0 d2 = Willmott index see Statistical metric page 27.mae:mean absolute error, rms root mean square



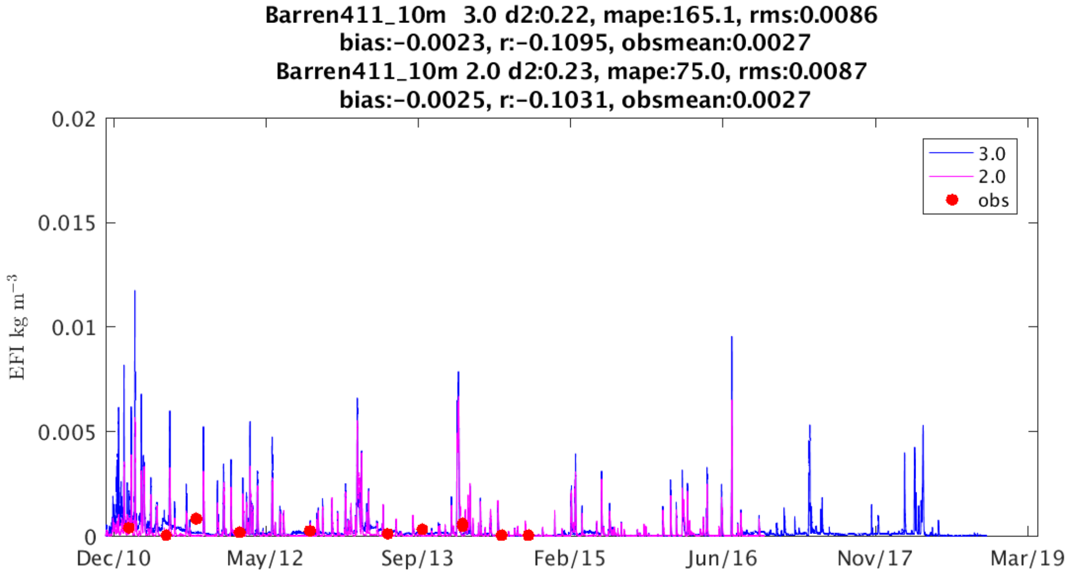
Pelican_5m 3.0 d2:0.41, mape:79.4, rms:0.0032
bias:-0.0019, r:0.0770, obsmean:0.0027
Pelican_5m 2.0 d2:0.41, mape:81.4, rms:0.0035
bias:-0.0024, r:-0.1694, obsmean:0.0027
EFI kg m^-3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

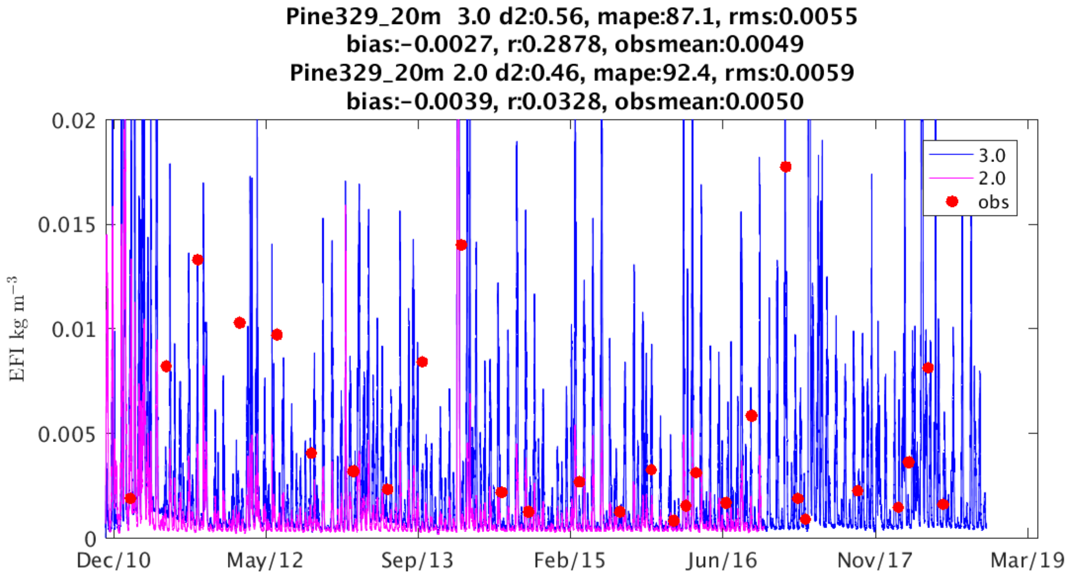


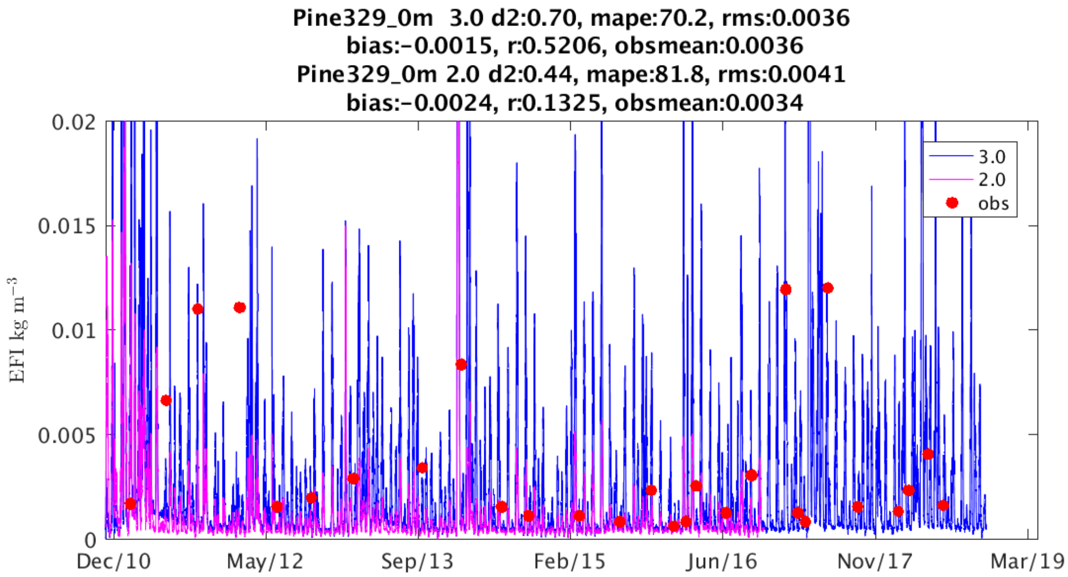
Humpy873_10m 3.0 d2:0.44, mape:85.4, rms:0.0011
bias:-0.0002, r:0.1055, obsmean:0.0009
Humpy873_10m 2.0 d2:0.50, mape:72.5, rms:0.0011
bias:-0.0005, r:0.1395, obsmean:0.0009
EFI kg m^-3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

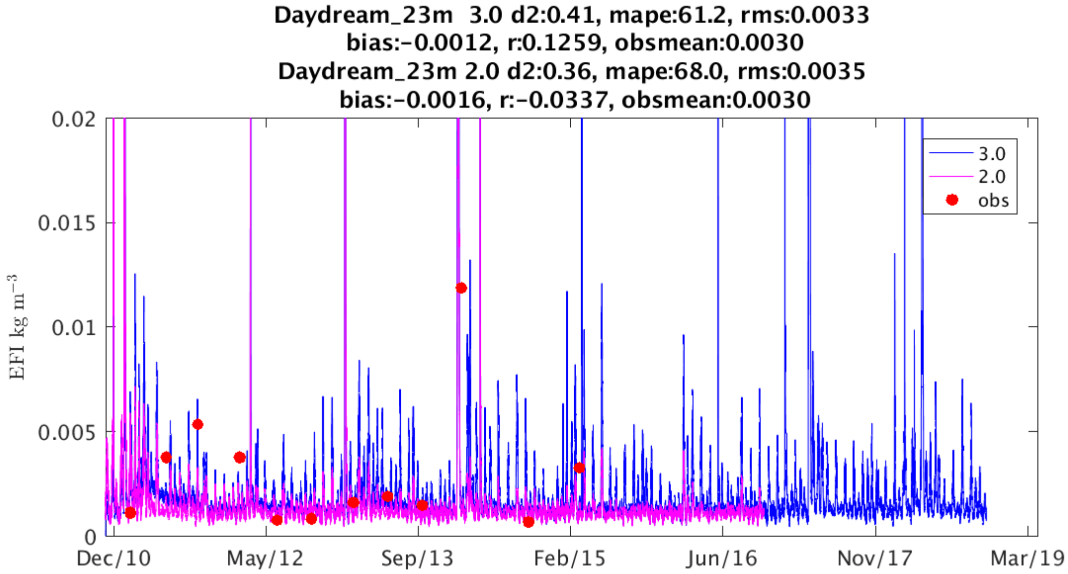


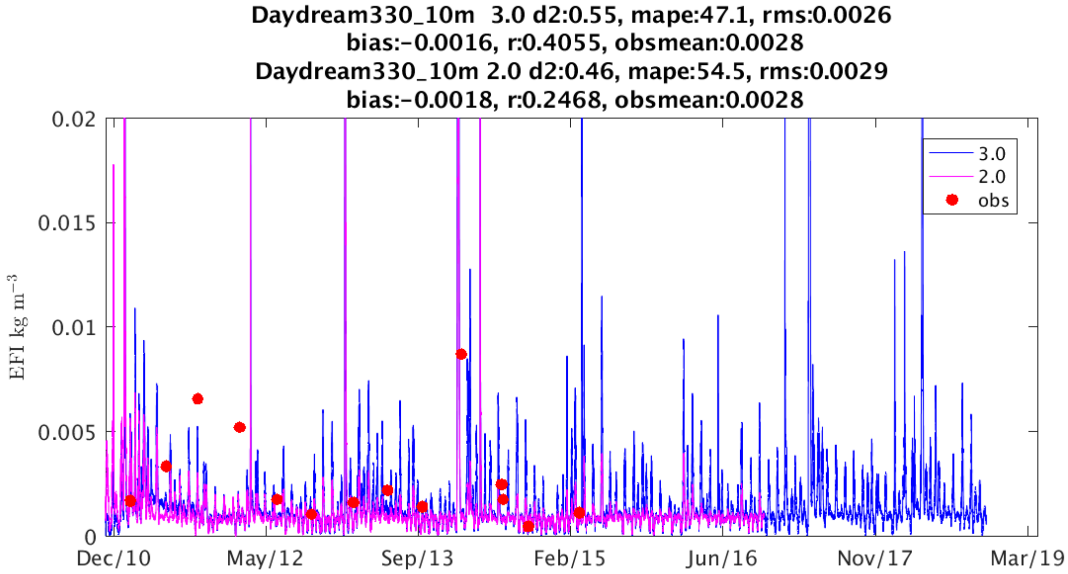
Humpy873_0m 3.0 d2:0.41, mape:91.6, rms:0.0009
bias:-0.0001, r:0.1776, obsmean:0.0006
Humpy873_0m 2.0 d2:0.28, mape:112.5, rms:0.0010
bias:-0.0003, r:-0.0965, obsmean:0.0006
EFI kg m^-3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

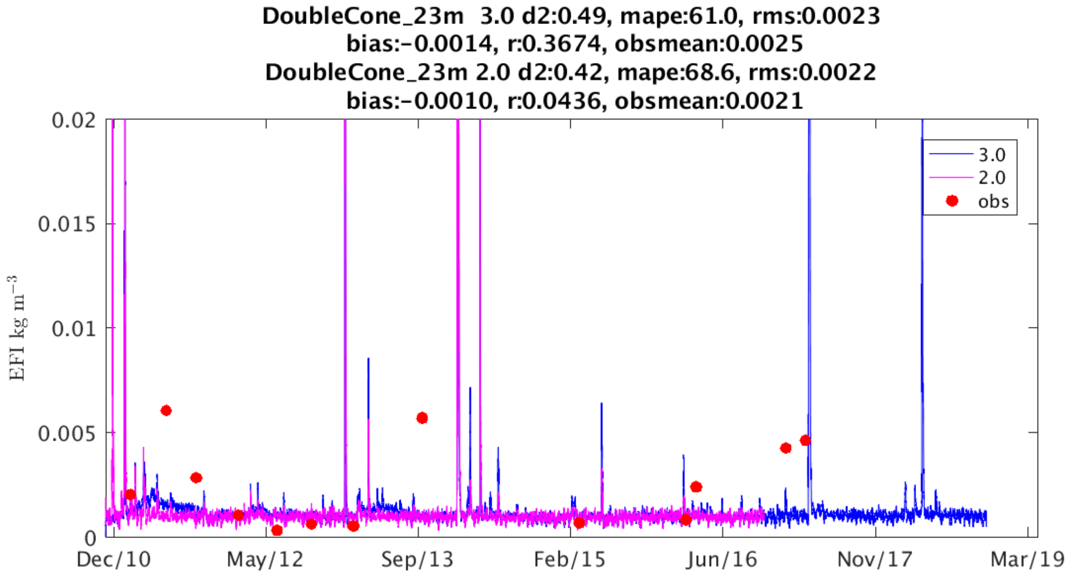

Barren411_10m 3.0 d2:0.22, mape:165.1, rms:0.0086
bias:-0.0023, r:-0.1095, obsmean:0.0027
Barren411_10m 2.0 d2:0.23, mape:75.0, rms:0.0087
bias:-0.0025, r:-0.1031, obsmean:0.0027
EFI kg m-3
0.02
0.015
0.01
0.005
0
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19
3.0
2.0
obs


Pine329_20m 3.0 d2:0.56, mape:87.1, rms:0.0055
bias:-0.0027, r:0.2878, obsmean:0.0049
Pine329_20m 2.0 d2:0.46, mape:92.4, rms:0.0059
bias:-0.0039, r:0.0328, obsmean:0.0050
EFI kg m-3
0.02
0.015
0.01
0.005
0
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19
3.0
2.0
obs

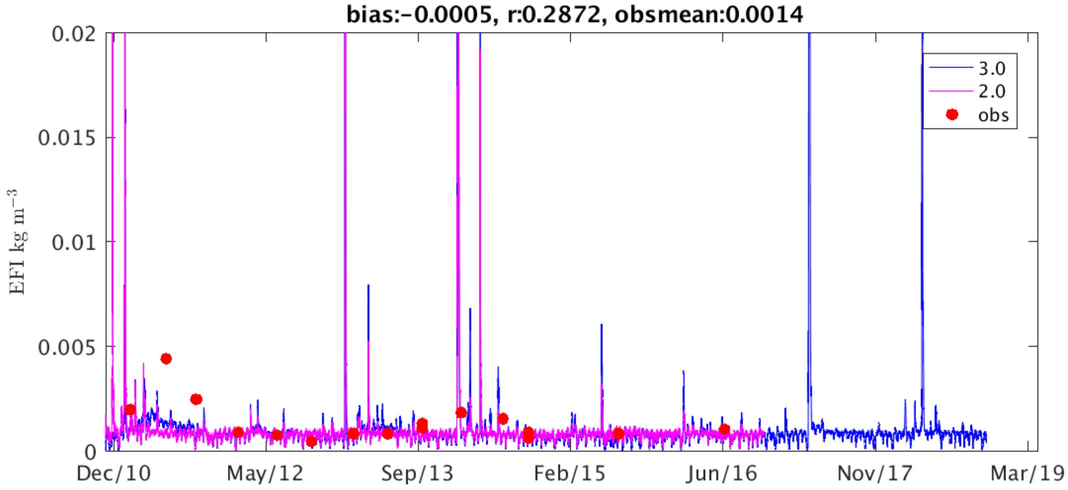

Pine329_0m 3.0 d2:0.70, mape:70.2, rms:0.0036
bias:-0.0015, r:0.5206, obsmean:0.0036
Pine329_0m 2.0 d2:0.44, mape:81.8, rms:0.0041
bias:-0.0024, r:0.1325, obsmean:0.0034
EFI kg m-3
0.02
0.015
0.01
0.005
0
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19
3.0
2.0
obs


Daydream_23m 3.0 d2:0.41, mape:61.2, rms:0.0033
bias:-0.0012, r:0.1259, obsmean:0.0030
Daydream_23m 2.0 d2:0.36, mape:68.0, rms:0.0035
bias:-0.0016, r:-0.0337, obsmean:0.0030
EFI kg m^-3
0.02
0.015
0.01
0.005
0
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19
3.0
2.0
obs

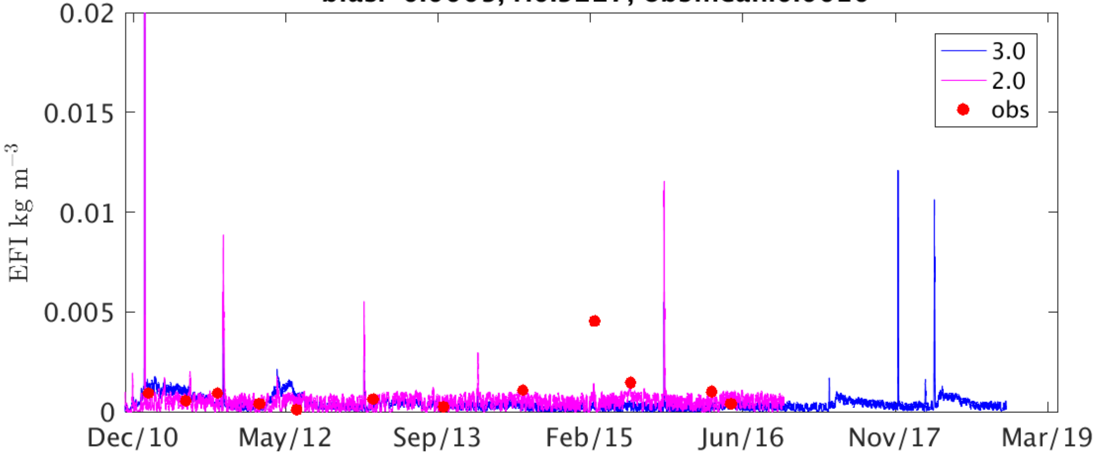

Daydream330_10m 3.0 d2:0.55, mape:47.1, rms:0.0026
bias:-0.0016, r:0.4055, obsmean:0.0028
Daydream330_10m 2.0 d2:0.46, mape:54.5, rms:0.0029
bias:-0.0018, r:0.2468, obsmean:0.0028
EFI kg m^-3
0.02
0.015
0.01
0.005
0
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19
3.0
2.0
obs


DoubleCone_23m 3.0 d2:0.49, mape:61.0, rms:0.0023
bias:-0.0014, r:0.3674, obsmean:0.0025
DoubleCone_23m 2.0 d2:0.42, mape:68.6, rms:0.0022
bias:-0.0010, r:0.0436, obsmean:0.0021
EFI kg m^-3
0.02
0.015
0.01
0.005
0
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19
3.0
2.0
obs

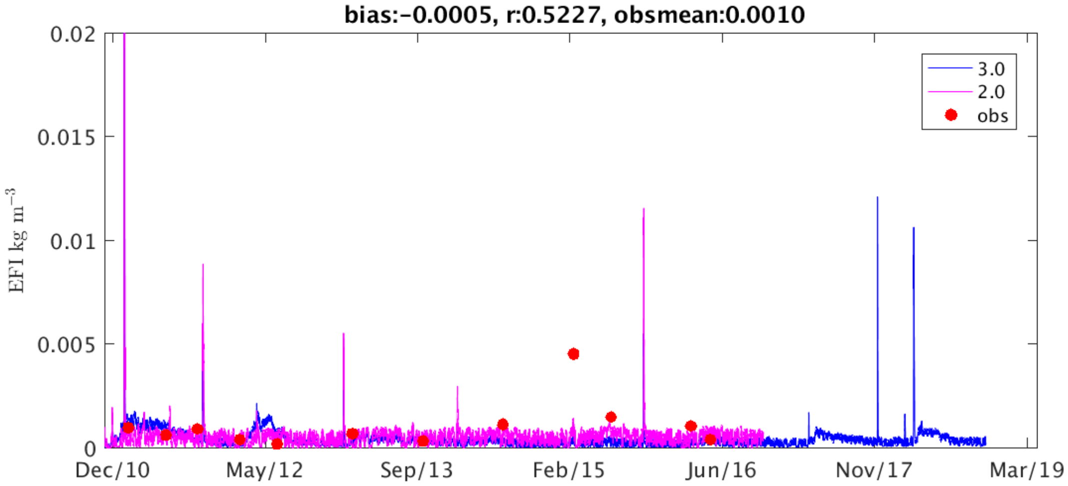
DoubleCone334_10m 3.0 d2:0.53, mape:32.8, rms:0.0010
bias:-0.0005, r:0.5558, obsmean:0.0014
DoubleCone334_10m 2.0 d2:0.51, mape:30.9, rms:0.0011
bias:-0.0005, r:0.2872, obsmean:0.0014



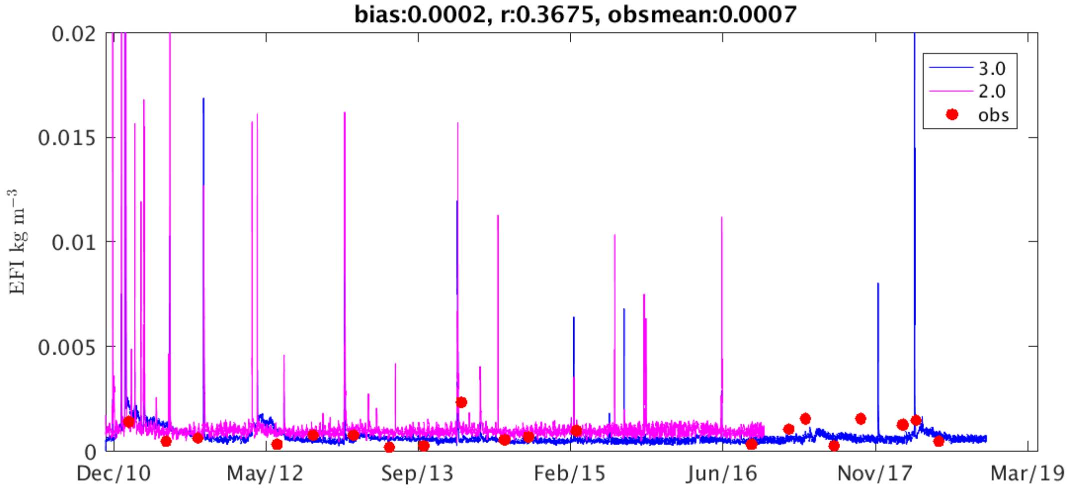
Pandora_5m 3.0 d2:0.29, mape:91.3, rms:0.0013
bias:-0.0006, r:-0.0931, obsmean:0.0010
Pandora_5m 2.0 d2:0.42, mape:78.4, rms:0.0011
bias:-0.0005, r:0.5227, obsmean:0.0010



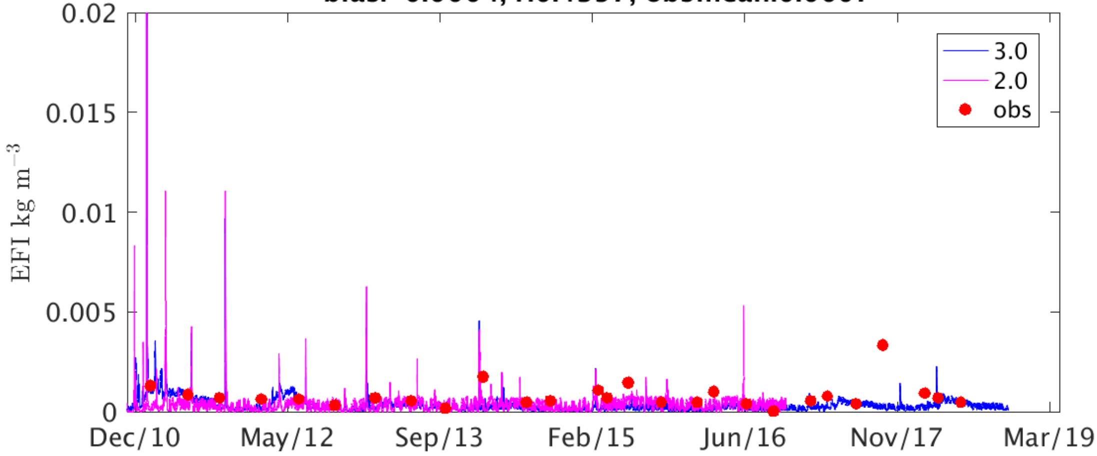
Pandora_5m 3.0 d2:0.29, mape:91.3, rms:0.0013
bias:-0.0006, r:-0.0931, obsmean:0.0010
Pandora_5m 2.0 d2:0.42, mape:78.4, rms:0.0011
bias:-0.0005, r:0.5227, obsmean:0.0010



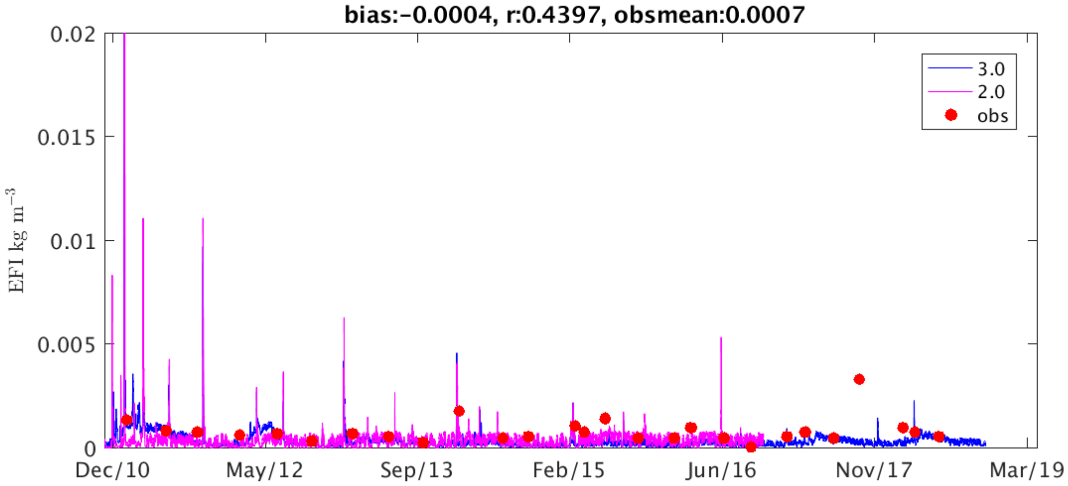
Pelorus686_28m 3.0 d2:0.46, mape:73.3, rms:0.0007
bias:-0.0002, r:0.1176, obsmean:0.0009
Pelorus686_28m 2.0 d2:0.43, mape:96.6, rms:0.0005
bias:0.0002, r:0.3675, obsmean:0.0007

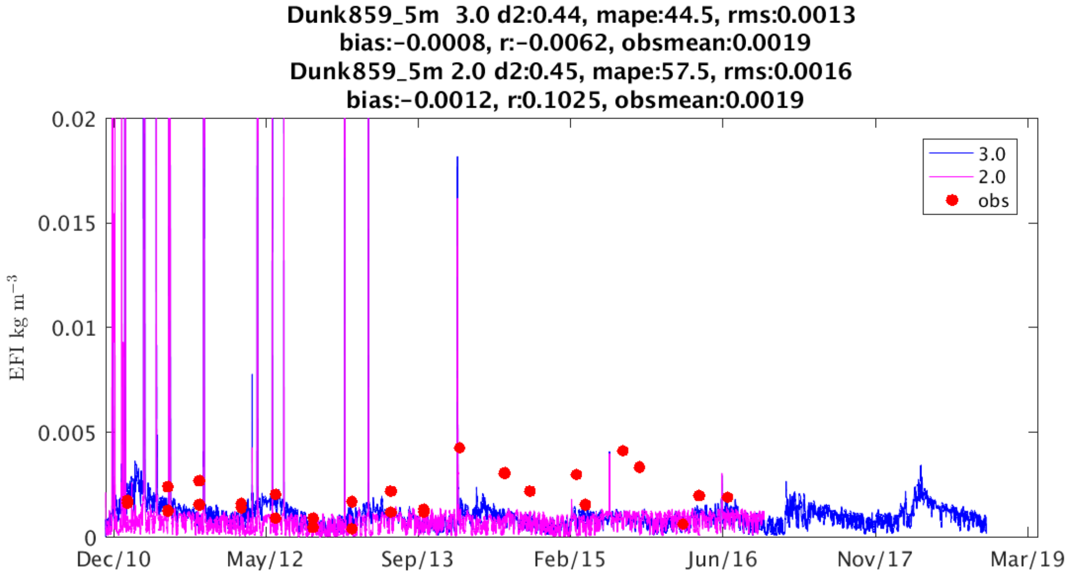


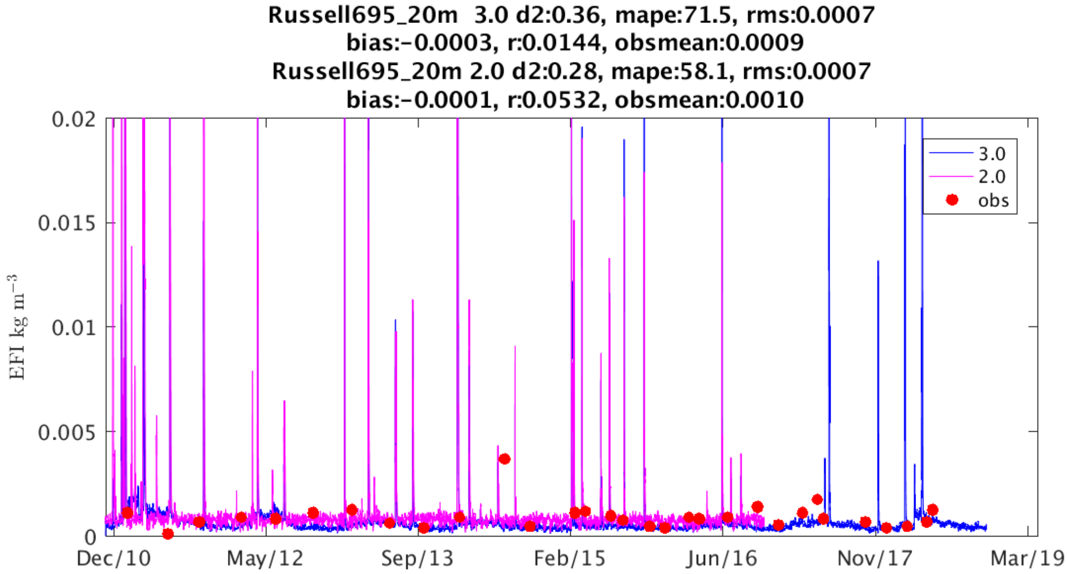
Pelorus686_0m 3.0 d2:0.42, mape:127.6, rms:0.0008
bias:-0.0005, r:0.1157, obsmean:0.0008
Pelorus686_0m 2.0 d2:0.48, mape:253.4, rms:0.0005
bias:-0.0004, r:0.4397, obsmean:0.0007

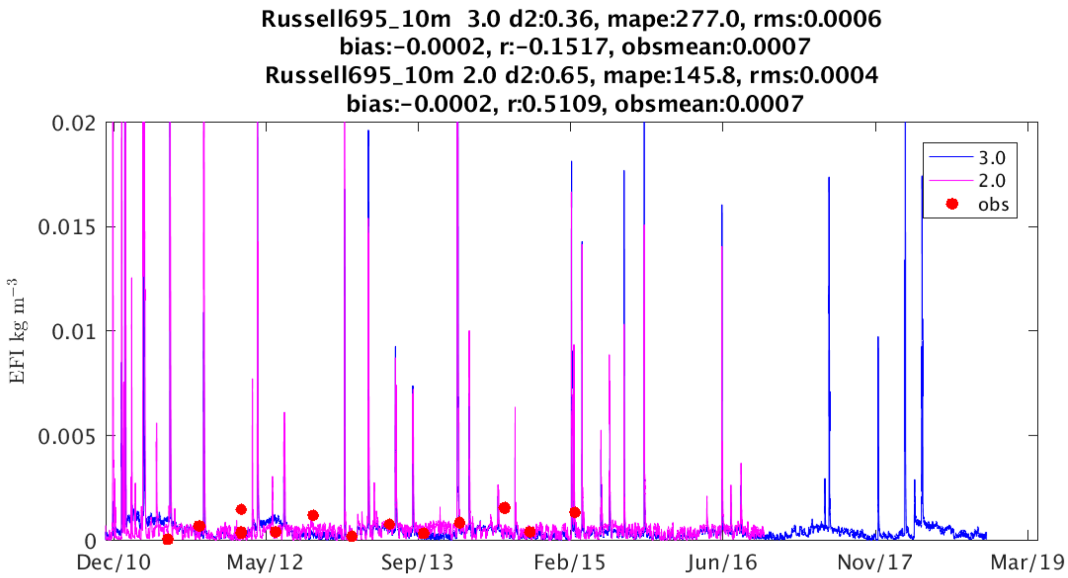


Pelorus686_0m 3.0 d2:0.42, mape:127.6, rms:0.0008
bias:-0.0005, r:0.1157, obsmean:0.0008
Pelorus686_0m 2.0 d2:0.48, mape:253.4, rms:0.0005
bias:-0.0004, r:0.4397, obsmean:0.0007

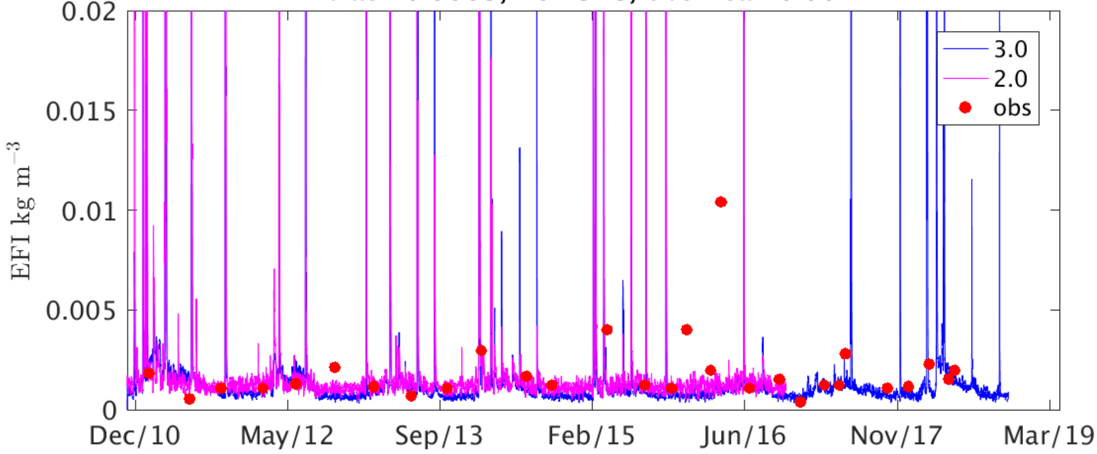



Dunk859_5m 3.0 d2:0.44, mape:44.5, rms:0.0013
bias:-0.0008, r:-0.0062, obsmean:0.0019
Dunk859_5m 2.0 d2:0.45, mape:57.5, rms:0.0016
bias:-0.0012, r:0.1025, obsmean:0.0019
EFI kg m⁻³
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

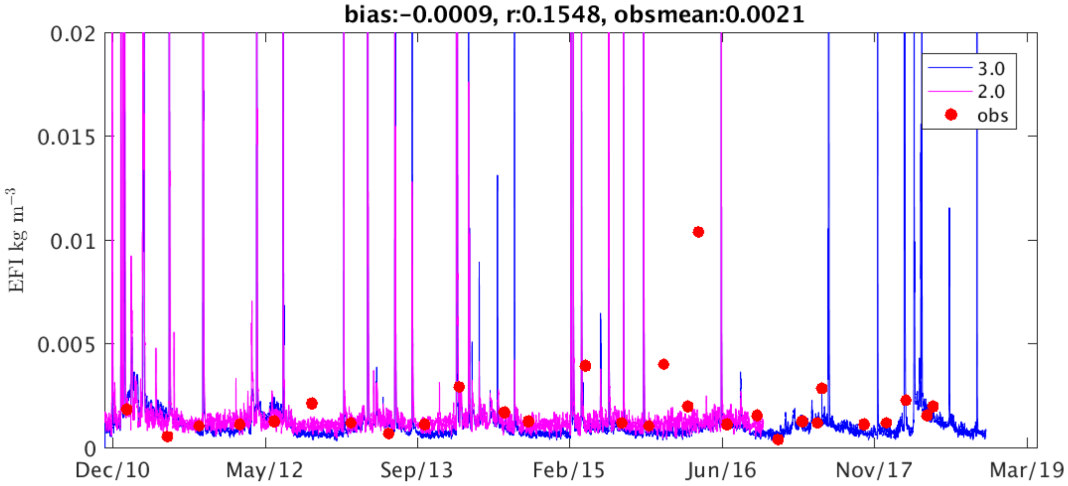

Russell695_20m 3.0 d2:0.36, mape:71.5, rms:0.0007
bias:-0.0003, r:0.0144, obsmean:0.0009
Russell695_20m 2.0 d2:0.28, mape:58.1, rms:0.0007
bias:-0.0001, r:0.0532, obsmean:0.0010
EFI kg m⁻³
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


Russell695_10m 3.0 d2:0.36, mape:277.0, rms:0.0006
bias:-0.0002, r:-0.1517, obsmean:0.0007
Russell695_10m 2.0 d2:0.65, mape:145.8, rms:0.0004
bias:-0.0002, r:0.5109, obsmean:0.0007
EFI kg m⁻³
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

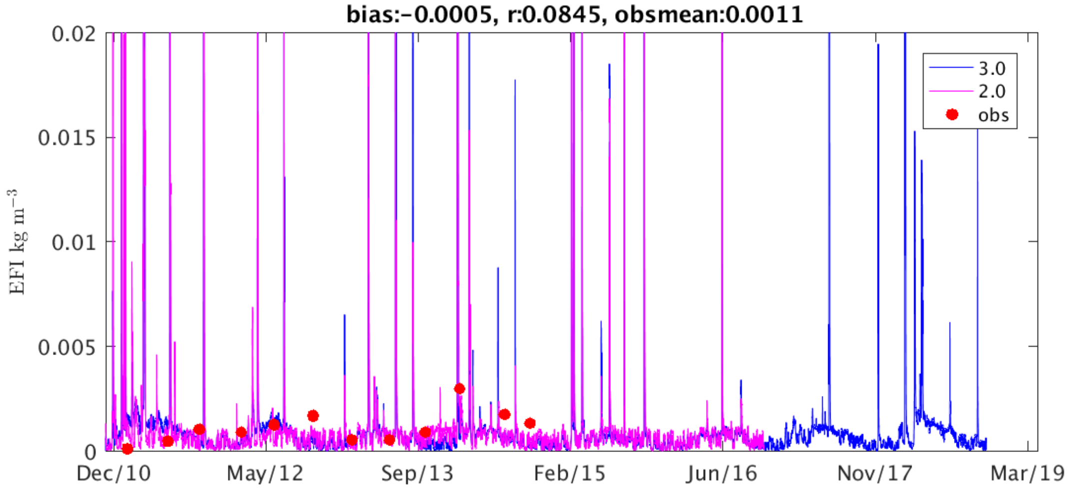
HighI_20m 3.0 d2:0.32, mape:48.0, rms:0.0020 bias:-0.0009, r:0.0646, obsmean:0.0019 HighI_20m 2.0 d2:0.32, mape:38.1, rms:0.0023 bias:-0.0009, r:0.1548, obsmean:0.0021



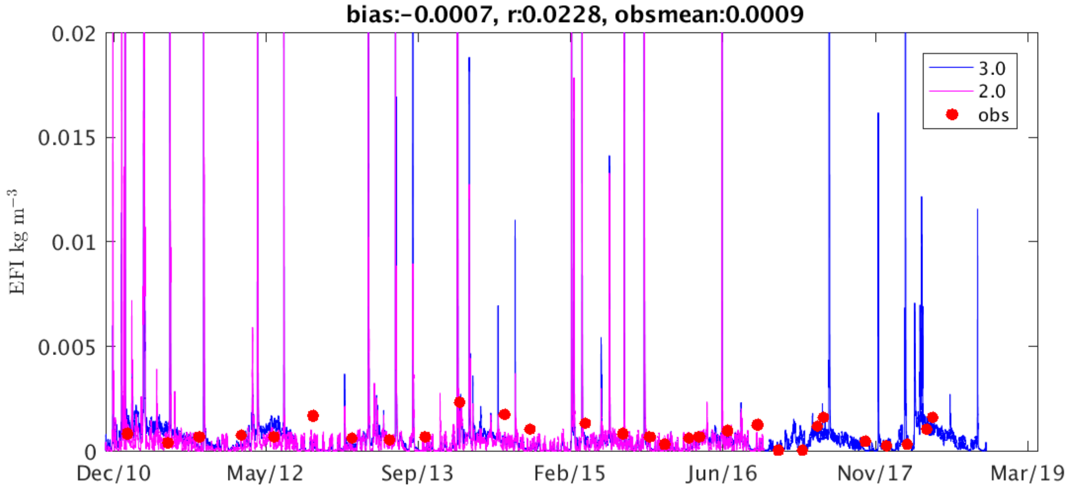
HighI_20m 3.0 d2:0.32, mape:48.0, rms:0.0020 bias:-0.0009, r:0.0646, obsmean:0.0019 HighI_20m 2.0 d2:0.32, mape:38.1, rms:0.0023 bias:-0.0009, r:0.1548, obsmean:0.0021



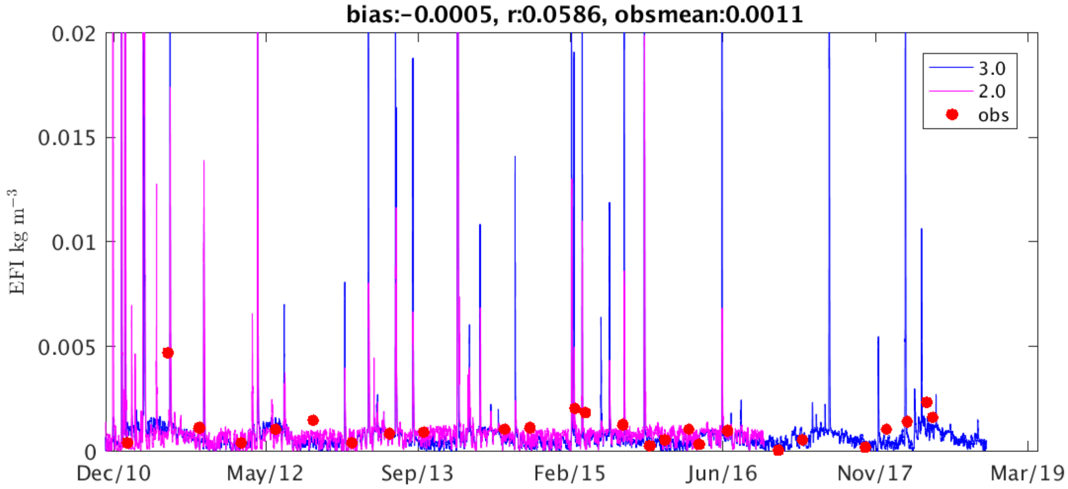
HighI_10m 3.0 d2:0.24, mape:167.1, rms:0.0010 bias:-0.0004, r:-0.2611, obsmean:0.0011 HighI_10m 2.0 d2:0.33, mape:141.6, rms:0.0009 bias:-0.0005, r:0.0845, obsmean:0.0011



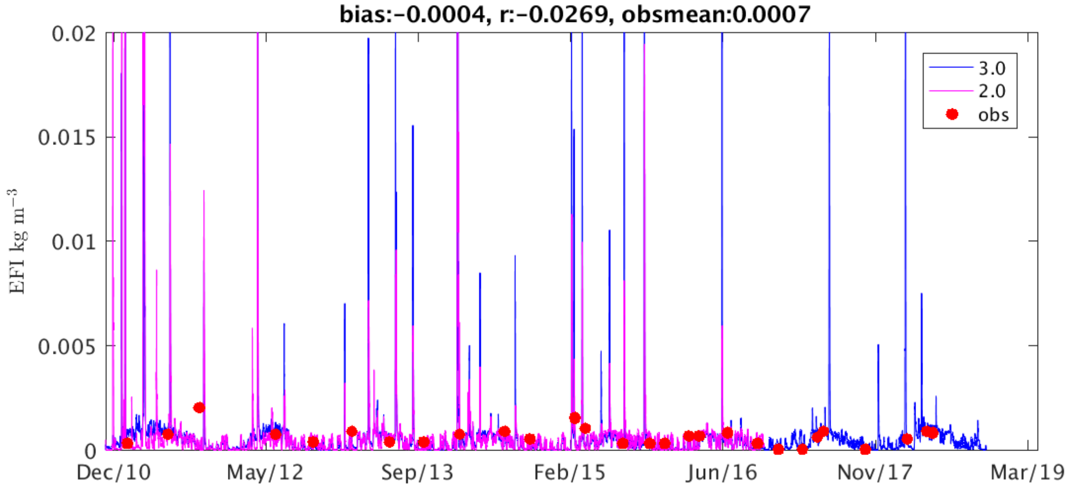
HighI697_0m 3.0 d2:0.51, mape:156.0, rms:0.0007
bias:-0.0004, r:0.2283, obsmean:0.0009
HighI697_0m 2.0 d2:0.40, mape:76.1, rms:0.0009
bias:-0.0007, r:0.0228, obsmean:0.0009



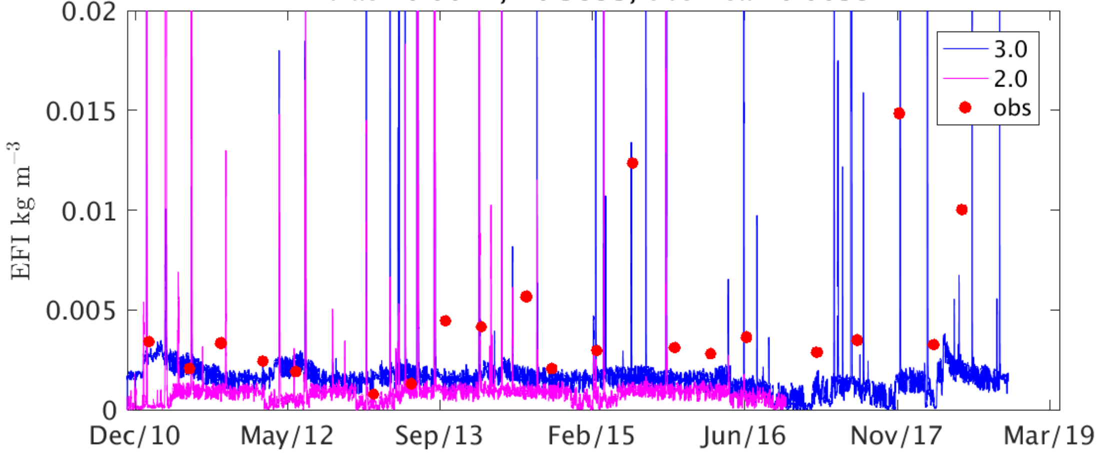
FitzCoral852_15m 3.0 d2:0.47, mape:160.7, rms:0.0010
bias:-0.0005, r:0.4042, obsmean:0.0011
FitzCoral852_15m 2.0 d2:0.32, mape:60.3, rms:0.0011
bias:-0.0005, r:0.0586, obsmean:0.0011



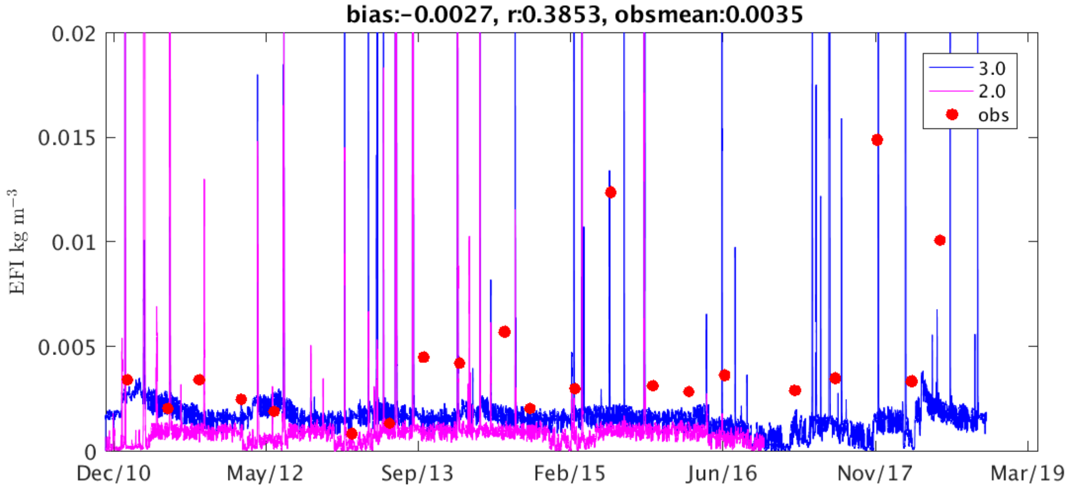
FitzCoral852_0m 3.0 d2:0.51, mape:87.5, rms:0.0006
bias:-0.0003, r:0.1662, obsmean:0.0006
FitzCoral852_0m 2.0 d2:0.40, mape:65.8, rms:0.0007
bias:-0.0004, r:-0.0269, obsmean:0.0007



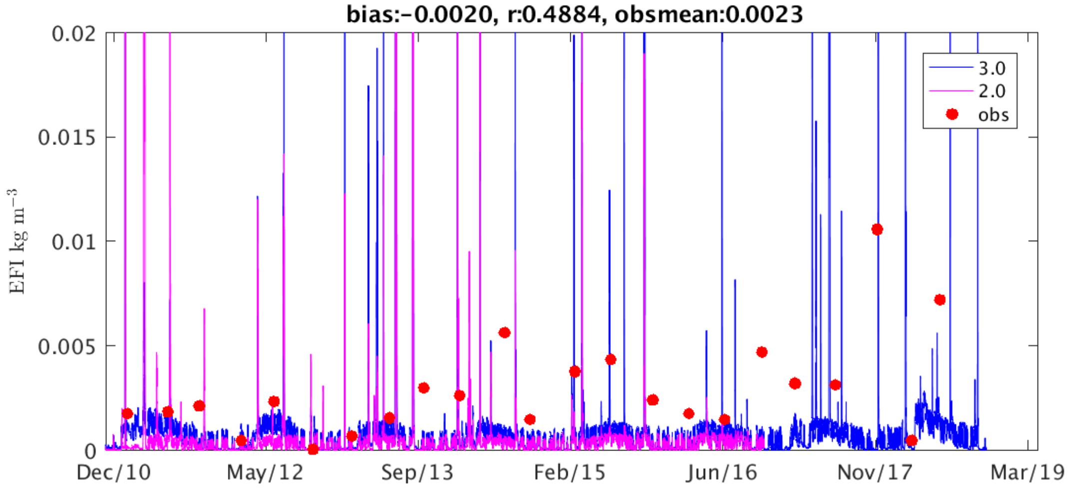
Yorkeys519_8m 3.0 d2:0.38, mape:55.0, rms:0.0045
bias:-0.0026, r:-0.1355, obsmean:0.0043
Yorkeys519_8m 2.0 d2:0.40, mape:68.8, rms:0.0037
bias:-0.0027, r:0.3853, obsmean:0.0035



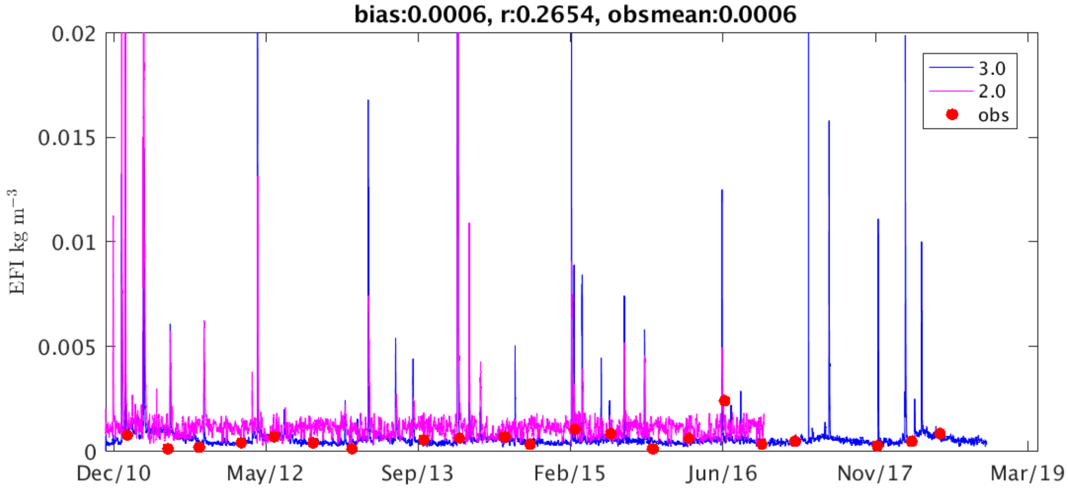
Yorkeys519_8m 3.0 d2:0.38, mape:55.0, rms:0.0045
bias:-0.0026, r:-0.1355, obsmean:0.0043
Yorkeys519_8m 2.0 d2:0.40, mape:68.8, rms:0.0037
bias:-0.0027, r:0.3853, obsmean:0.0035



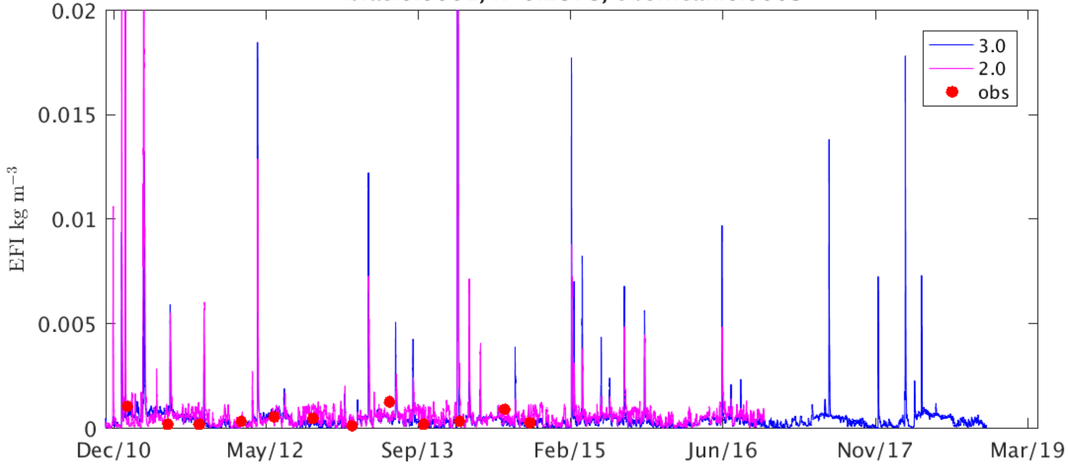
Yorkeys519_0m 3.0 d2:0.45, mape:70.4, rms:0.0032
bias:-0.0023, r:0.3135, obsmean:0.0029
Yorkeys519_0m 2.0 d2:0.44, mape:83.9, rms:0.0025
bias:-0.0020, r:0.4884, obsmean:0.0023



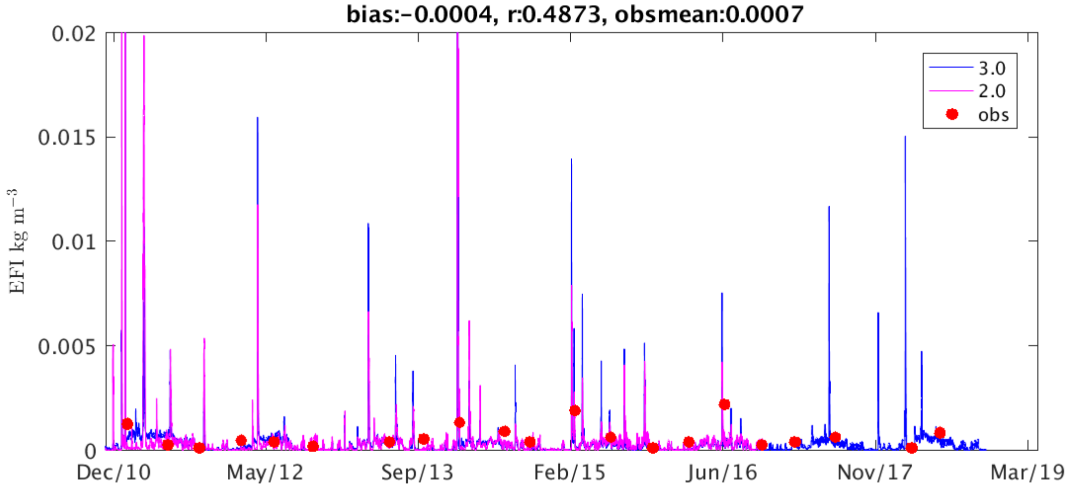
Green830_36m 3.0 d2:0.35, mape:78.1, rms:0.0005
bias:-0.0000, r:0.2181, obsmean:0.0006
Green830_36m 2.0 d2:0.47, mape:246.0, rms:0.0008
bias:0.0006, r:0.2654, obsmean:0.0006

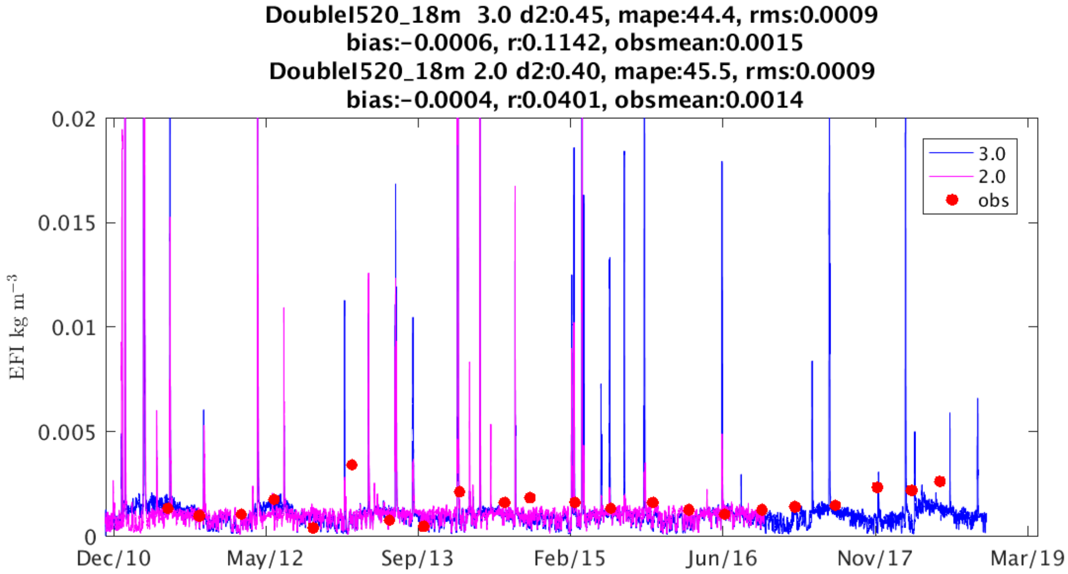


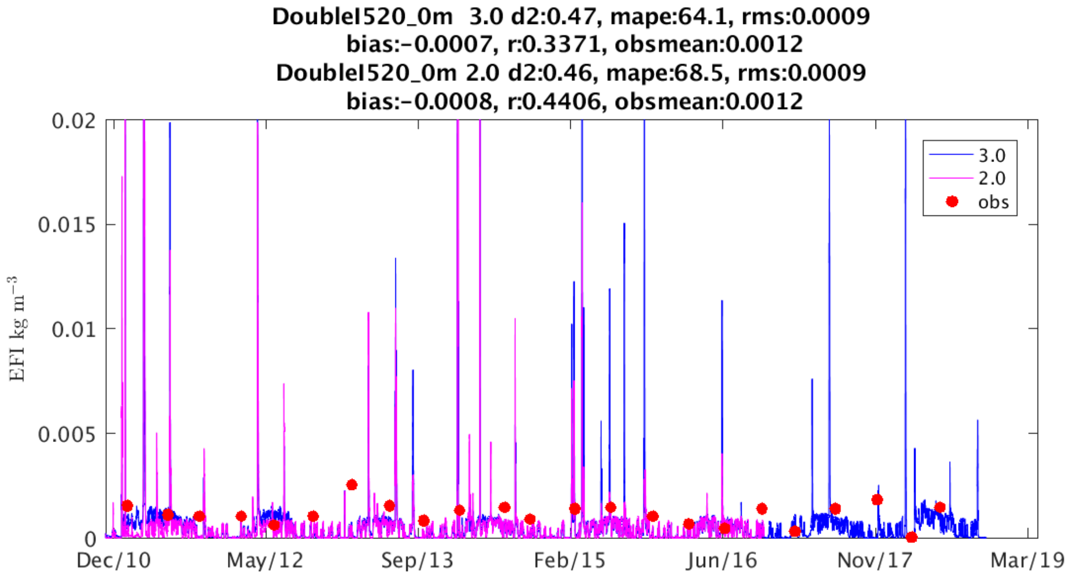
Green830_18m 3.0 d2:0.51, mape:82.5, rms:0.0004
bias:-0.0001, r:0.3274, obsmean:0.0005
Green830_18m 2.0 d2:0.17, mape:141.1, rms:0.0006
bias:0.0001, r:-0.1878, obsmean:0.0005

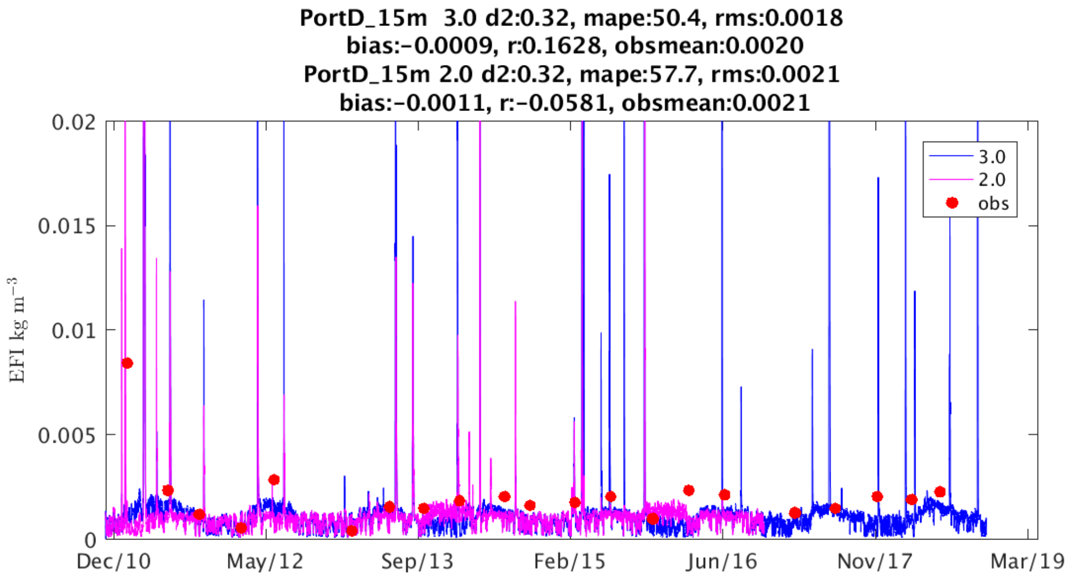


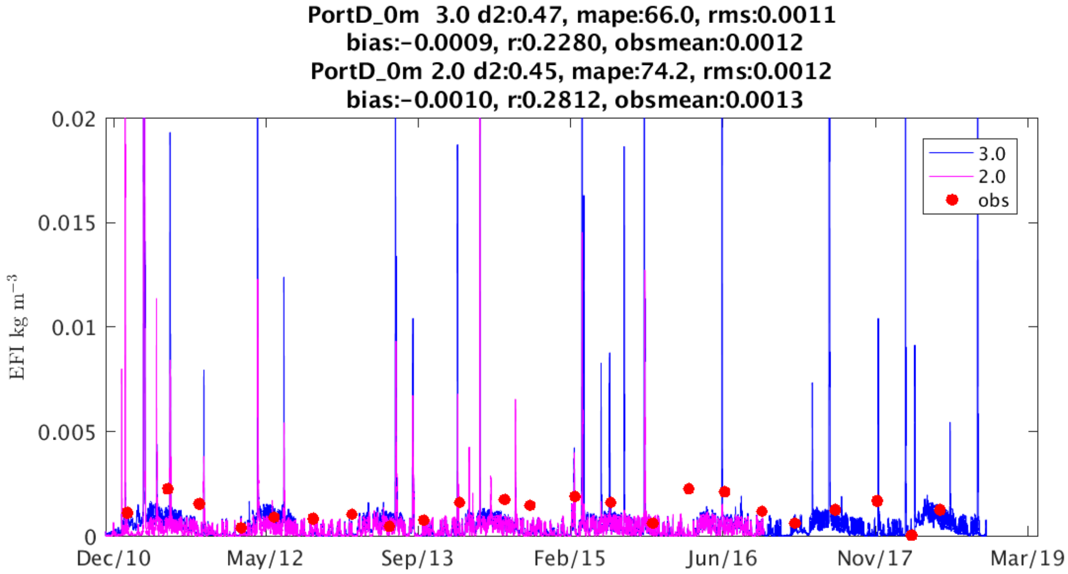
Green830_0m 3.0 d2:0.47, mape:67.2, rms:0.0007
bias:-0.0004, r:0.2557, obsmean:0.0006
Green830_0m 2.0 d2:0.58, mape:68.1, rms:0.0007
bias:-0.0004, r:0.4873, obsmean:0.0007

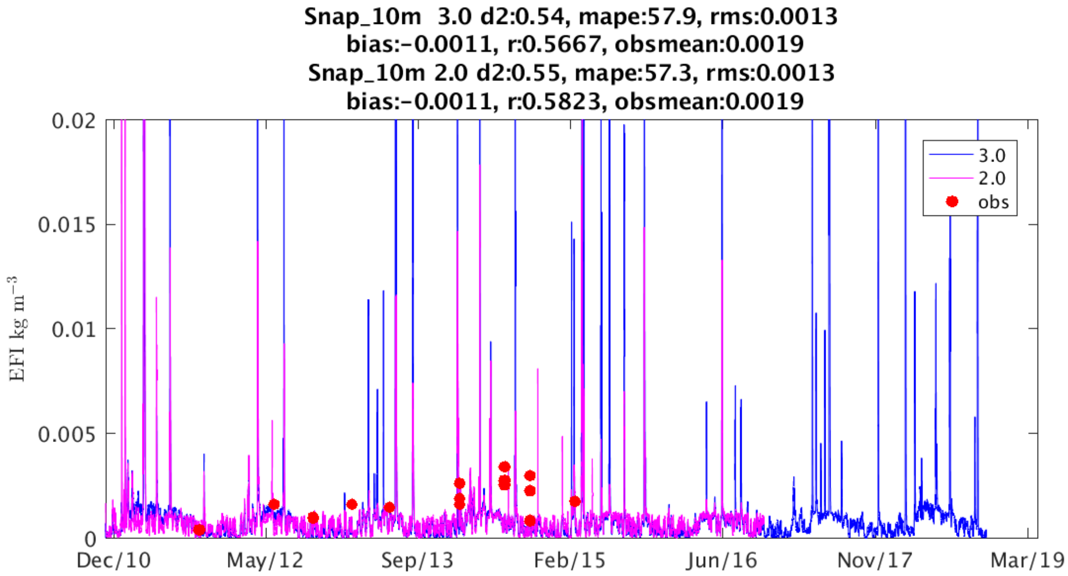



DoubleI520_18m 3.0 d2:0.45, mape:44.4, rms:0.0009
bias:-0.0006, r:0.1142, obsmean:0.0015
DoubleI520_18m 2.0 d2:0.40, mape:45.5, rms:0.0009
bias:-0.0004, r:0.0401, obsmean:0.0014
EFI kg m^-3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


DoubleI520_0m 3.0 d2:0.47, mape:64.1, rms:0.0009
bias:-0.0007, r:0.3371, obsmean:0.0012
DoubleI520_0m 2.0 d2:0.46, mape:68.5, rms:0.0009
bias:-0.0008, r:0.4406, obsmean:0.0012
EFI kg m^-3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


PortD_15m 3.0 d2:0.32, mape:50.4, rms:0.0018
bias:-0.0009, r:0.1628, obsmean:0.0020
PortD_15m 2.0 d2:0.32, mape:57.7, rms:0.0021
bias:-0.0011, r:-0.0581, obsmean:0.0021
EFI kg m^-3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


PortD_0m 3.0 d2:0.47, mape:66.0, rms:0.0011
bias:-0.0009, r:0.2280, obsmean:0.0012
PortD_0m 2.0 d2:0.45, mape:74.2, rms:0.0012
bias:-0.0010, r:0.2812, obsmean:0.0013
EFI kg m^{-3}
0.02
0.015
0.01
0.005
0
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19
3.0
2.0
obs


Snap_10m 3.0 d2:0.54, mape:57.9, rms:0.0013
bias:-0.0011, r:0.5667, obsmean:0.0019
Snap_10m 2.0 d2:0.55, mape:57.3, rms:0.0013
bias:-0.0011, r:0.5823, obsmean:0.0019
EFI kg m^{-3}
0.02
0.015
0.01
0.005
0
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19
3.0
2.0
obs

18. Simulated Chl *a* assessment against IMOS NRS HPLC Chl *a*

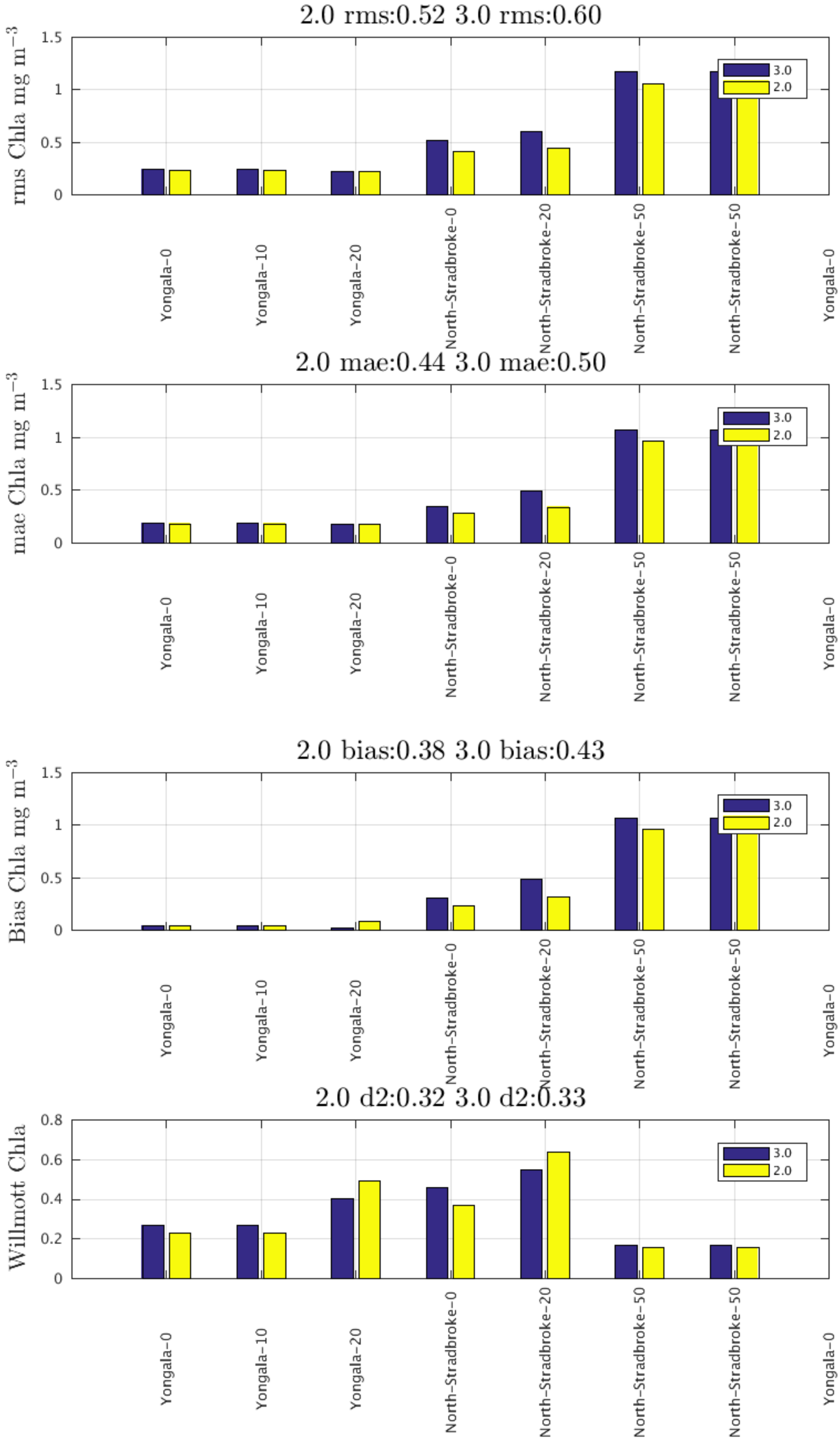
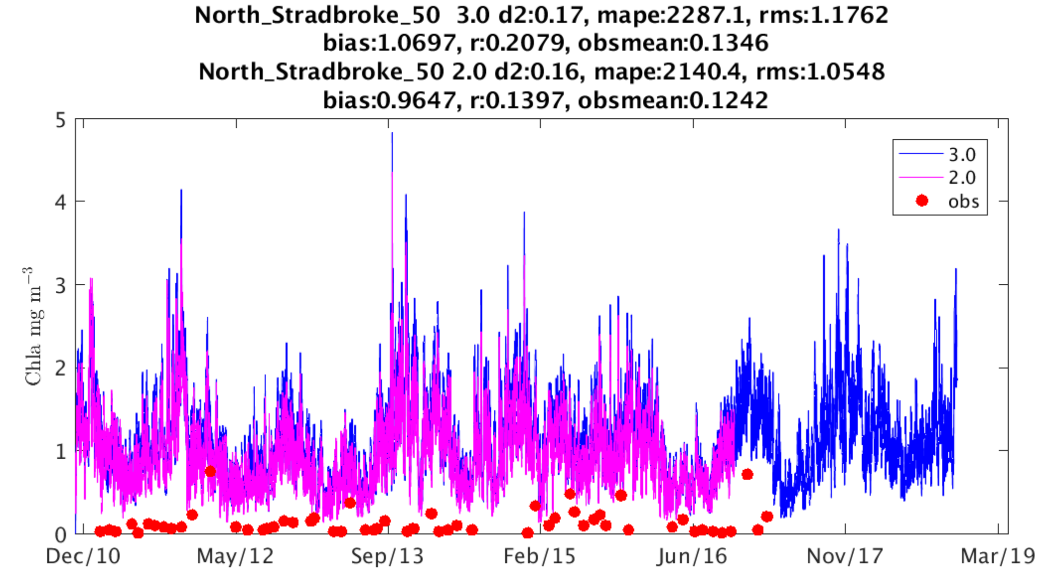
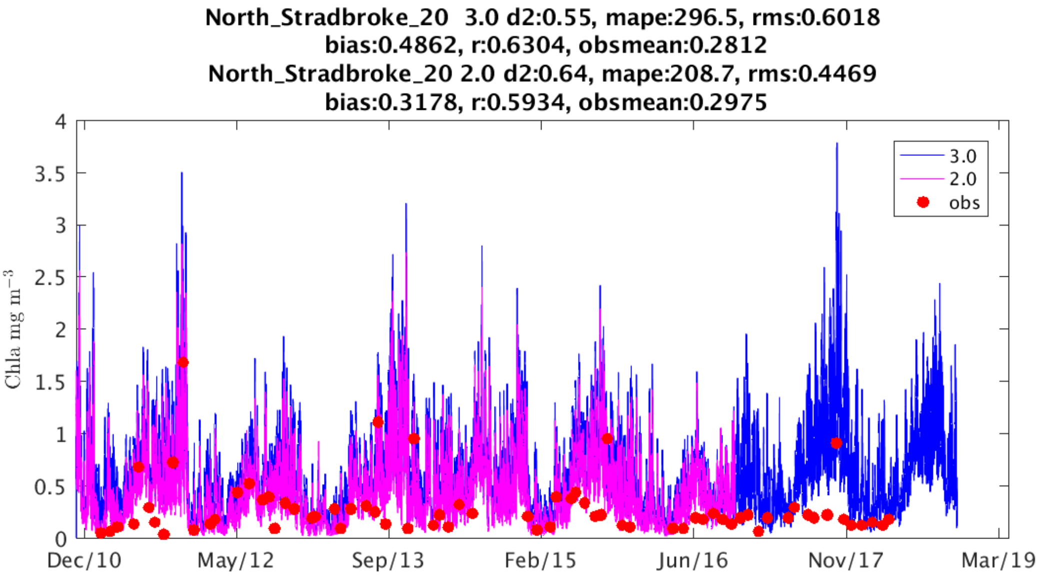
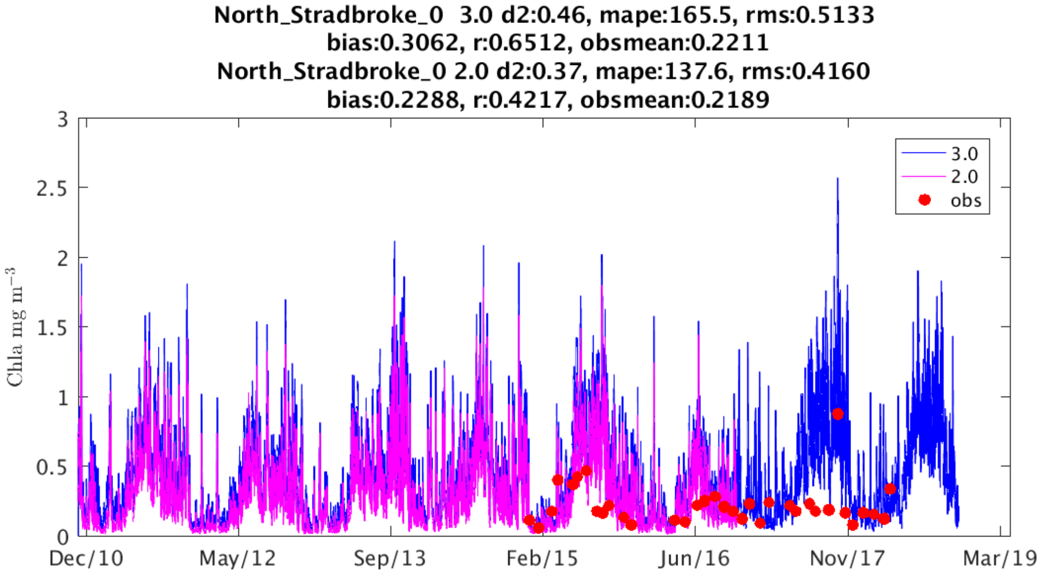
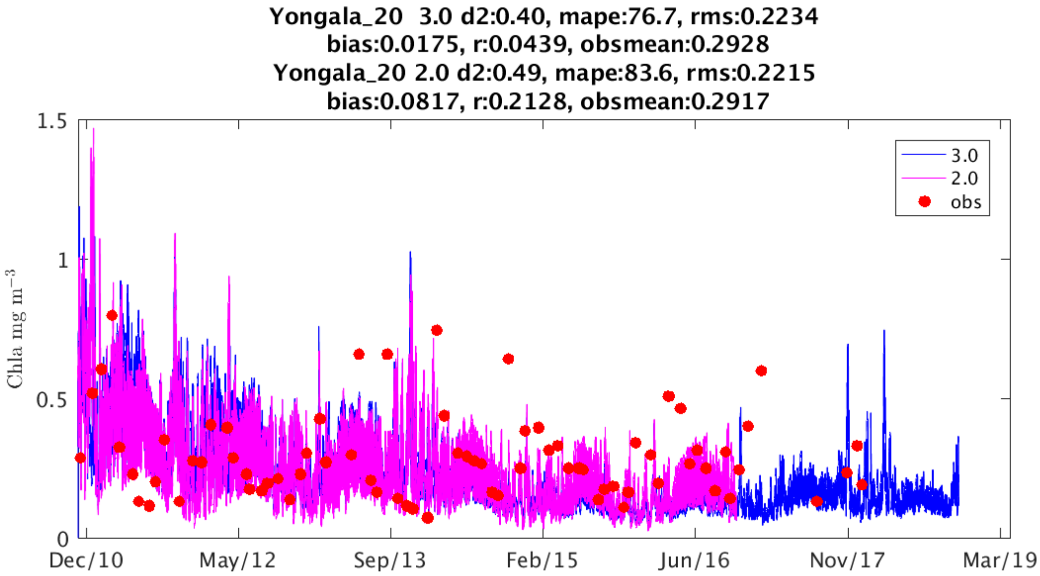


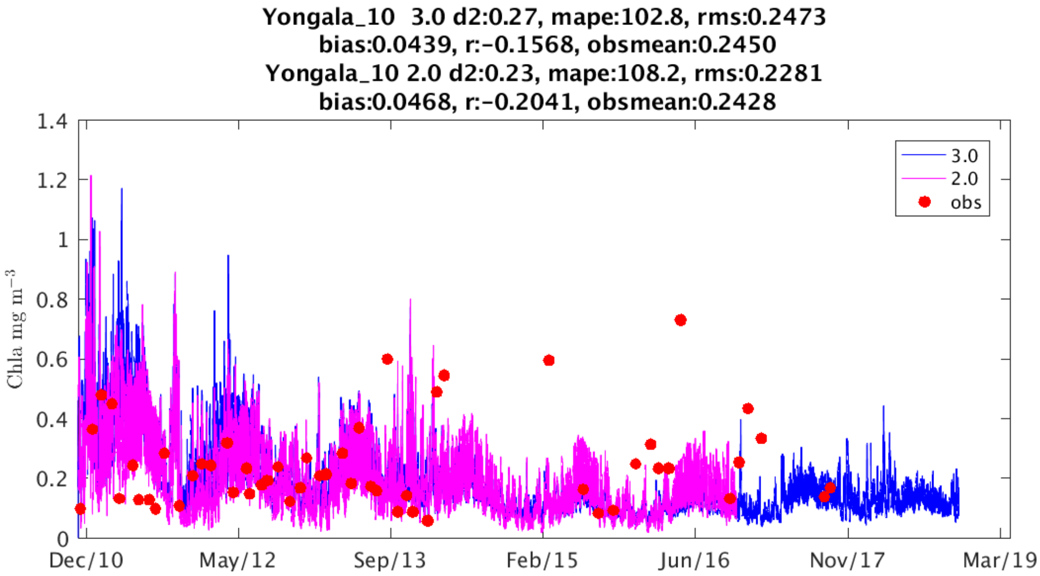
Figure 13 Metrics for IMOS NRS sites Chlorophyll assessment against observations for model version 3p0 and 2p0 d2 = Willmott index see Statistical metric page 27.mae:mean absolute error, rms root mean square


North_Stradbroke_50 3.0 d2:0.17, mape:2287.1, rms:1.1762
bias:1.0697, r:0.2079, obsmean:0.1346
North_Stradbroke_50 2.0 d2:0.16, mape:2140.4, rms:1.0548
bias:0.9647, r:0.1397, obsmean:0.1242
Chla mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


North_Stradbroke_20 3.0 d2:0.55, mape:296.5, rms:0.6018
bias:0.4862, r:0.6304, obsmean:0.2812
North_Stradbroke_20 2.0 d2:0.64, mape:208.7, rms:0.4469
bias:0.3178, r:0.5934, obsmean:0.2975
Chla mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


North_Stradbroke_0 3.0 d2:0.46, mape:165.5, rms:0.5133
bias:0.3062, r:0.6512, obsmean:0.2211
North_Stradbroke_0 2.0 d2:0.37, mape:137.6, rms:0.4160
bias:0.2288, r:0.4217, obsmean:0.2189
3.0
2.0
obs
Chla mg m^{-3}
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


Yongala_20 3.0 d2:0.40, mape:76.7, rms:0.2234
bias:0.0175, r:0.0439, obsmean:0.2928
Yongala_20 2.0 d2:0.49, mape:83.6, rms:0.2215
bias:0.0817, r:0.2128, obsmean:0.2917
3.0
2.0
obs
Chla mg m^{-3}
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


Yongala_10 3.0 d2:0.27, mape:102.8, rms:0.2473
bias:0.0439, r:-0.1568, obsmean:0.2450
Yongala_10 2.0 d2:0.23, mape:108.2, rms:0.2281
bias:0.0468, r:-0.2041, obsmean:0.2428
3.0
2.0
obs
Chla mg m^{-3}
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

19. Simulated Chl *a* and fluorescence assessment against AIMS MMP fluorescence

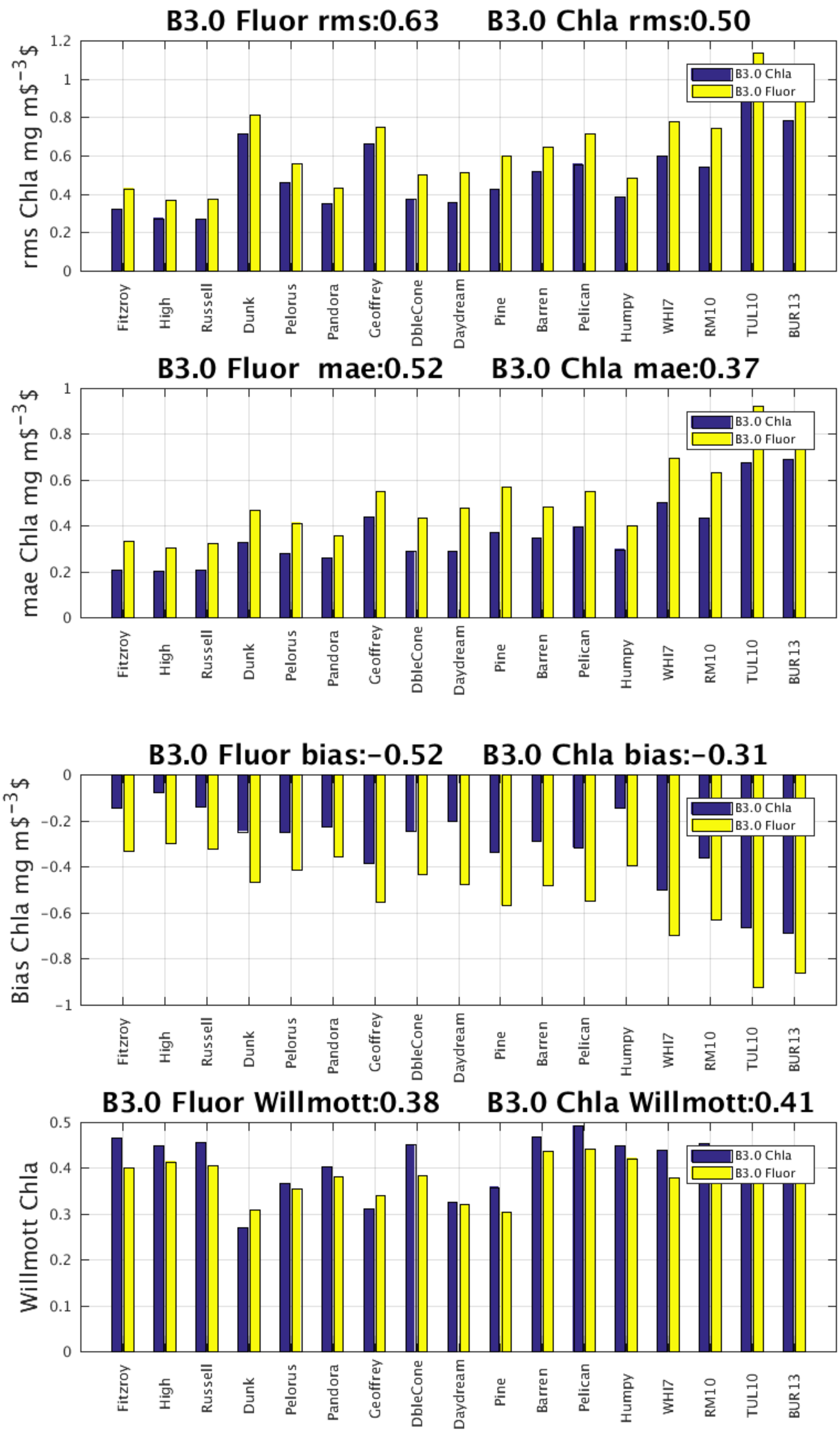
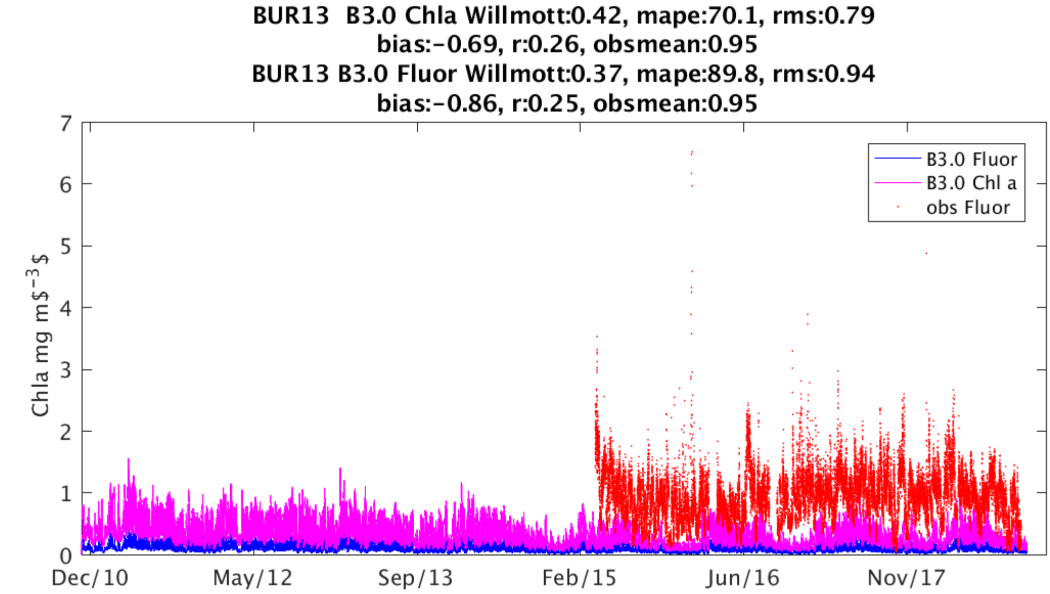
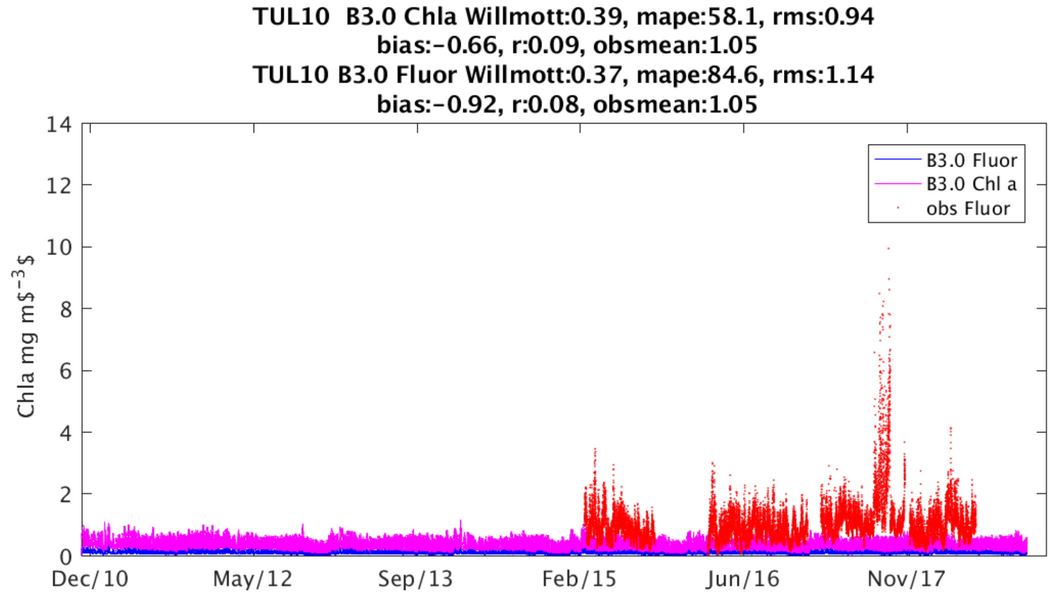
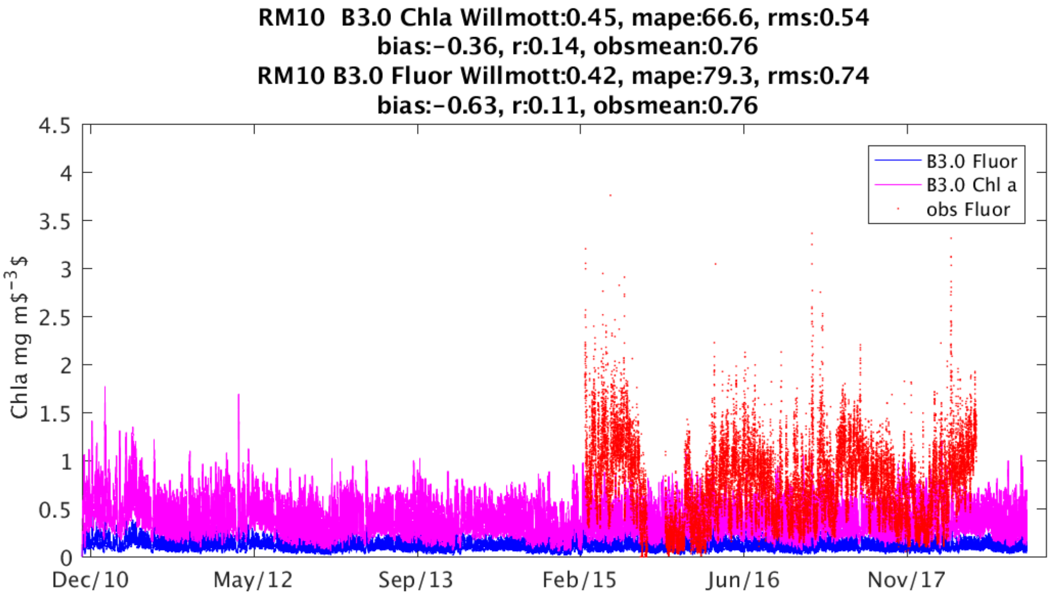
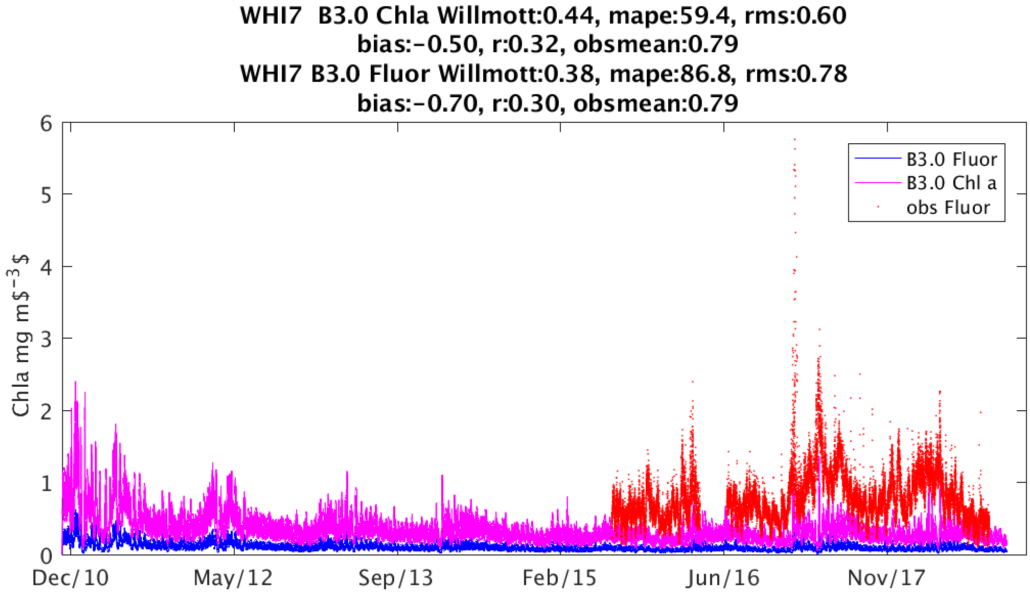


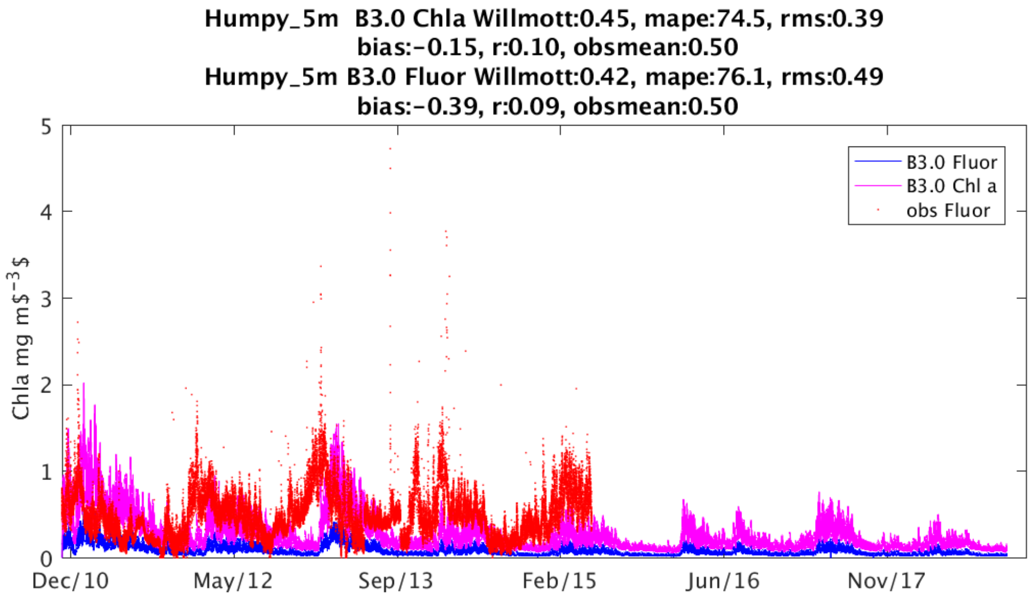
Figure 14 Metrics for AIMS MMP fluorescence against Chl a and fluorescence for model version 3p0 and 2p0 d2 = Willmott index see Statistical metric page 27.mae:mean absolute error, rms root mean square

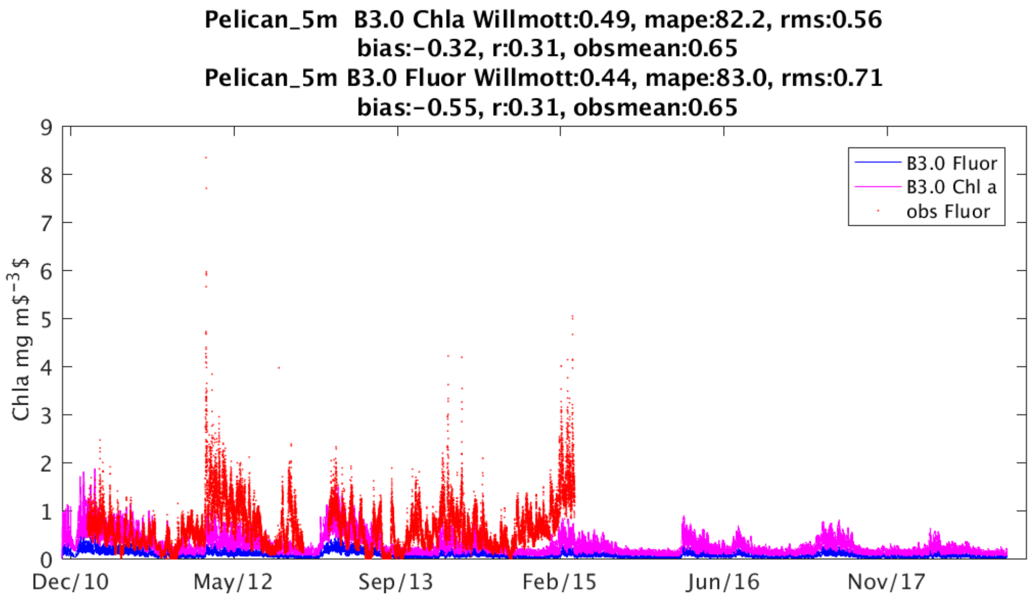

BUR13 B3.0 Chla Willmott:0.42, mape:70.1, rms:0.79
bias:-0.69, r:0.26, obsmean:0.95
BUR13 B3.0 Fluor Willmott:0.37, mape:89.8, rms:0.94
bias:-0.86, r:0.25, obsmean:0.95
Chla mg m$-3 $
B3.0 Fluor
B3.0 Chl a
obs Fluor
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17

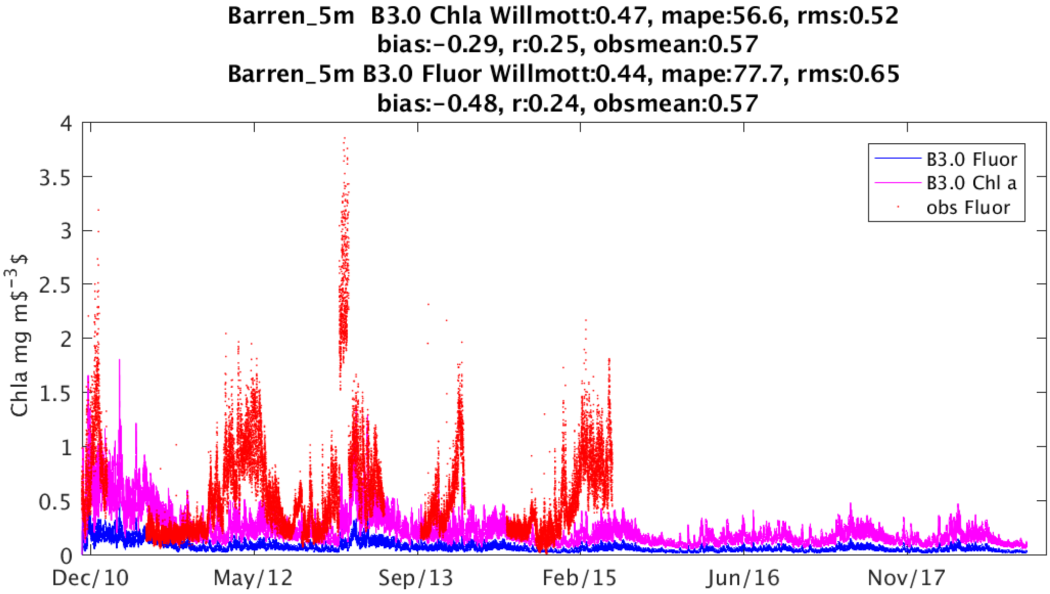

TUL10 B3.0 Chla Willmott:0.39, mape:58.1, rms:0.94
bias:-0.66, r:0.09, obsmean:1.05
TUL10 B3.0 Fluor Willmott:0.37, mape:84.6, rms:1.14
bias:-0.92, r:0.08, obsmean:1.05
Chla mg m$-3 $
B3.0 Fluor
B3.0 Chl a
obs Fluor
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17

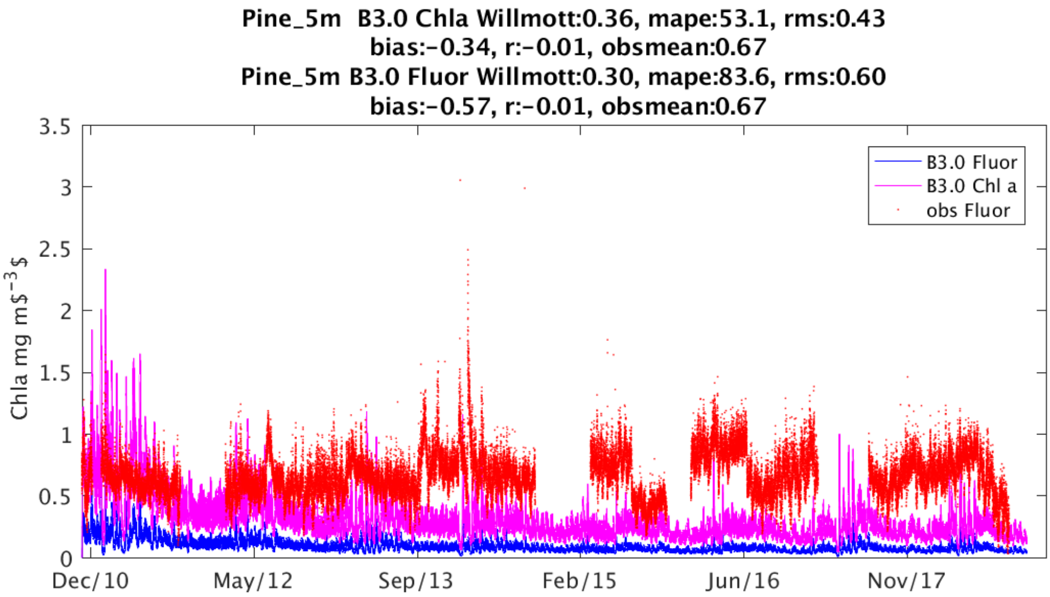

RM10 B3.0 Chla Willmott:0.45, mape:66.6, rms:0.54
bias:-0.36, r:0.14, obsmean:0.76
RM10 B3.0 Fluor Willmott:0.42, mape:79.3, rms:0.74
bias:-0.63, r:0.11, obsmean:0.76
Chla mg m$-3 $
B3.0 Fluor
B3.0 Chl a
obs Fluor
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17

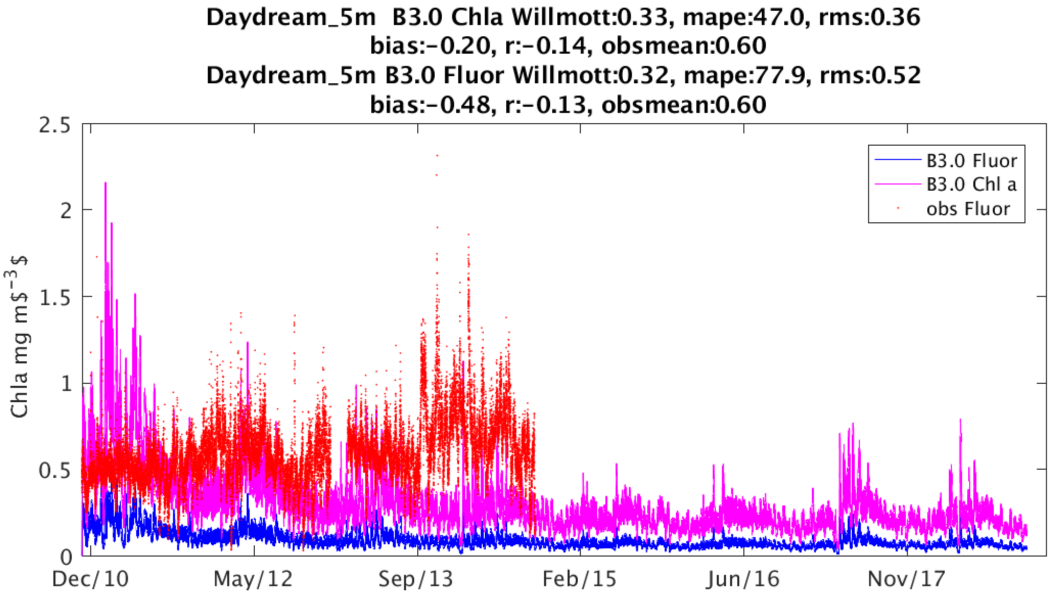

WHI7 B3.0 Chla Willmott:0.44, mape:59.4, rms:0.60
bias:-0.50, r:0.32, obsmean:0.79
WHI7 B3.0 Fluor Willmott:0.38, mape:86.8, rms:0.78
bias:-0.70, r:0.30, obsmean:0.79
Chla mg m$^-3$
B3.0 Fluor
B3.0 Chl a
obs Fluor
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17

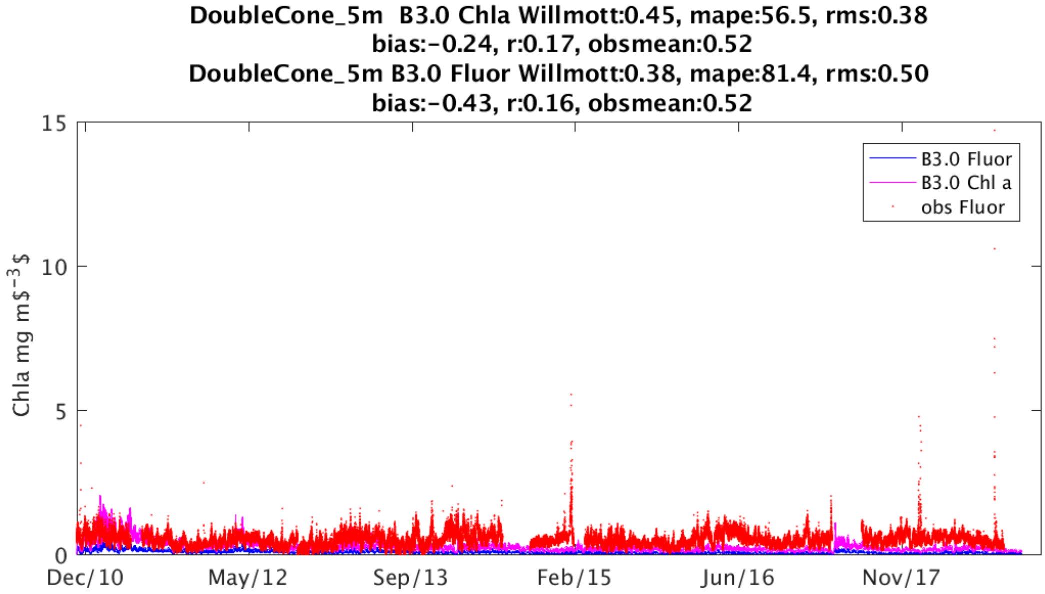

Humpy_5m B3.0 Chla Willmott:0.45, mape:74.5, rms:0.39
bias:-0.15, r:0.10, obsmean:0.50
Humpy_5m B3.0 Fluor Willmott:0.42, mape:76.1, rms:0.49
bias:-0.39, r:0.09, obsmean:0.50
Chla mg m$^-3$
B3.0 Fluor
B3.0 Chl a
obs Fluor
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17

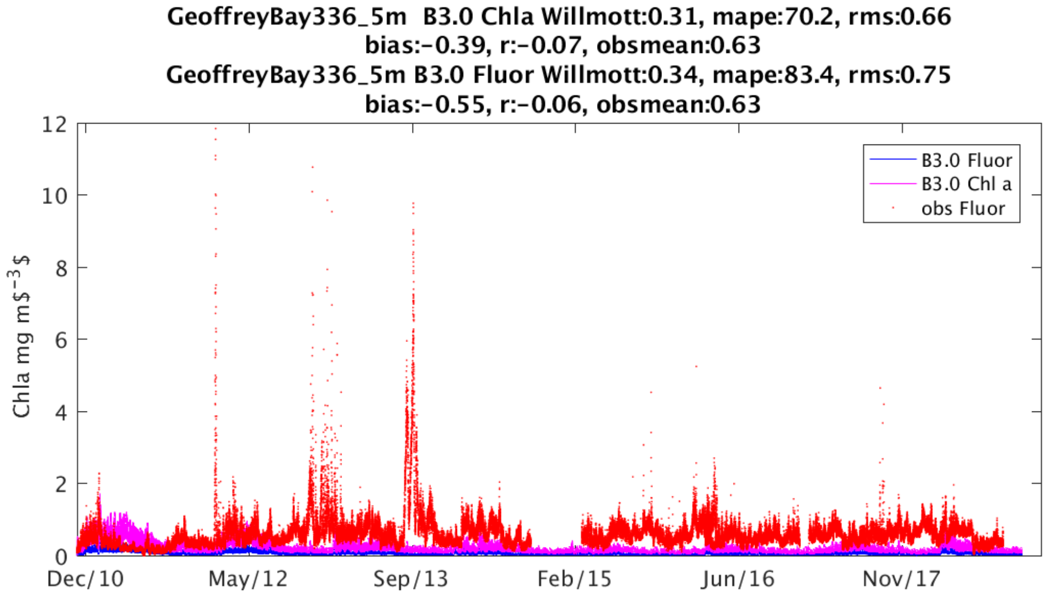

Pelican_5m B3.0 Chla Willmott:0.49, mape:82.2, rms:0.56
bias:-0.32, r:0.31, obsmean:0.65
Pelican_5m B3.0 Fluor Willmott:0.44, mape:83.0, rms:0.71
bias:-0.55, r:0.31, obsmean:0.65
Chla mg m$^-3$
B3.0 Fluor
B3.0 Chl a
obs Fluor
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17

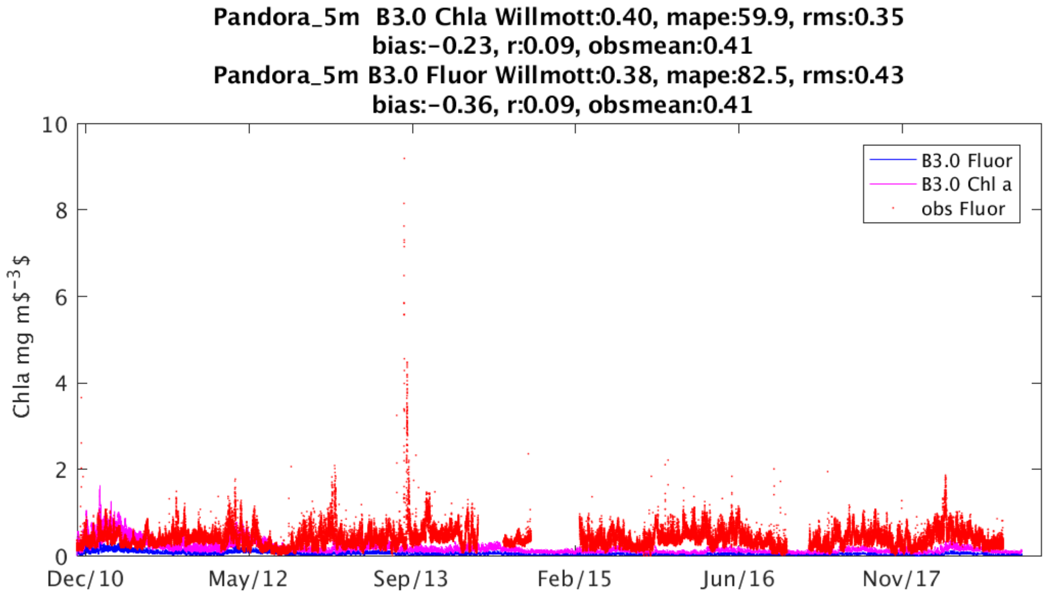

Barren_5m B3.0 Chla Willmott:0.47, mape:56.6, rms:0.52
bias:-0.29, r:0.25, obsmean:0.57
Barren_5m B3.0 Fluor Willmott:0.44, mape:77.7, rms:0.65
bias:-0.48, r:0.24, obsmean:0.57
Chla mg m^{-3}$
B3.0 Fluor
B3.0 Chl a
obs Fluor
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17


Pine_5m B3.0 Chla Willmott:0.36, mape:53.1, rms:0.43
bias:-0.34, r:-0.01, obsmean:0.67
Pine_5m B3.0 Fluor Willmott:0.30, mape:83.6, rms:0.60
bias:-0.57, r:-0.01, obsmean:0.67
Chla mg m^{-3}$
B3.0 Fluor
B3.0 Chl a
obs Fluor
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17

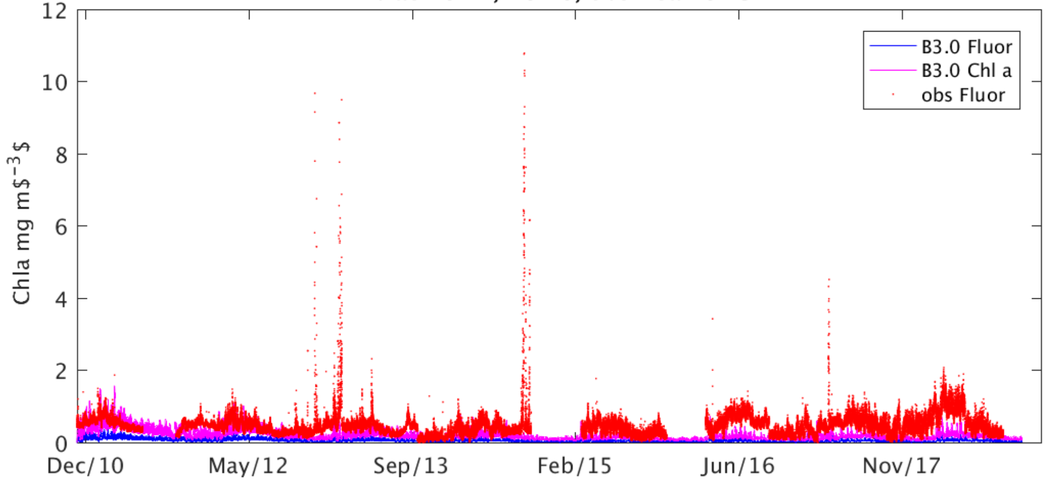

Daydream_5m B3.0 Chla Willmott:0.33, mape:47.0, rms:0.36
bias:-0.20, r:-0.14, obsmean:0.60
Daydream_5m B3.0 Fluor Willmott:0.32, mape:77.9, rms:0.52
bias:-0.48, r:-0.13, obsmean:0.60
Chla mg m^{-3}$
B3.0 Fluor
B3.0 Chl a
obs Fluor
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17


DoubleCone_5m B3.0 Chla Willmott:0.45, mape:56.5, rms:0.38
bias:-0.24, r:0.17, obsmean:0.52
DoubleCone_5m B3.0 Fluor Willmott:0.38, mape:81.4, rms:0.50
bias:-0.43, r:0.16, obsmean:0.52
Chla mg m$^-3$
B3.0 Fluor
B3.0 Chl a
obs Fluor
0
5
10
15
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17

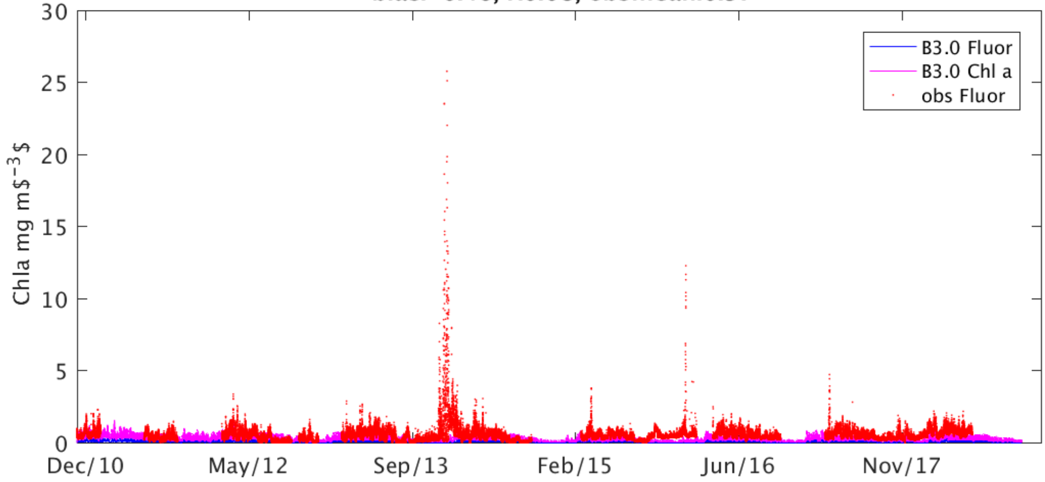

GeoffreyBay336_5m B3.0 Chla Willmott:0.31, mape:70.2, rms:0.66
bias:-0.39, r:-0.07, obsmean:0.63
GeoffreyBay336_5m B3.0 Fluor Willmott:0.34, mape:83.4, rms:0.75
bias:-0.55, r:-0.06, obsmean:0.63
Chla mg m$^-3$
B3.0 Fluor
B3.0 Chl a
obs Fluor
0
2
4
6
8
10
12
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17


Pandora_5m B3.0 Chla Willmott:0.40, mape:59.9, rms:0.35
bias:-0.23, r:0.09, obsmean:0.41
Pandora_5m B3.0 Fluor Willmott:0.38, mape:82.5, rms:0.43
bias:-0.36, r:0.09, obsmean:0.41
Chla mg m$^-3$
B3.0 Fluor
B3.0 Chl a
obs Fluor
0
2
4
6
8
10
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17

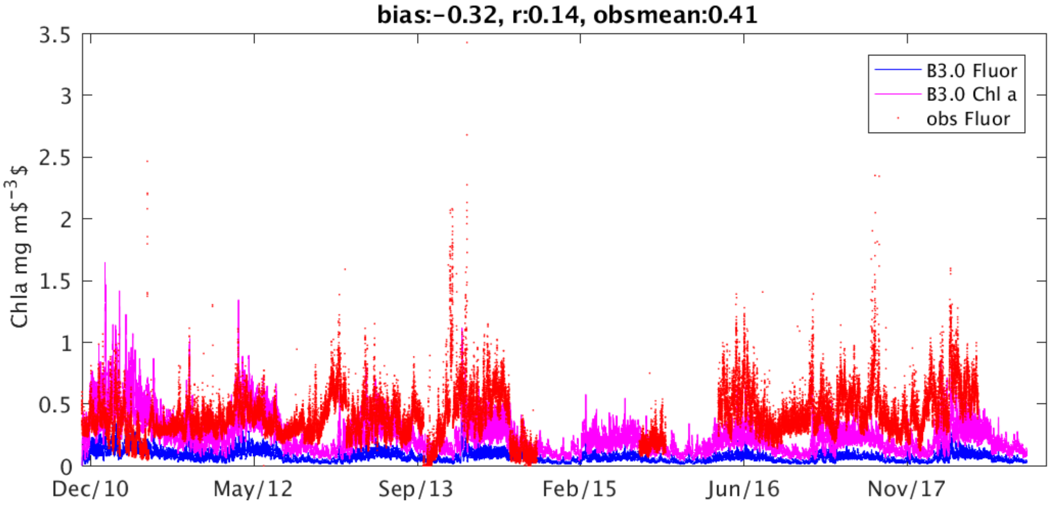
Pelorus_5m B3.0 Chla Willmott:0.37, mape:53.1, rms:0.46
bias:-0.25, r:0.11, obsmean:0.49
Pelorus_5m B3.0 Fluor Willmott:0.35, mape:80.9, rms:0.56
bias:-0.41, r:0.10, obsmean:0.49



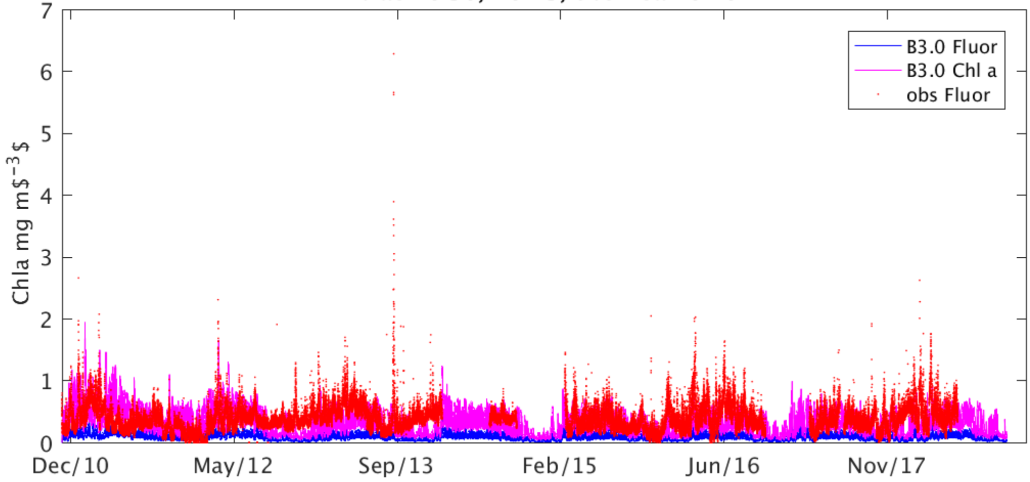
Dunk859_5m B3.0 Chla Willmott:0.27, mape:93.6, rms:0.72
bias:-0.25, r:0.09, obsmean:0.57
Dunk859_5m B3.0 Fluor Willmott:0.31, mape:83.3, rms:0.81
bias:-0.46, r:0.08, obsmean:0.57



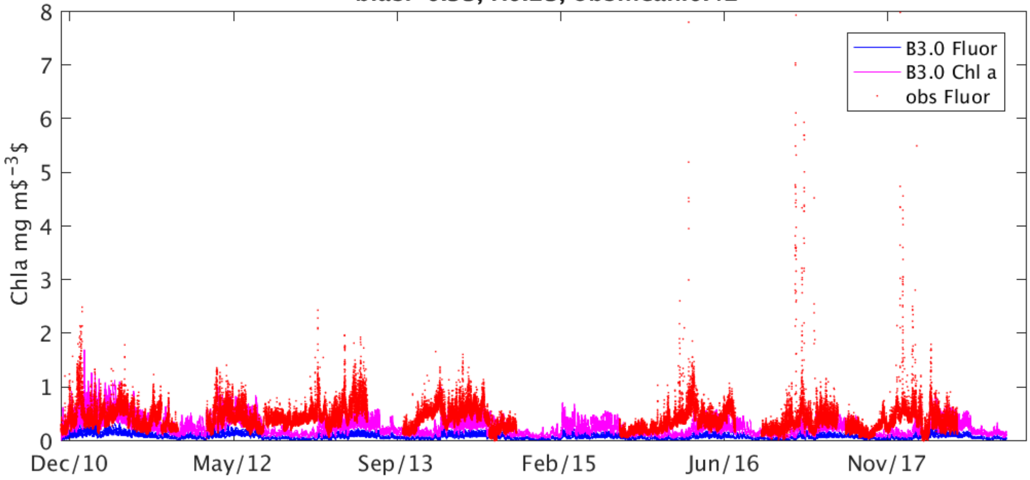
Russell_5m B3.0 Chla Willmott:0.46, mape:58.4, rms:0.27
bias:-0.14, r:0.14, obsmean:0.41
Russell_5m B3.0 Fluor Willmott:0.40, mape:77.0, rms:0.38
bias:-0.32, r:0.14, obsmean:0.41



High_5m B3.0 Chla Willmott:0.45, mape:72.4, rms:0.27
bias:-0.08, r:0.14, obsmean:0.40
High_5m B3.0 Fluor Willmott:0.41, mape:74.6, rms:0.37
bias:-0.30, r:0.13, obsmean:0.40



Fitz_5m B3.0 Chla Willmott:0.47, mape:50.5, rms:0.32
bias:-0.15, r:0.24, obsmean:0.42
Fitz_5m B3.0 Fluor Willmott:0.40, mape:76.3, rms:0.43
bias:-0.33, r:0.23, obsmean:0.42



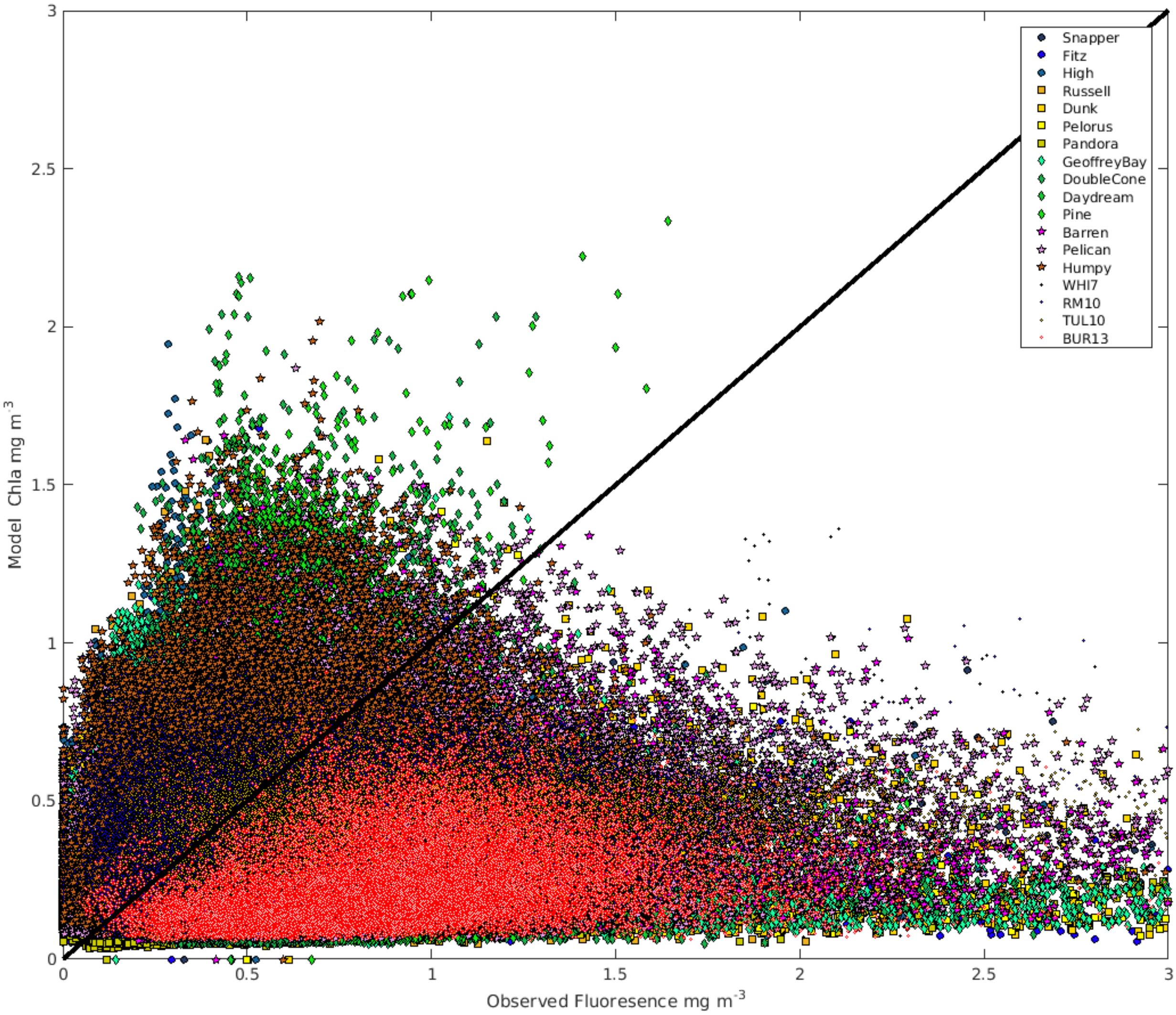
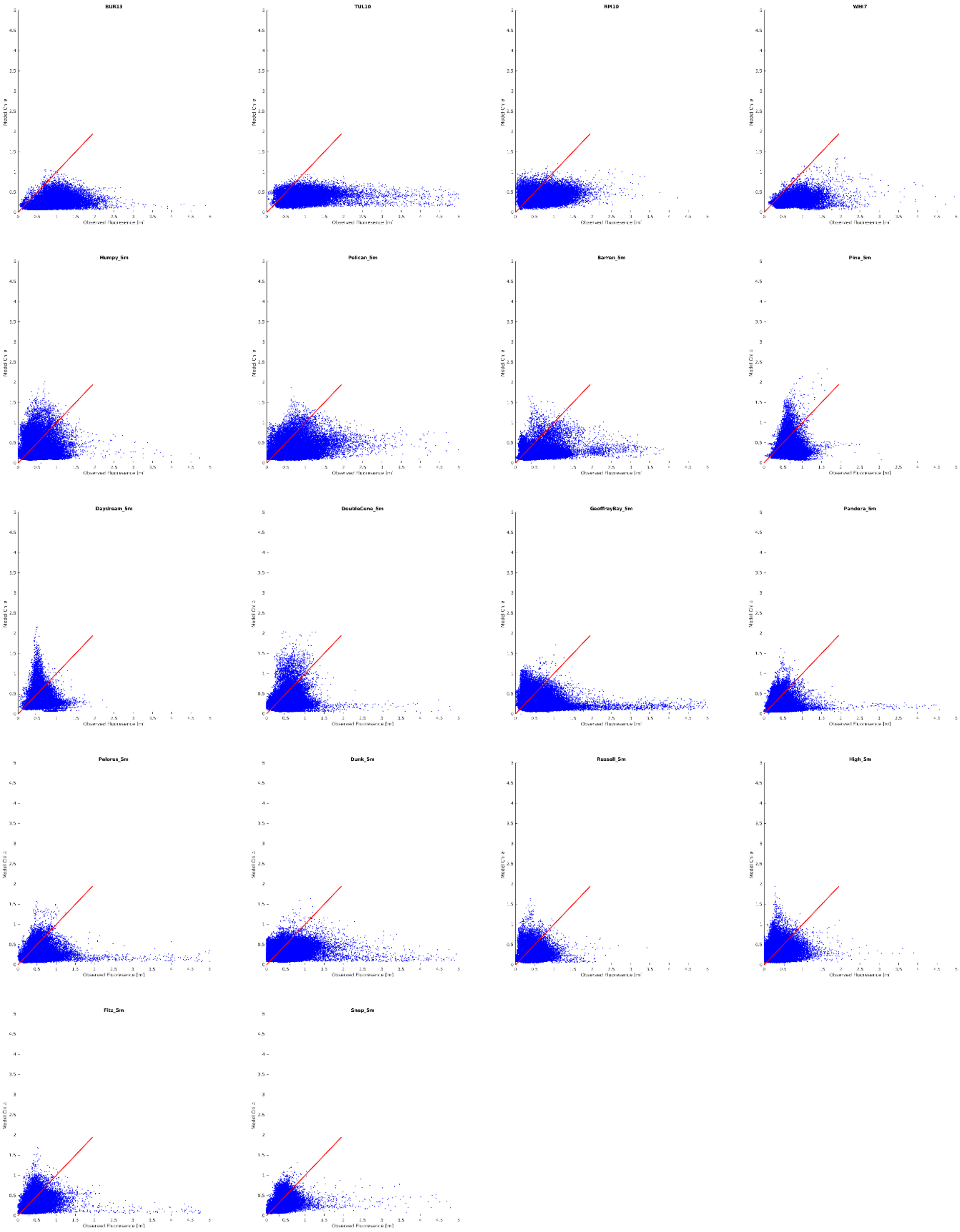


Figure 15 Scatter plot of observed Fluorescence for AIMS MMP assessment against simulated Chl a for model version 3p0


BUR13
TUL10
RM10
WHI7
Humpy_Sm
Pelican_Sm
Barron_Sm
Pine_Sm
Daydream_Sm
DoubleCone_Sm
GeoffreyBay_Sm
Pandora_Sm
Pelorus_Sm
Dunk_Sm
Russell_Sm
High_Sm
Fitz_Sm
Snap_Sm

20. Simulated Turbidity assessment against AIMS MMP Turbidity

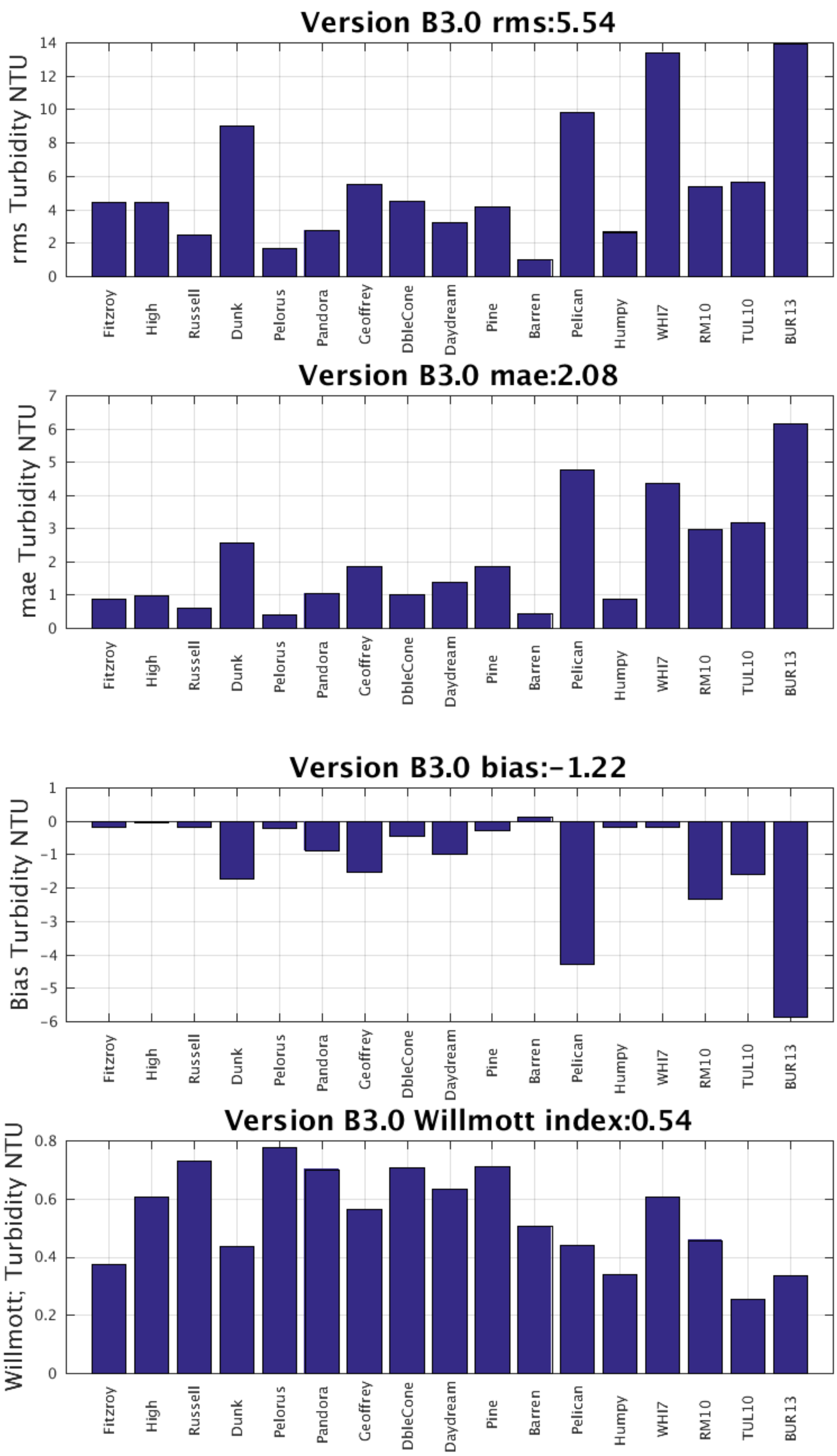
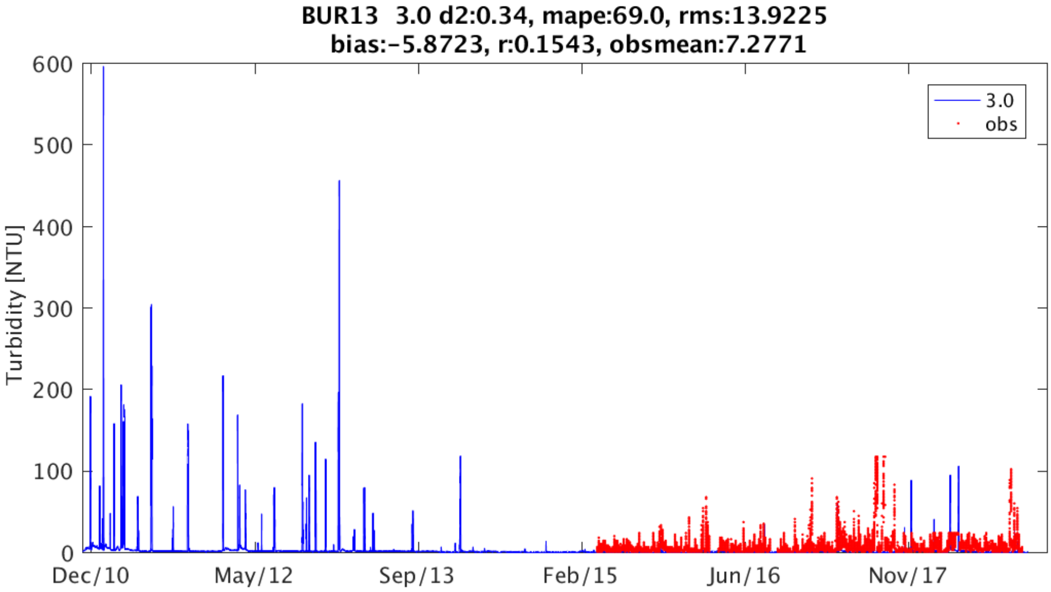
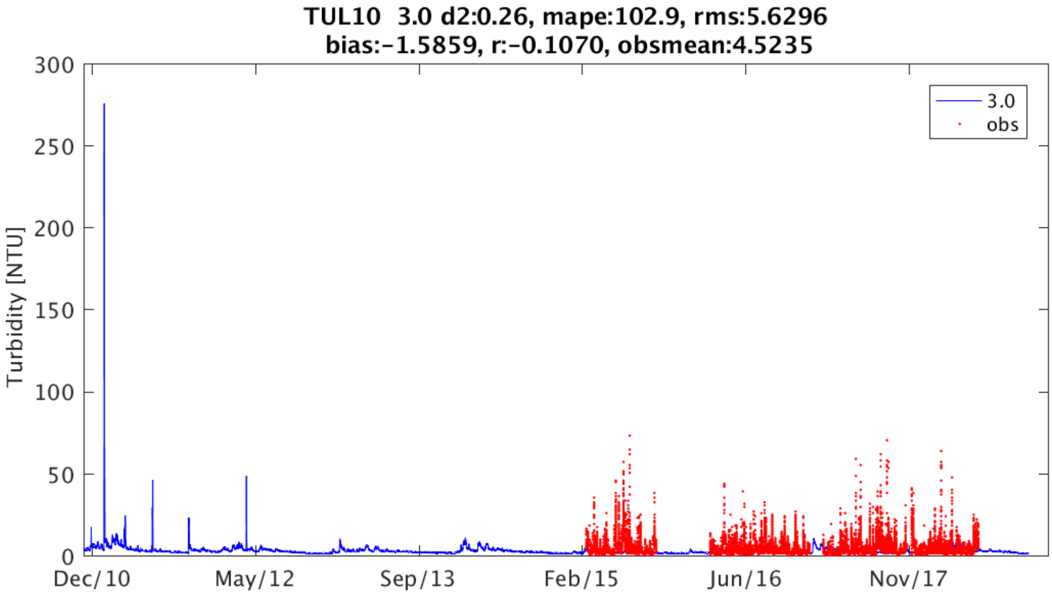
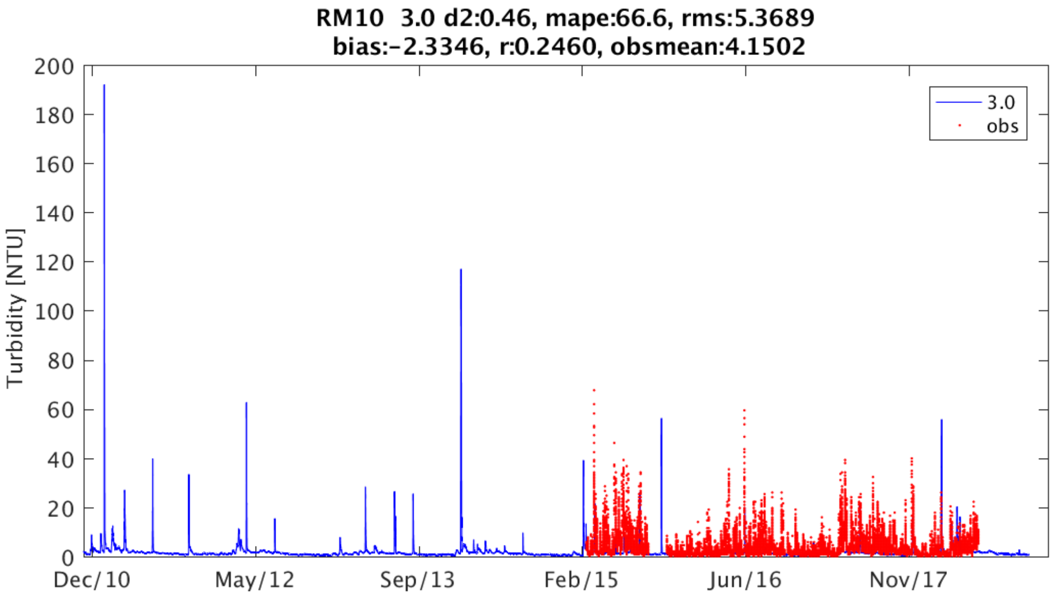
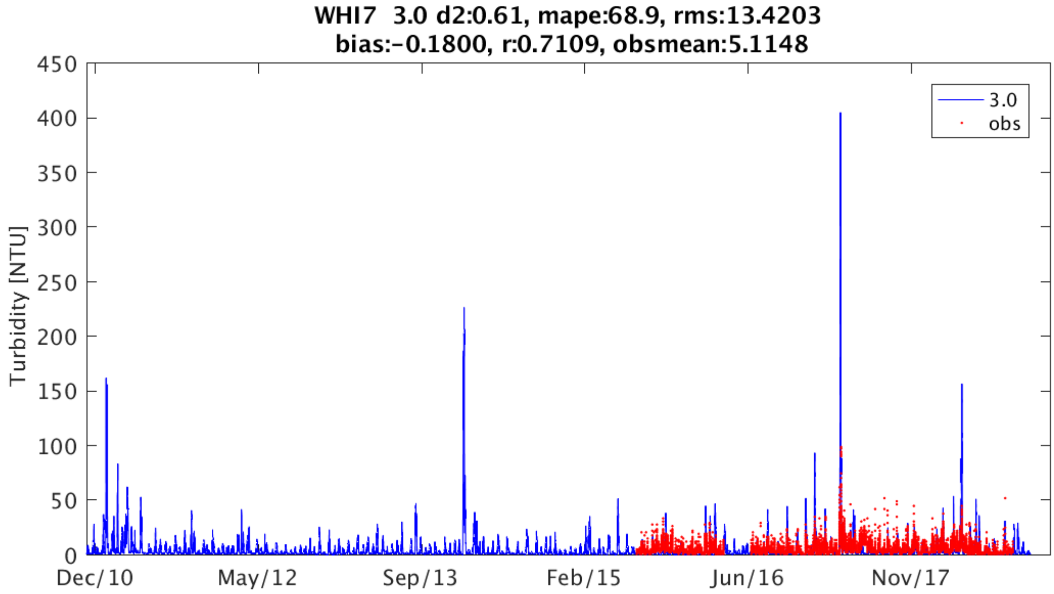


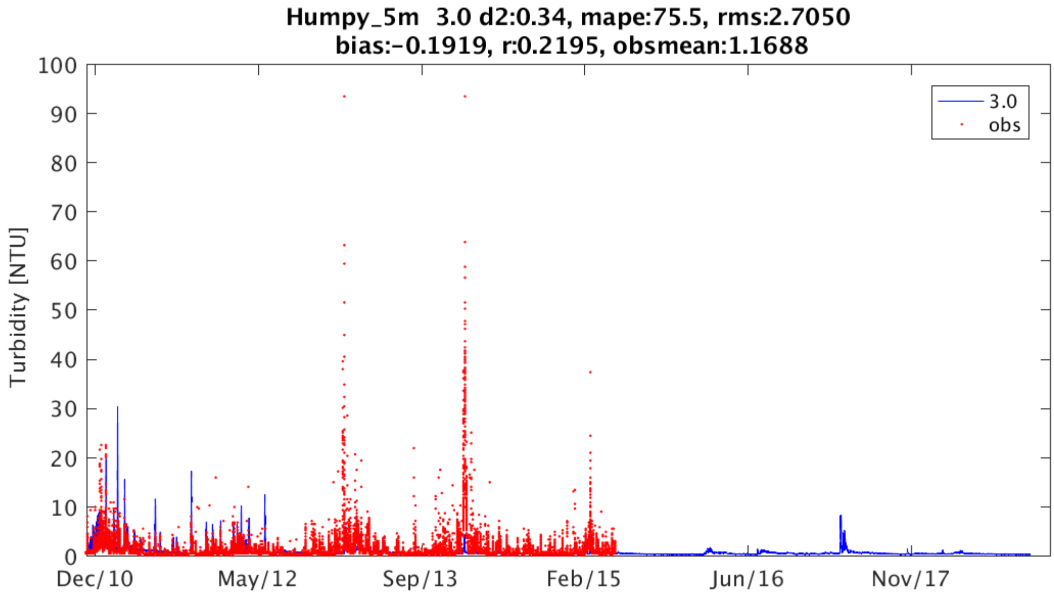
Figure 16 Metrics for AIMS MMP turbidity against simulated turbidity Dec 2010 to November 2018 for model version 3p0 d2 = Willmott index see Statistical metric page 27.mae:mean absolute error, rms root mean square

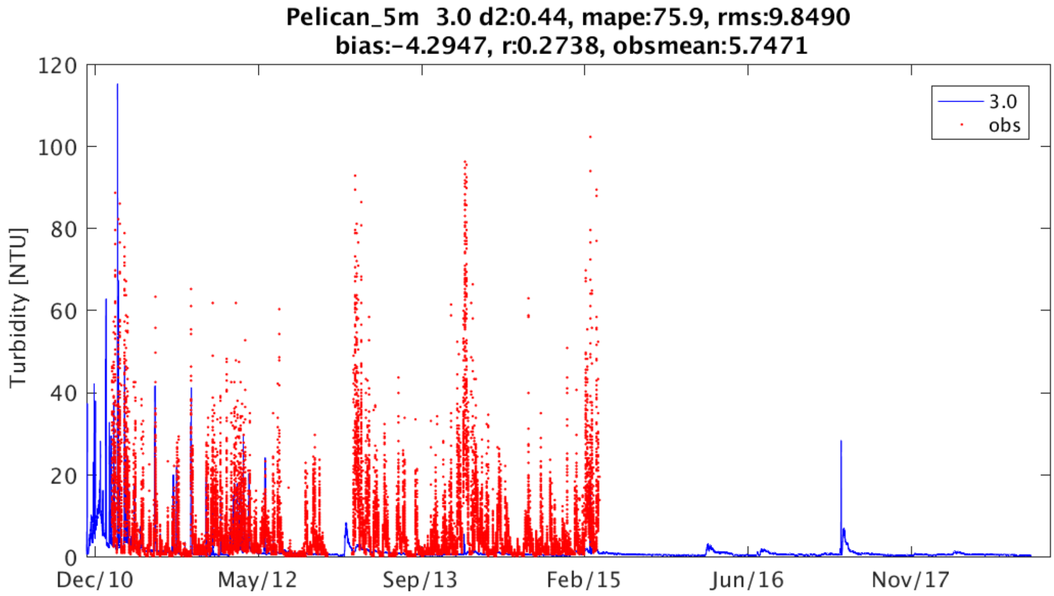

BUR13 3.0 d2:0.34, mape:69.0, rms:13.9225
bias:-5.8723, r:0.1543, obsmean:7.2771
Turbidity [NTU]
600
500
400
300
200
100
0
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
3.0
obs

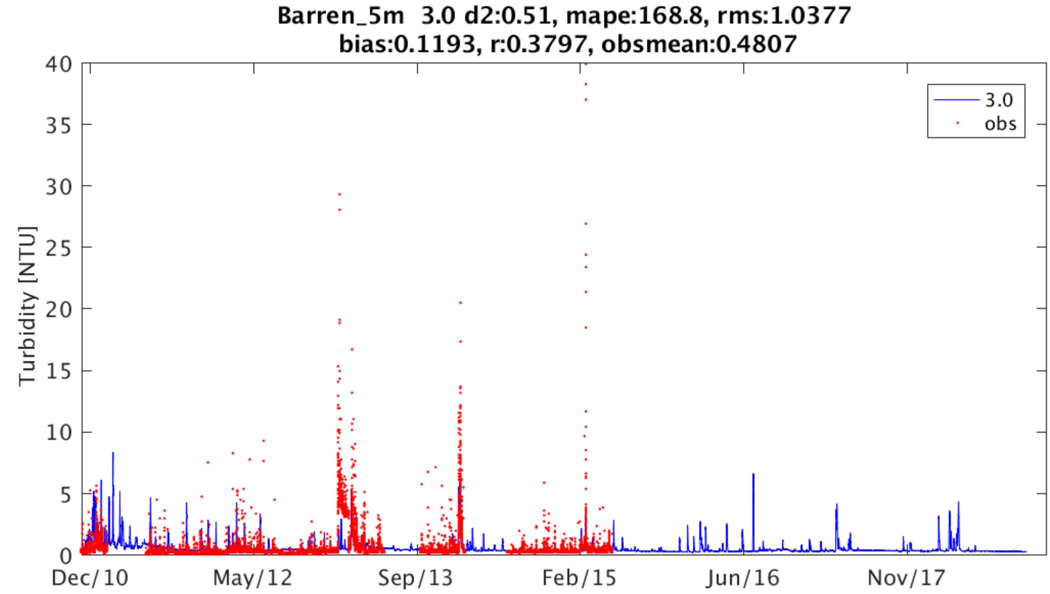

TUL10 3.0 d2:0.26, mape:102.9, rms:5.6296
bias:-1.5859, r:-0.1070, obsmean:4.5235
Turbidity [NTU]
300
250
200
150
100
50
0
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
3.0
obs

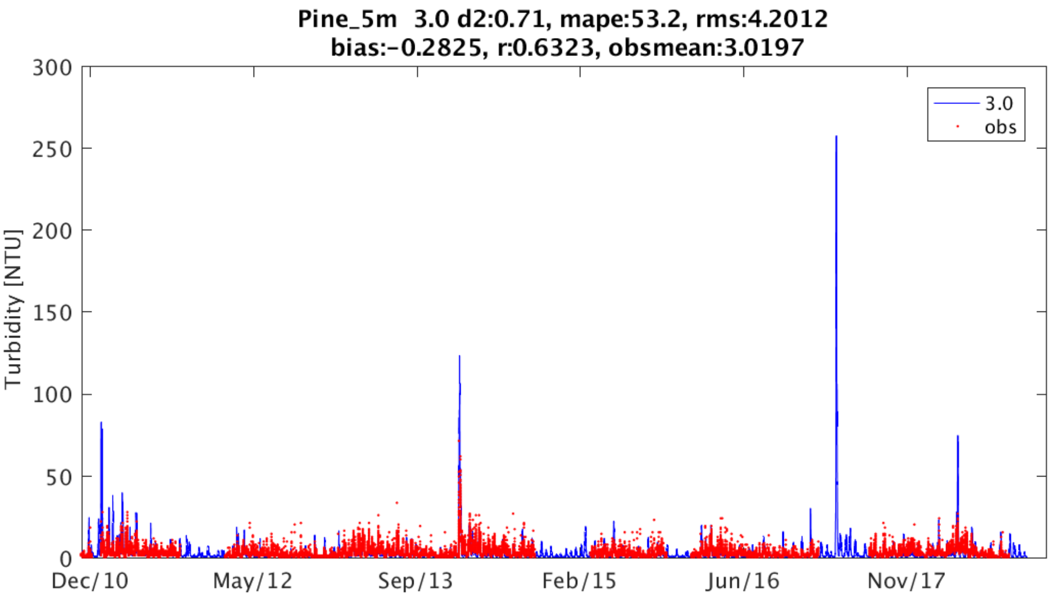

RM10 3.0 d2:0.46, mape:66.6, rms:5.3689
bias:-2.3346, r:0.2460, obsmean:4.1502
Turbidity [NTU]
200
180
160
140
120
100
80
60
40
20
0
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
3.0
obs

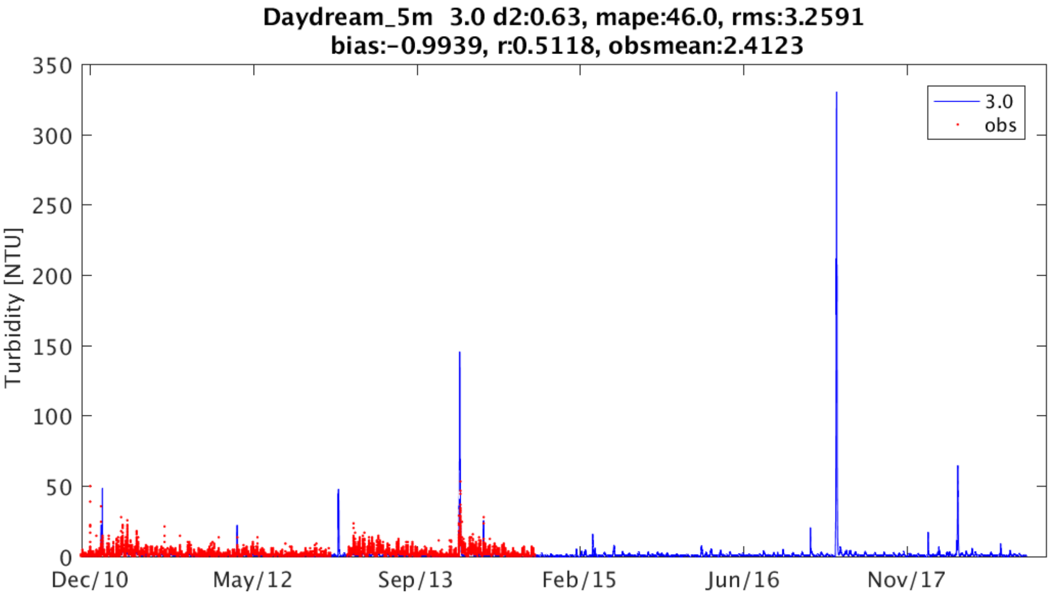

WHI7 3.0 d2:0.61, mape:68.9, rms:13.4203
bias:-0.1800, r:0.7109, obsmean:5.1148
Turbidity [NTU]
3.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17

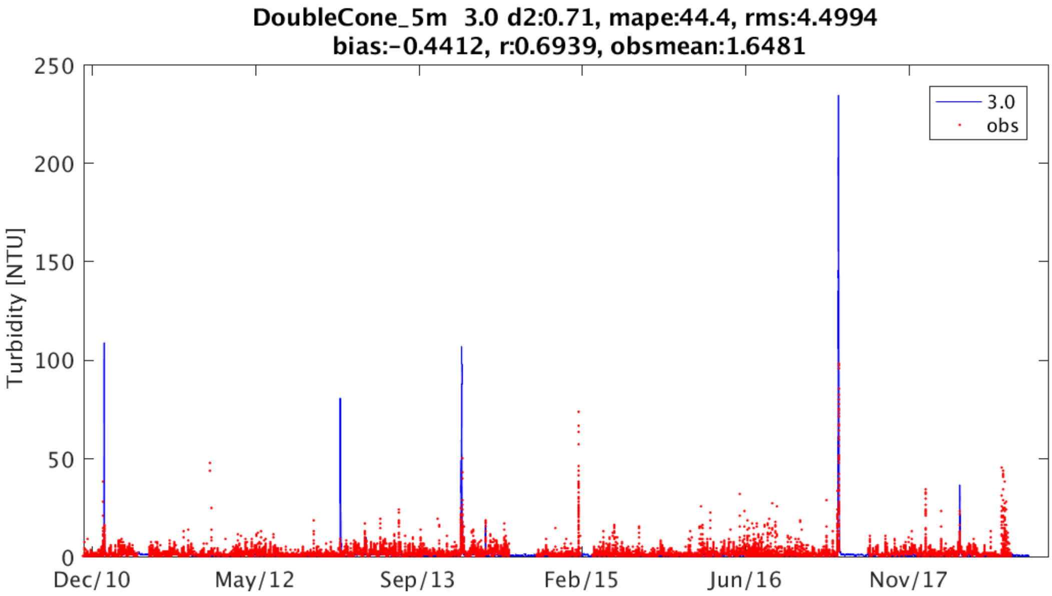

Humpy_5m 3.0 d2:0.34, mape:75.5, rms:2.7050
bias:-0.1919, r:0.2195, obsmean:1.1688
Turbidity [NTU]
3.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17

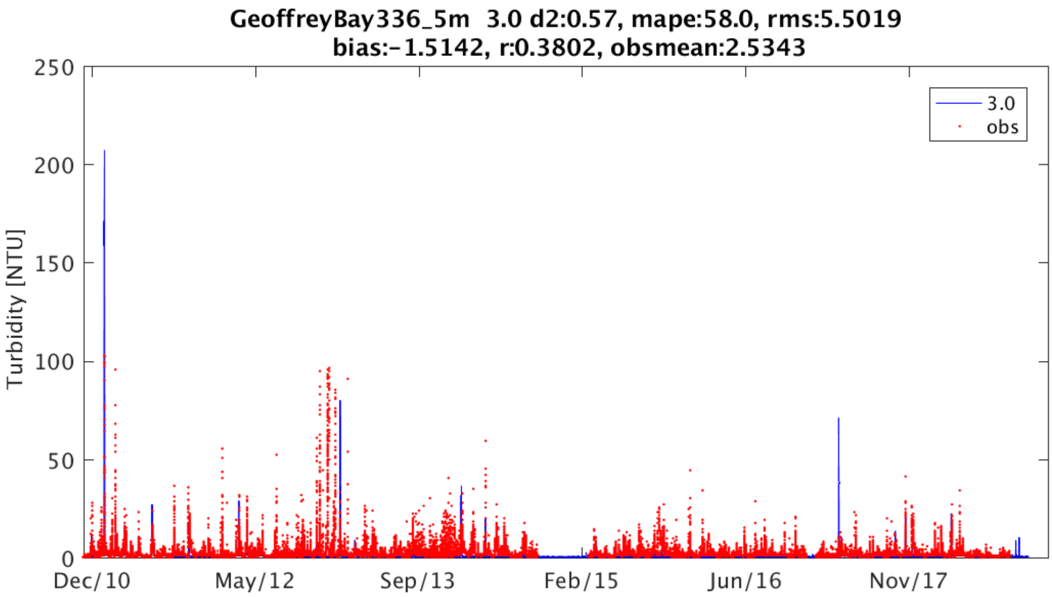

Pelican_5m 3.0 d2:0.44, mape:75.9, rms:9.8490
bias:-4.2947, r:0.2738, obsmean:5.7471
Turbidity [NTU]
3.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17

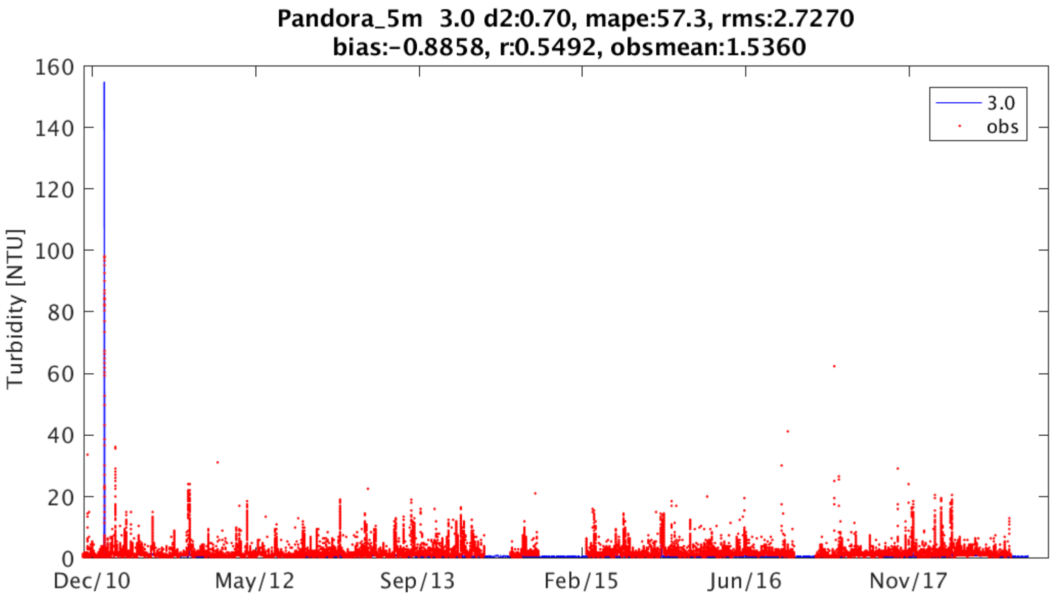

Barren_5m 3.0 d2:0.51, mape:168.8, rms:1.0377
bias:0.1193, r:0.3797, obsmean:0.4807
Turbidity [NTU]
3.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17

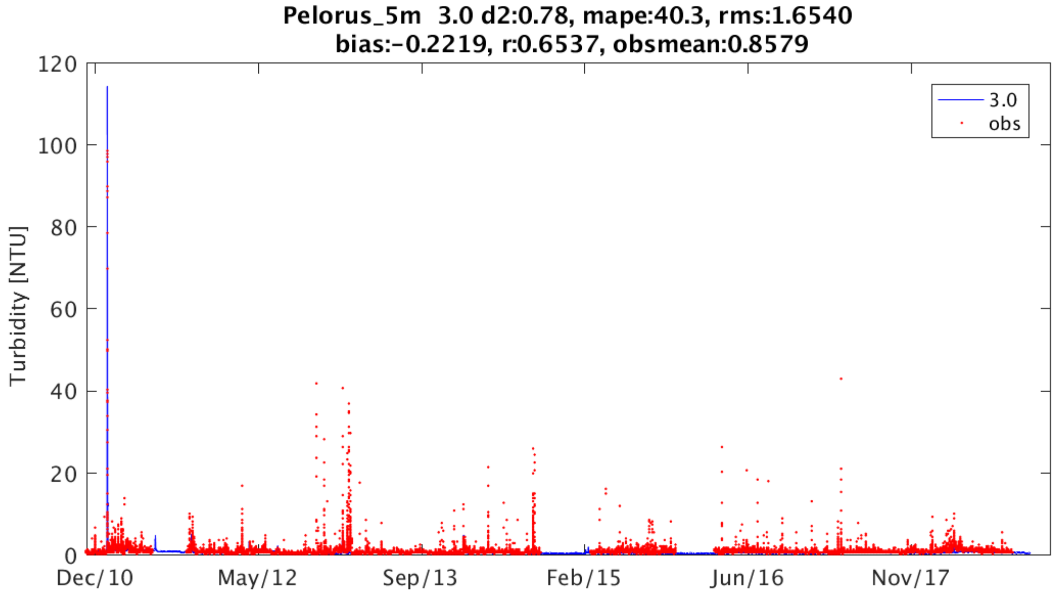

Pine_5m 3.0 d2:0.71, mape:53.2, rms:4.2012
bias:-0.2825, r:0.6323, obsmean:3.0197
Turbidity [NTU]
3.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17


Daydream_5m 3.0 d2:0.63, mape:46.0, rms:3.2591
bias:-0.9939, r:0.5118, obsmean:2.4123
Turbidity [NTU]
3.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17

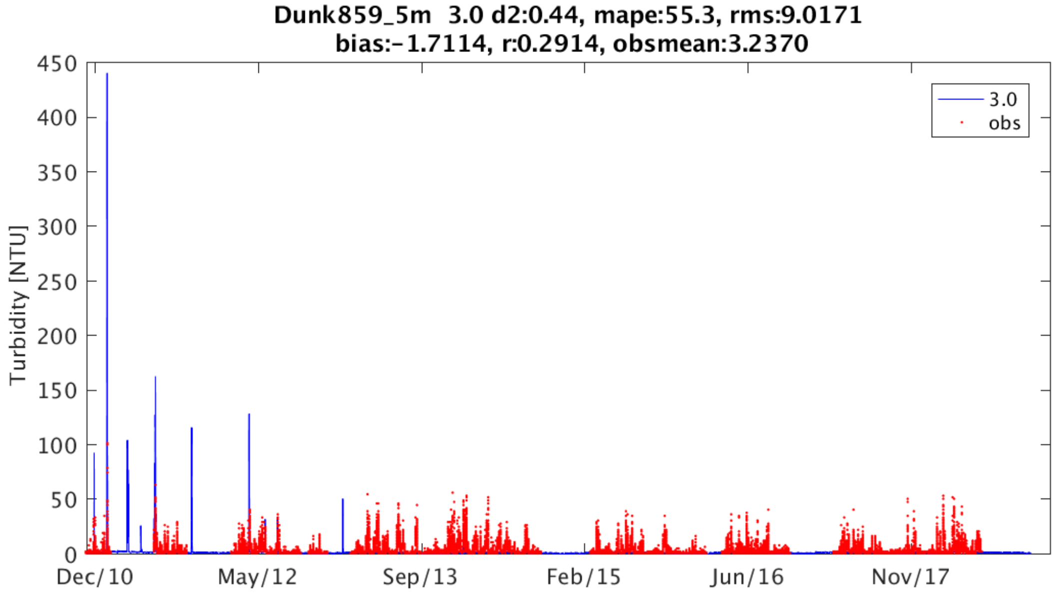

DoubleCone_5m 3.0 d2:0.71, mape:44.4, rms:4.4994
bias:-0.4412, r:0.6939, obsmean:1.6481
Turbidity [NTU]
250
200
150
100
50
0
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
3.0
obs


GeoffreyBay336_5m 3.0 d2:0.57, mape:58.0, rms:5.5019
bias:-1.5142, r:0.3802, obsmean:2.5343
Turbidity [NTU]
250
200
150
100
50
0
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
3.0
obs

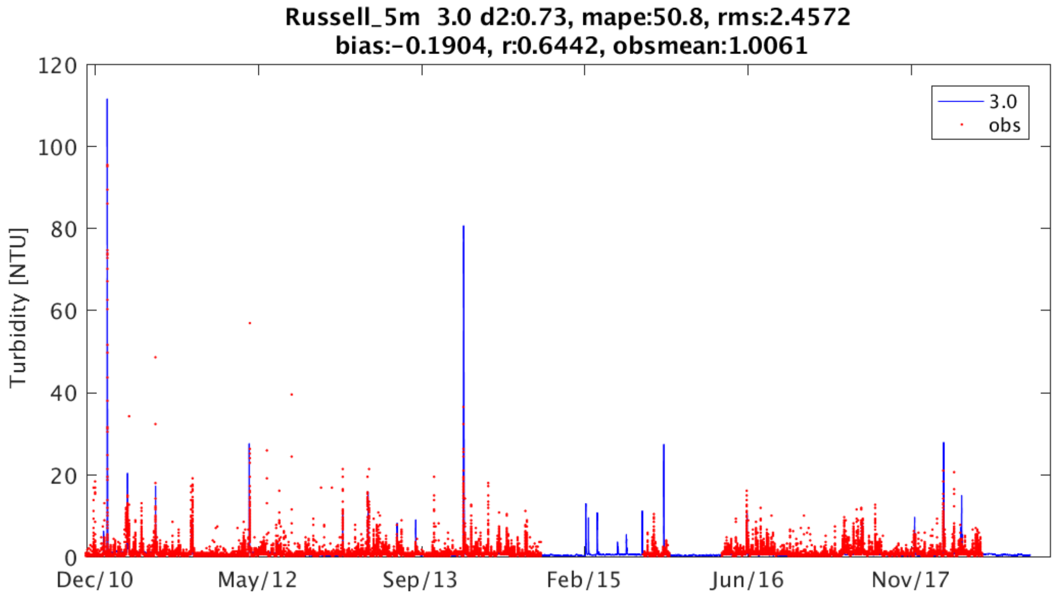

Pandora_5m 3.0 d2:0.70, mape:57.3, rms:2.7270
bias:-0.8858, r:0.5492, obsmean:1.5360
Turbidity [NTU]
160
140
120
100
80
60
40
20
0
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
3.0
obs



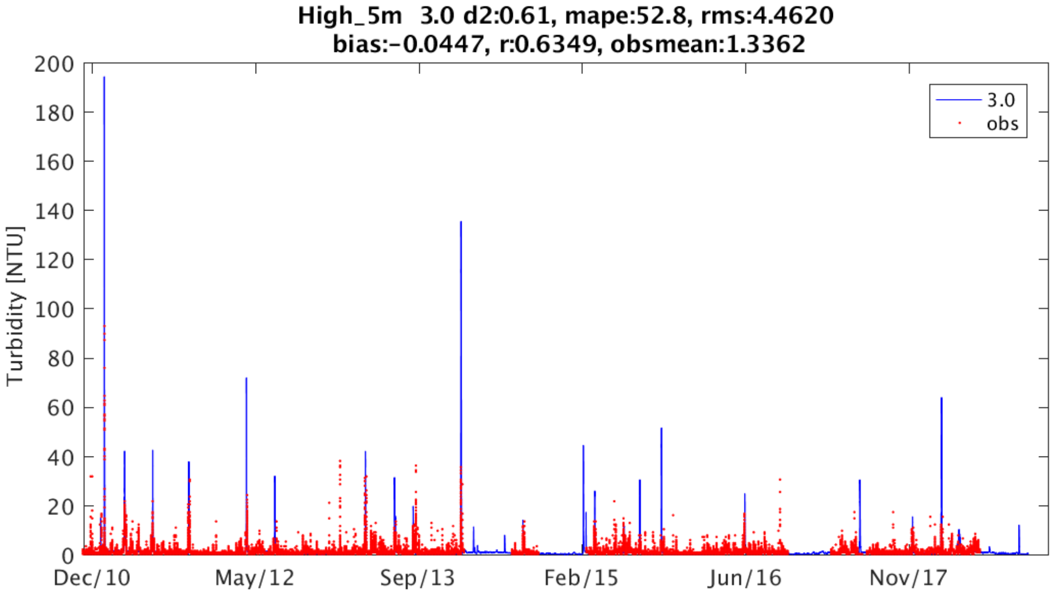
Pelorus_5m 3.0 d2:0.78, mape:40.3, rms:1.6540
bias:-0.2219, r:0.6537, obsmean:0.8579
Turbidity [NTU]
3.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17

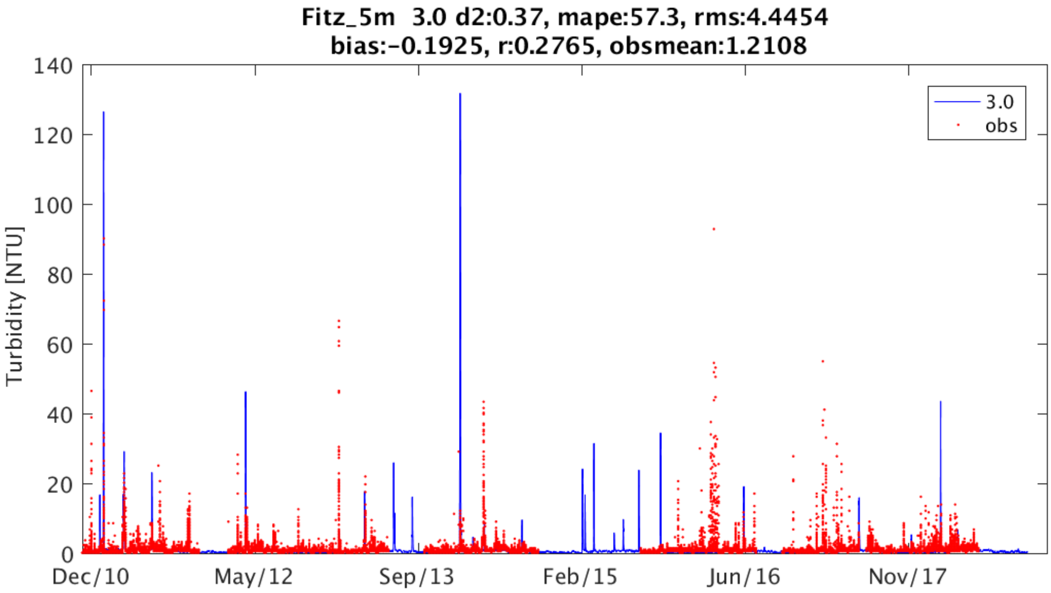


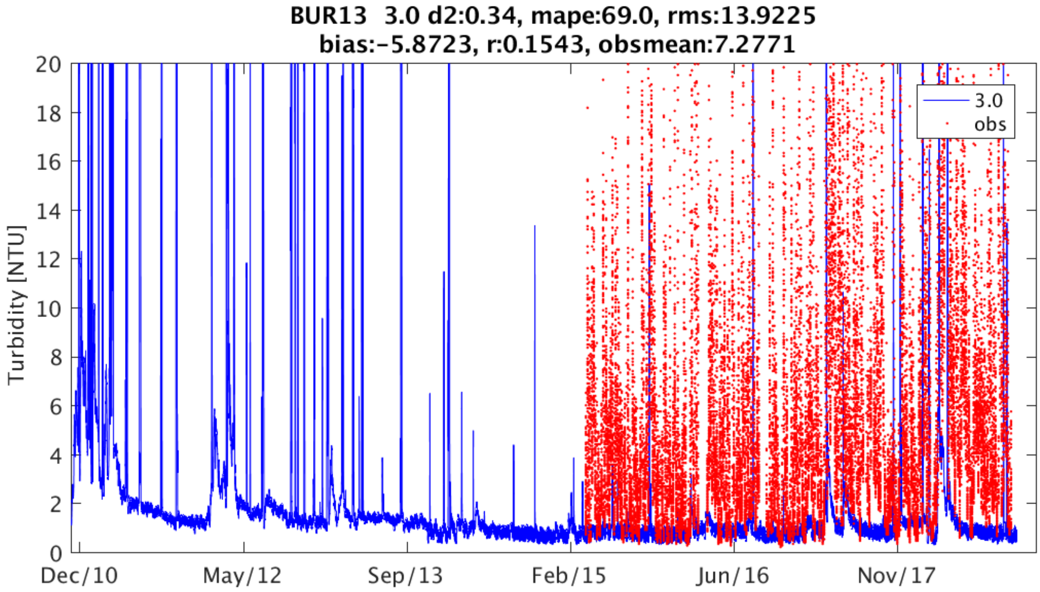
Dunk859_5m 3.0 d2:0.44, mape:55.3, rms:9.0171
bias:-1.7114, r:0.2914, obsmean:3.2370
Turbidity [NTU]
3.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17

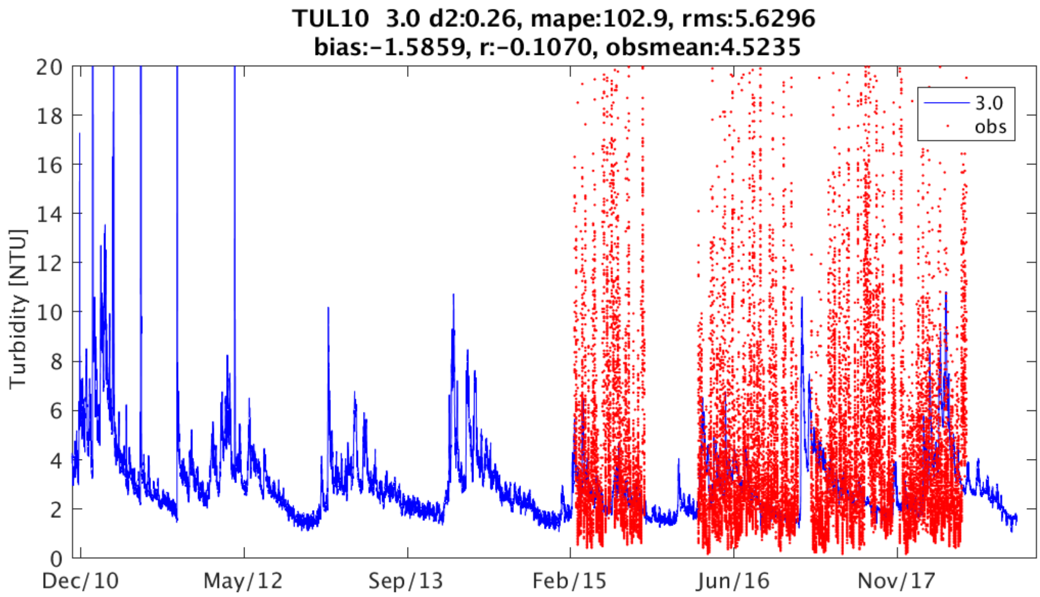


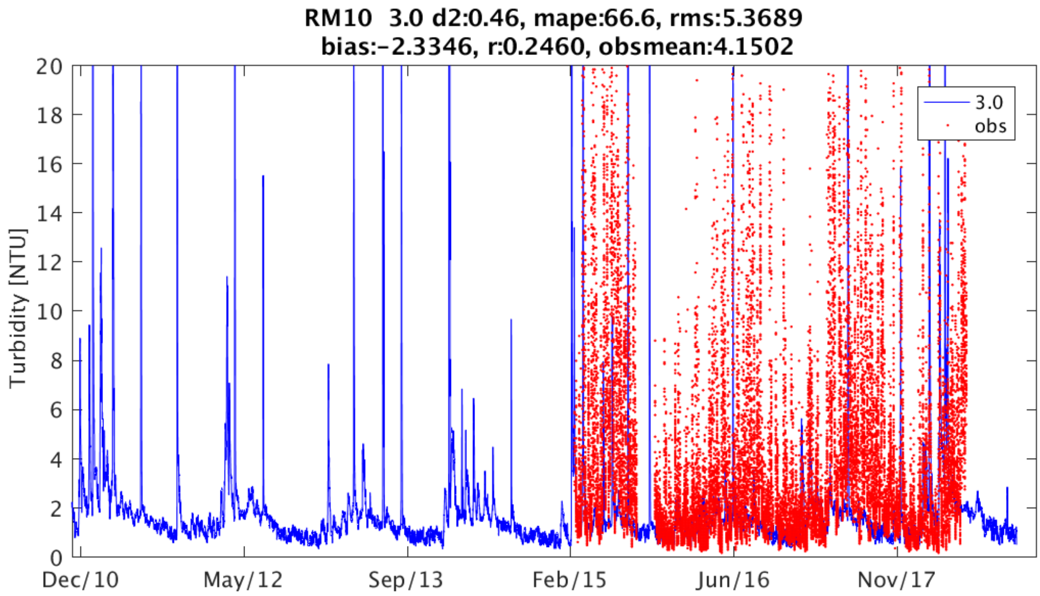
Russell_5m 3.0 d2:0.73, mape:50.8, rms:2.4572
bias:-0.1904, r:0.6442, obsmean:1.0061
Turbidity [NTU]
3.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17

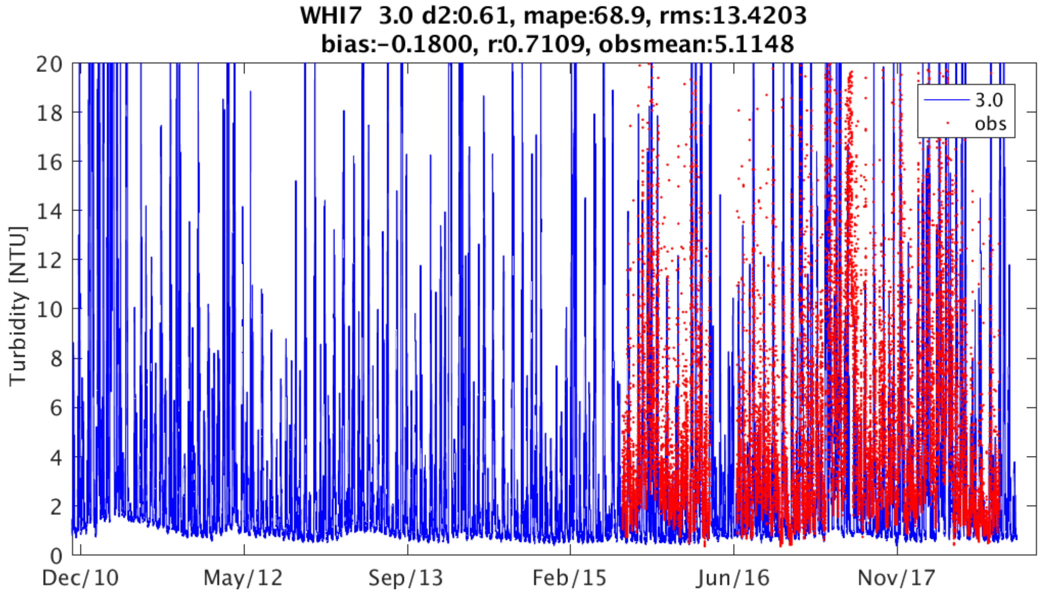

High_5m 3.0 d2:0.61, mape:52.8, rms:4.4620
bias:-0.0447, r:0.6349, obsmean:1.3362
Turbidity [NTU]
3.0
obs
200
180
160
140
120
100
80
60
40
20
0
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17

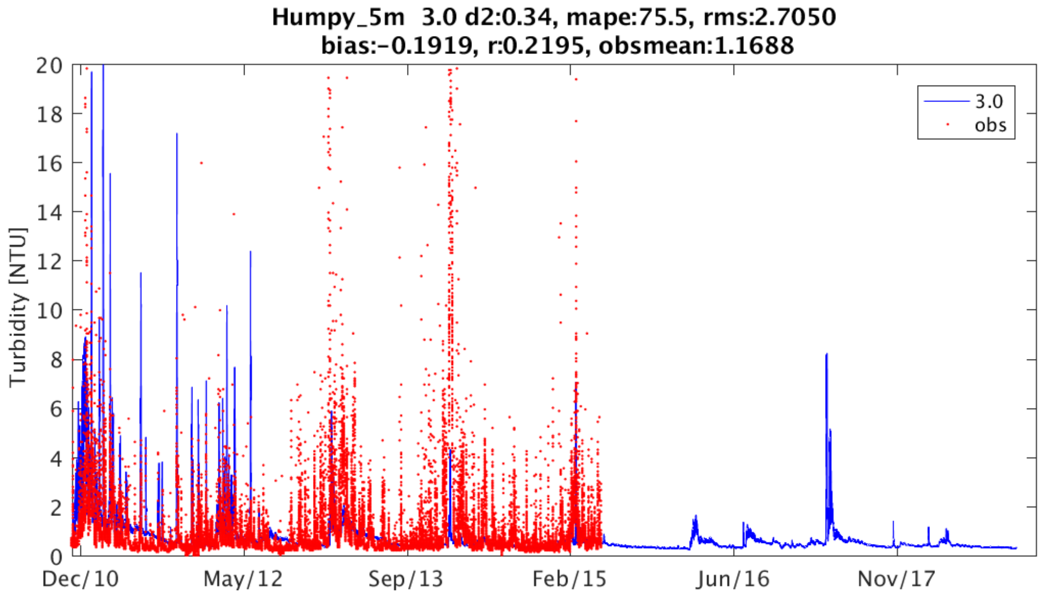

Fitz_5m 3.0 d2:0.37, mape:57.3, rms:4.4454
bias:-0.1925, r:0.2765, obsmean:1.2108
Turbidity [NTU]
3.0
obs
140
120
100
80
60
40
20
0
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17

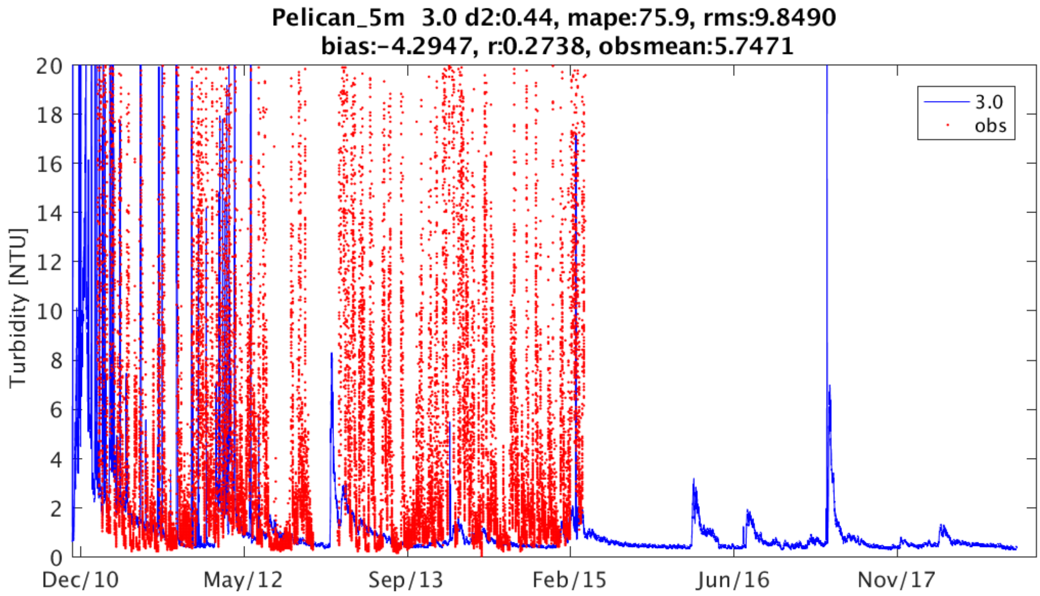

BUR13 3.0 d2:0.34, mape:69.0, rms:13.9225
bias:-5.8723, r:0.1543, obsmean:7.2771
Turbidity [NTU]
3.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17

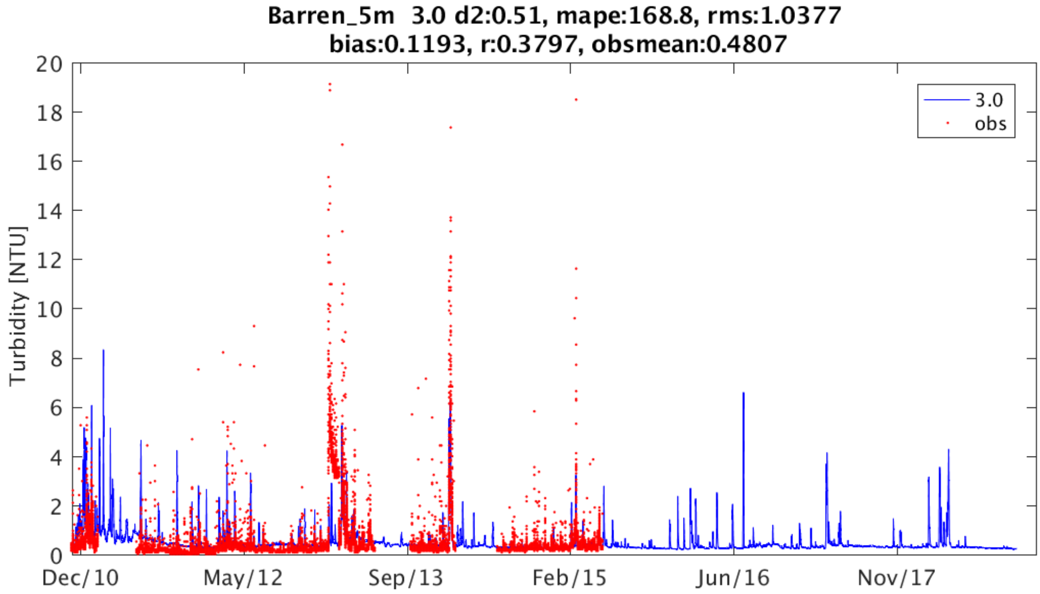

TUL10 3.0 d2:0.26, mape:102.9, rms:5.6296
bias:-1.5859, r:-0.1070, obsmean:4.5235
Turbidity [NTU]
3.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17


RM10 3.0 d2:0.46, mape:66.6, rms:5.3689
bias:-2.3346, r:0.2460, obsmean:4.1502
Turbidity [NTU]
3.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17

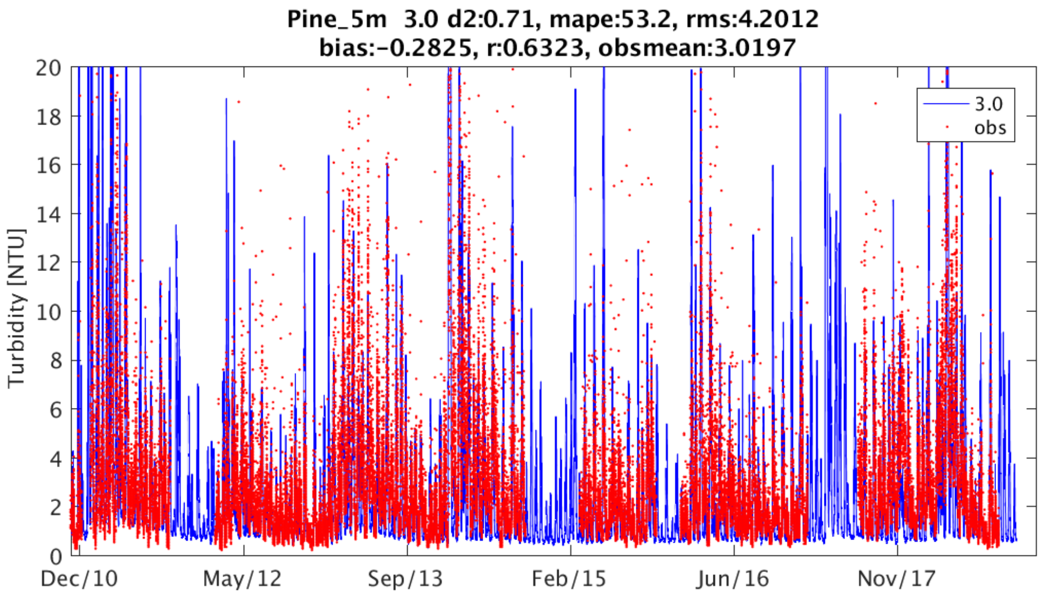

WHI7 3.0 d2:0.61, mape:68.9, rms:13.4203
bias:-0.1800, r:0.7109, obsmean:5.1148
Turbidity [NTU]
20
18
16
14
12
10
8
6
4
2
0
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
3.0
obs


Humpy_5m 3.0 d2:0.34, mape:75.5, rms:2.7050
bias:-0.1919, r:0.2195, obsmean:1.1688
Turbidity [NTU]
20
18
16
14
12
10
8
6
4
2
0
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
3.0
obs

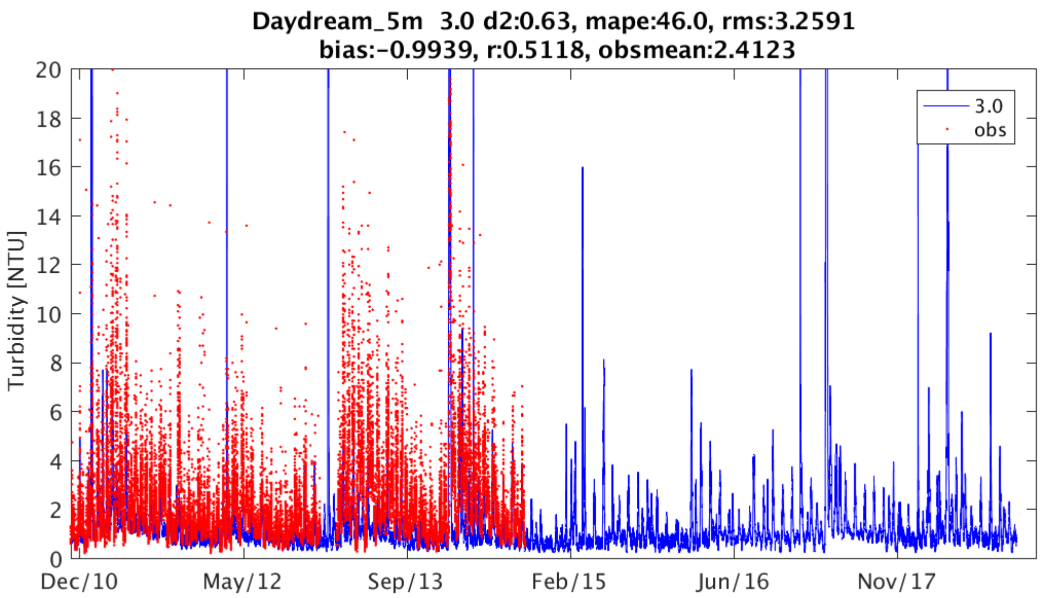

Pelican_5m 3.0 d2:0.44, mape:75.9, rms:9.8490
bias:-4.2947, r:0.2738, obsmean:5.7471
Turbidity [NTU]
20
18
16
14
12
10
8
6
4
2
0
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
3.0
obs



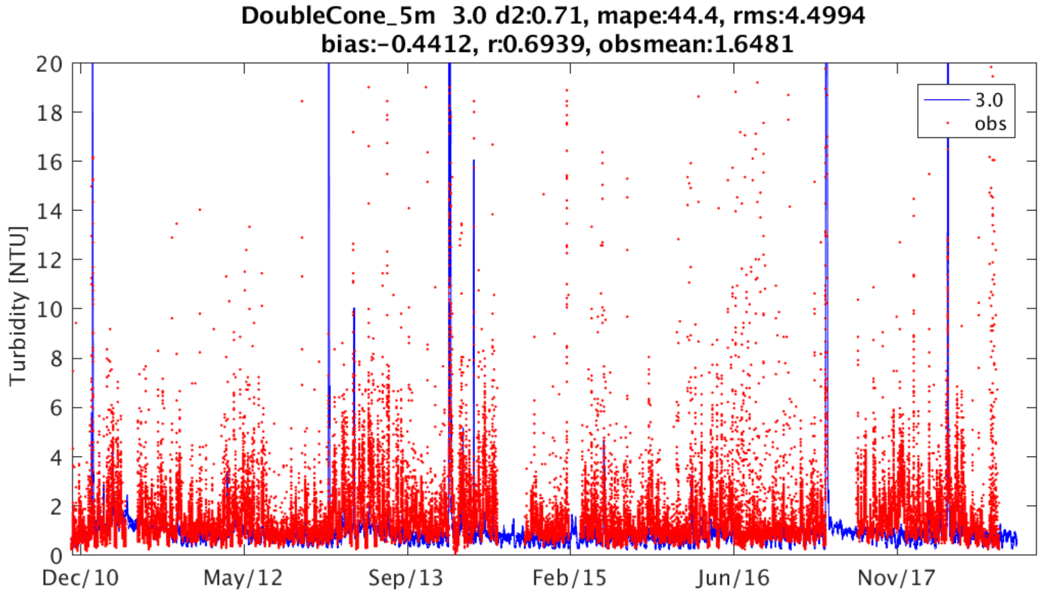
Barren_5m 3.0 d2:0.51, mape:168.8, rms:1.0377
bias:0.1193, r:0.3797, obsmean:0.4807
Turbidity [NTU]
3.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17

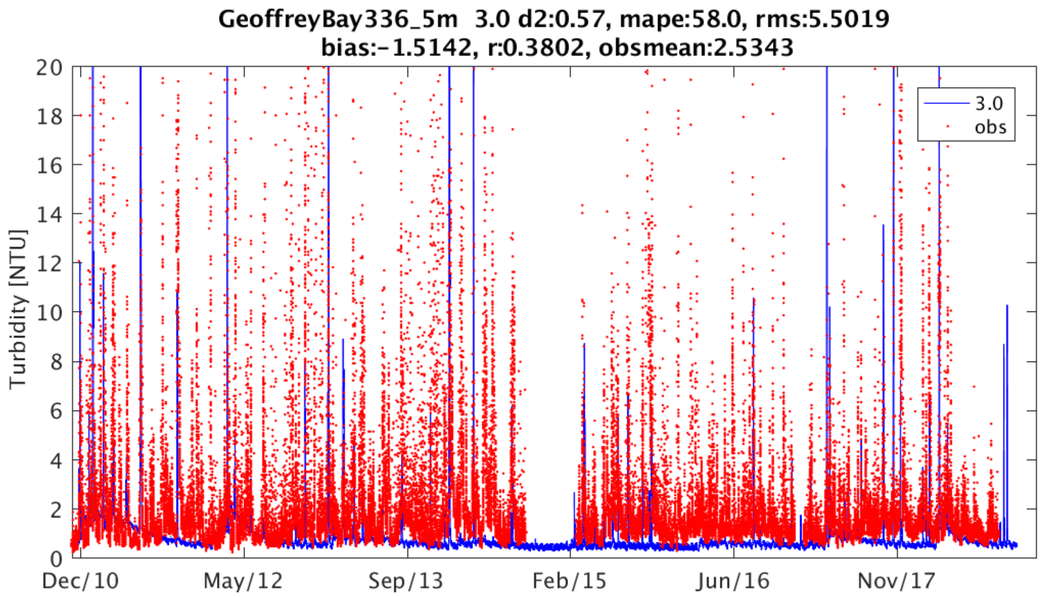


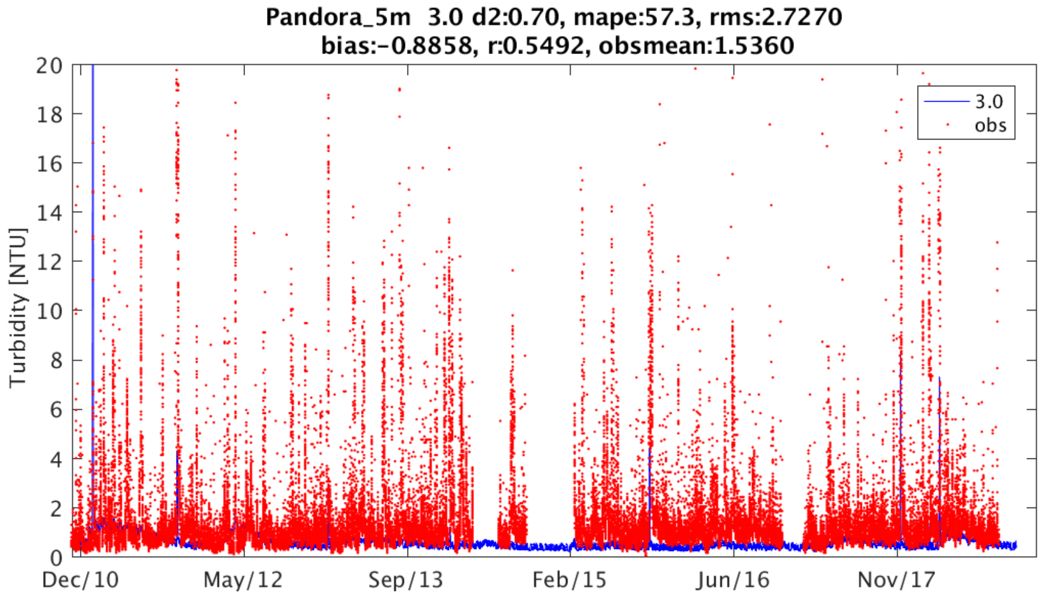
Pine_5m 3.0 d2:0.71, mape:53.2, rms:4.2012
bias:-0.2825, r:0.6323, obsmean:3.0197
Turbidity [NTU]
3.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17

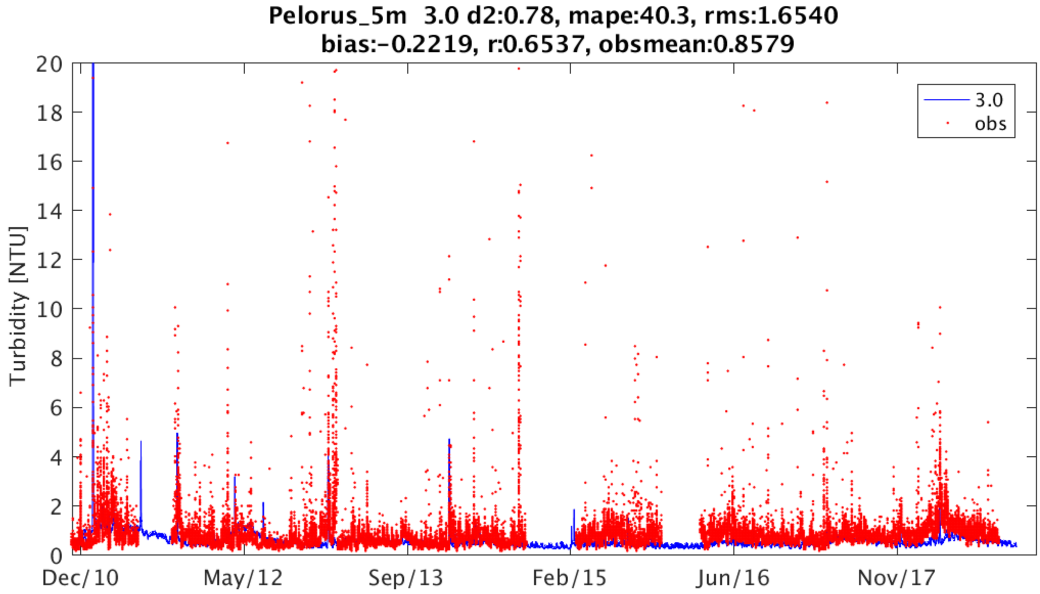


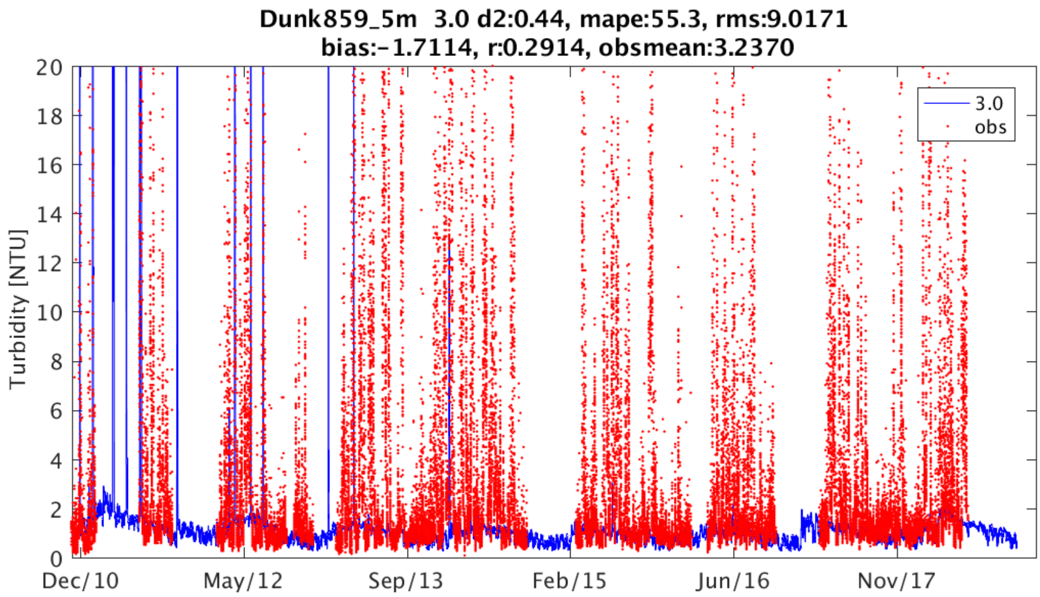
Daydream_5m 3.0 d2:0.63, mape:46.0, rms:3.2591
bias:-0.9939, r:0.5118, obsmean:2.4123
Turbidity [NTU]
3.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17

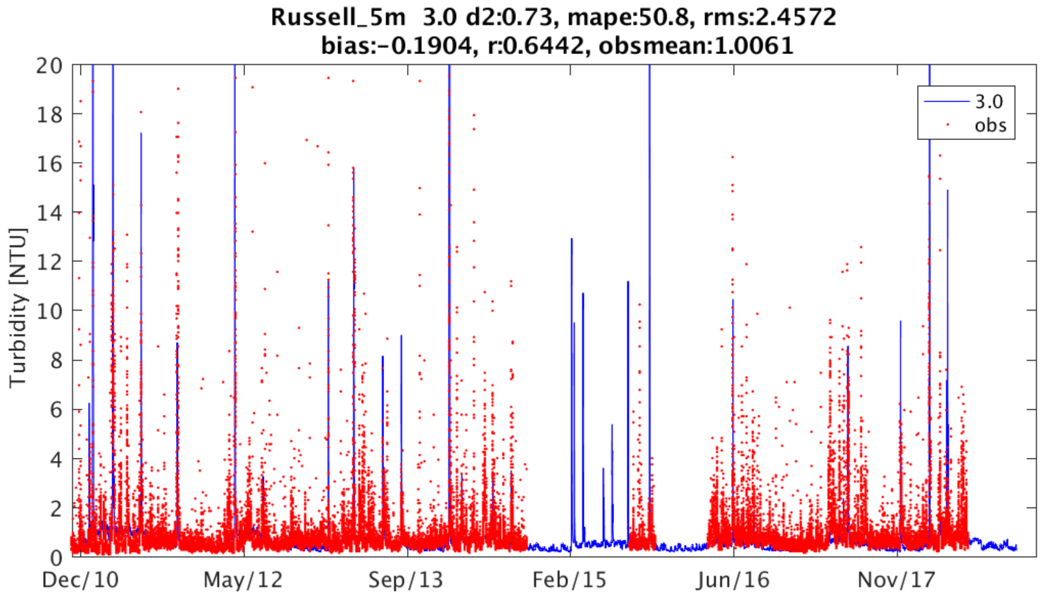

DoubleCone_5m 3.0 d2:0.71, mape:44.4, rms:4.4994
bias:-0.4412, r:0.6939, obsmean:1.6481
Turbidity [NTU]
3.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17

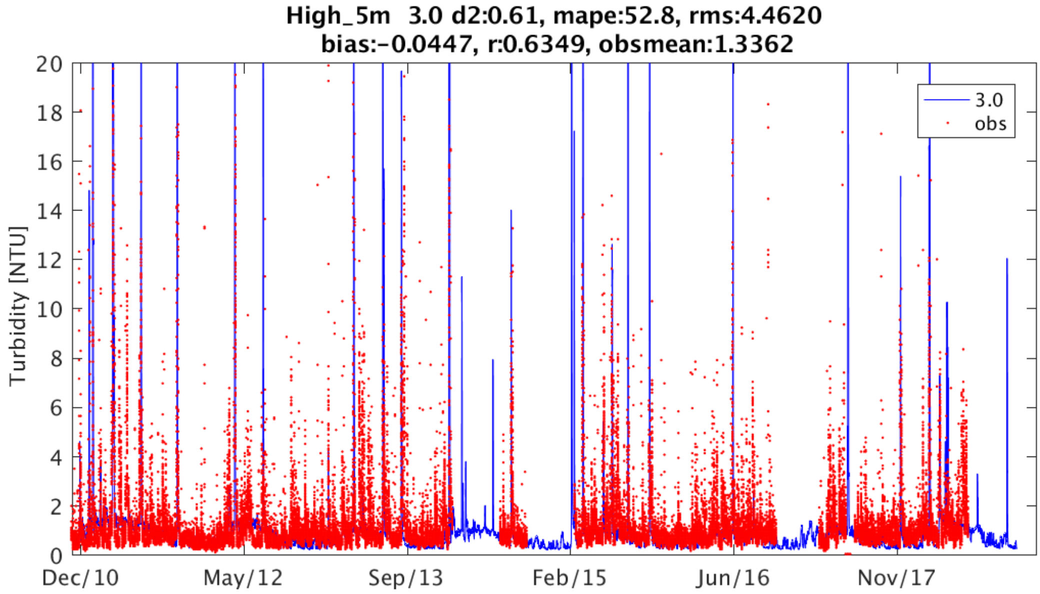

GeoffreyBay336_5m 3.0 d2:0.57, mape:58.0, rms:5.5019
bias:-1.5142, r:0.3802, obsmean:2.5343
Turbidity [NTU]
3.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17

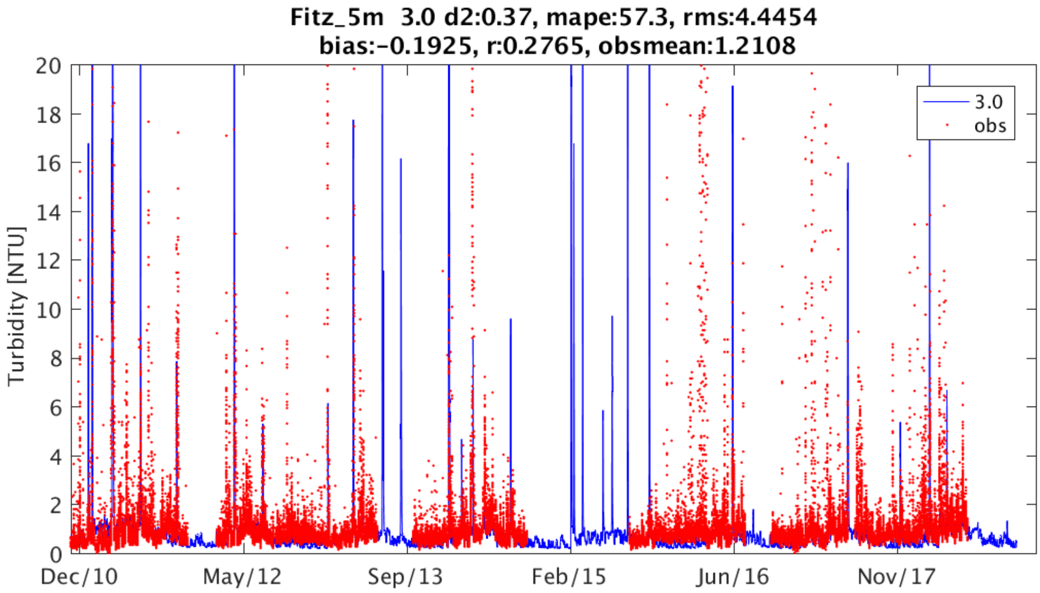

Pandora_5m 3.0 d2:0.70, mape:57.3, rms:2.7270
bias:-0.8858, r:0.5492, obsmean:1.5360
Turbidity [NTU]
3.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17


Pelorus_5m 3.0 d2:0.78, mape:40.3, rms:1.6540
bias:-0.2219, r:0.6537, obsmean:0.8579
Turbidity [NTU]
3.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17


Dunk859_5m 3.0 d2:0.44, mape:55.3, rms:9.0171
bias:-1.7114, r:0.2914, obsmean:3.2370
Turbidity [NTU]
3.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17


Russell_5m 3.0 d2:0.73, mape:50.8, rms:2.4572
bias:-0.1904, r:0.6442, obsmean:1.0061
Turbidity [NTU]
3.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17


High_5m 3.0 d2:0.61, mape:52.8, rms:4.4620
bias:-0.0447, r:0.6349, obsmean:1.3362
Turbidity [NTU]
3.0
obs
0
2
4
6
8
10
12
14
16
18
20
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17


Fitz_5m 3.0 d2:0.37, mape:57.3, rms:4.4454
bias:-0.1925, r:0.2765, obsmean:1.2108
Turbidity [NTU]
3.0
obs
0
2
4
6
8
10
12
14
16
18
20
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17

21. Simulated Chl *a* assessment against IMOS/NRS fluorescence

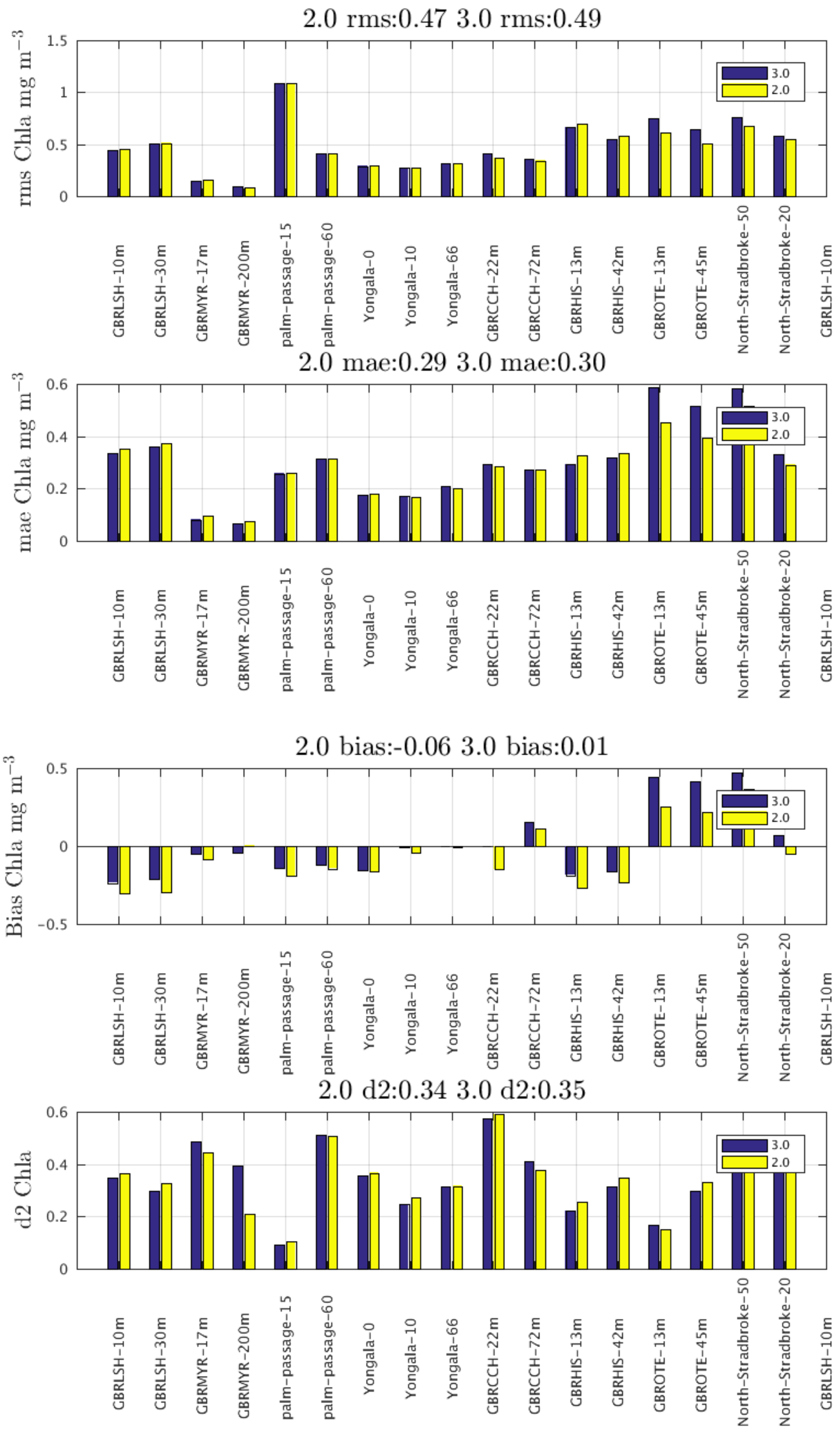
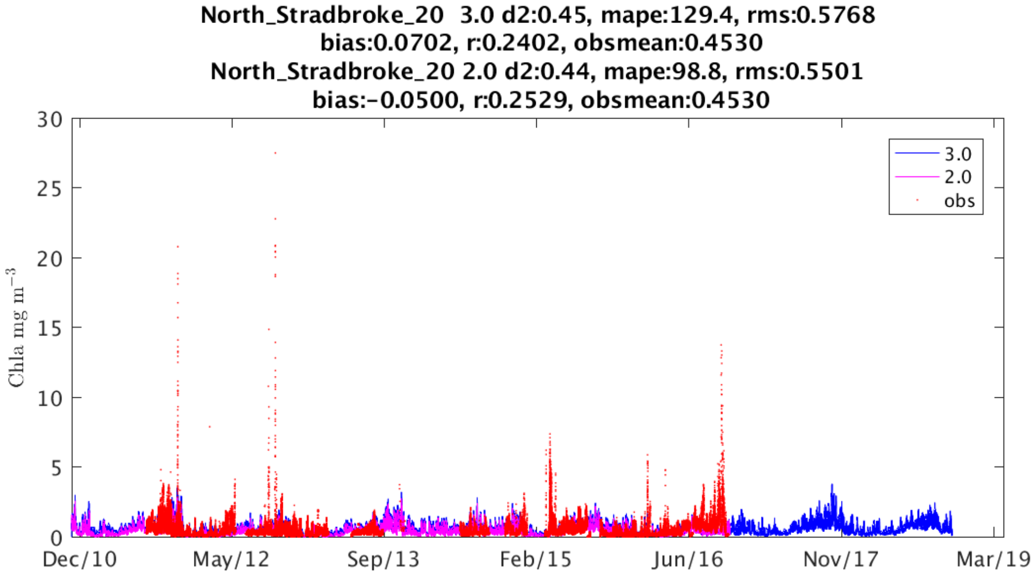
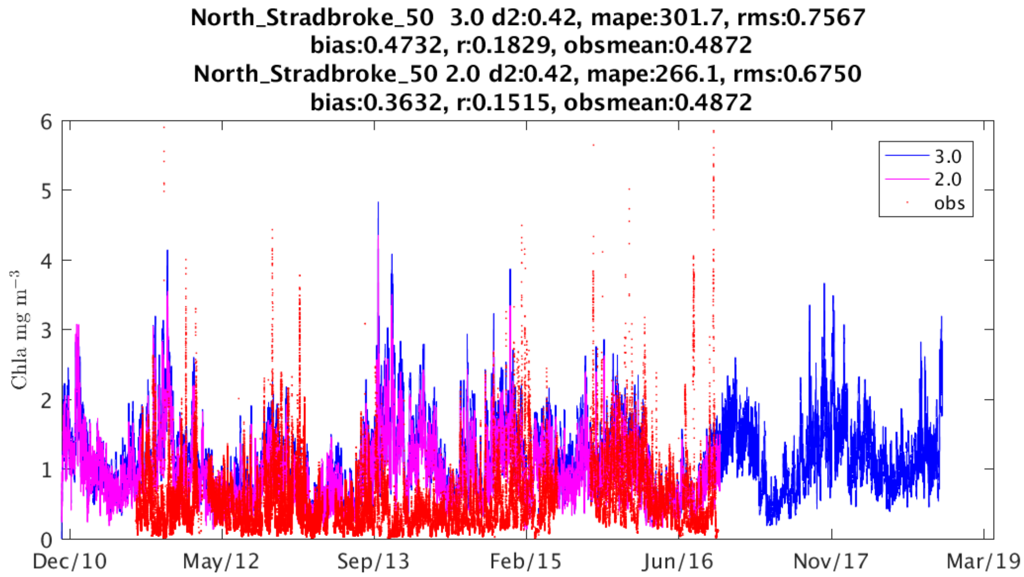
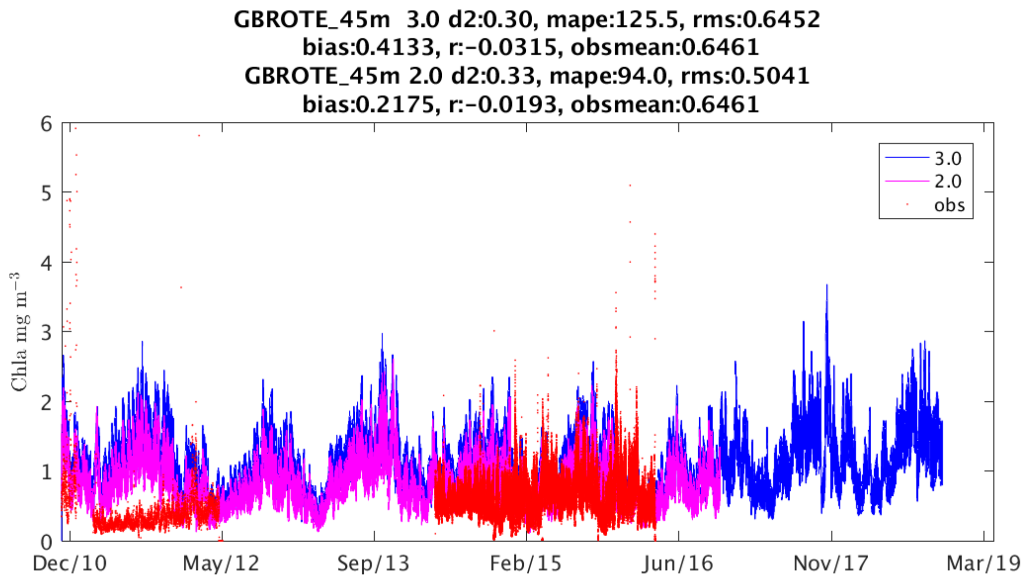


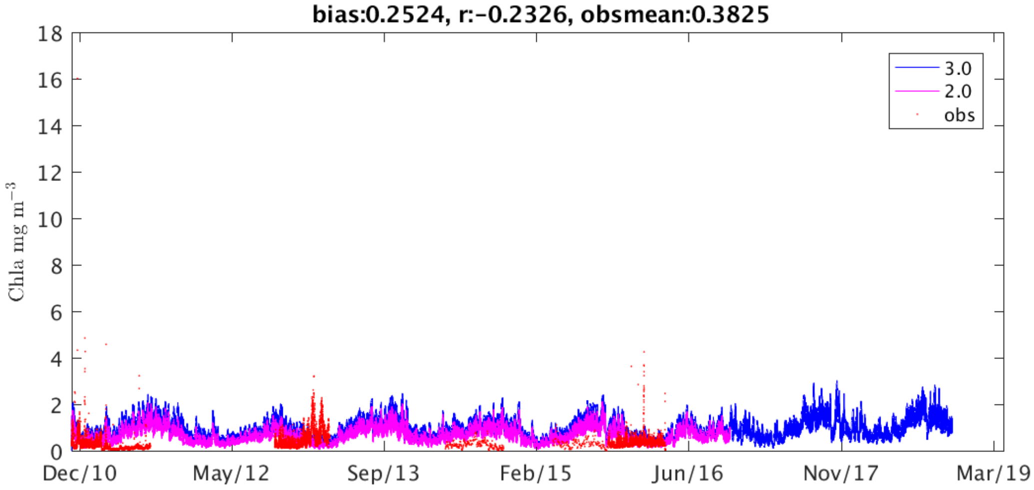
Figure 17 Metrics for IMOS and NRS fluorescence against Chl a for model version 3p0 and 2p0 d2 = Willmott index see Statistical metric page 27.mae:mean absolute error, rms root mean square


North_Stradbroke_20 3.0 d2:0.45, mape:129.4, rms:0.5768
bias:0.0702, r:0.2402, obsmean:0.4530
North_Stradbroke_20 2.0 d2:0.44, mape:98.8, rms:0.5501
bias:-0.0500, r:0.2529, obsmean:0.4530
Chla mg m^-3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

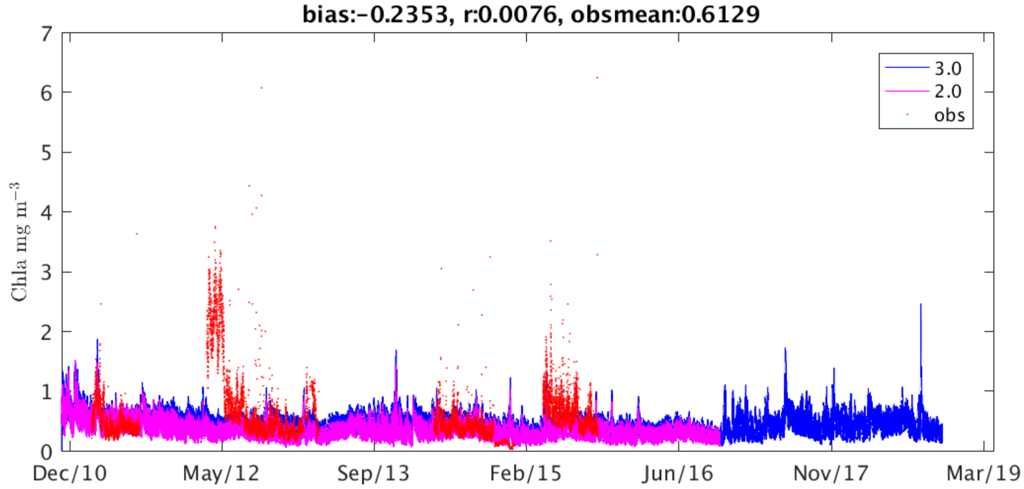

North_Stradbroke_50 3.0 d2:0.42, mape:301.7, rms:0.7567
bias:0.4732, r:0.1829, obsmean:0.4872
North_Stradbroke_50 2.0 d2:0.42, mape:266.1, rms:0.6750
bias:0.3632, r:0.1515, obsmean:0.4872
Chla mg m^-3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


GBROTE_45m 3.0 d2:0.30, mape:125.5, rms:0.6452
bias:0.4133, r:-0.0315, obsmean:0.6461
GBROTE_45m 2.0 d2:0.33, mape:94.0, rms:0.5041
bias:0.2175, r:-0.0193, obsmean:0.6461
Chla mg m^-3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

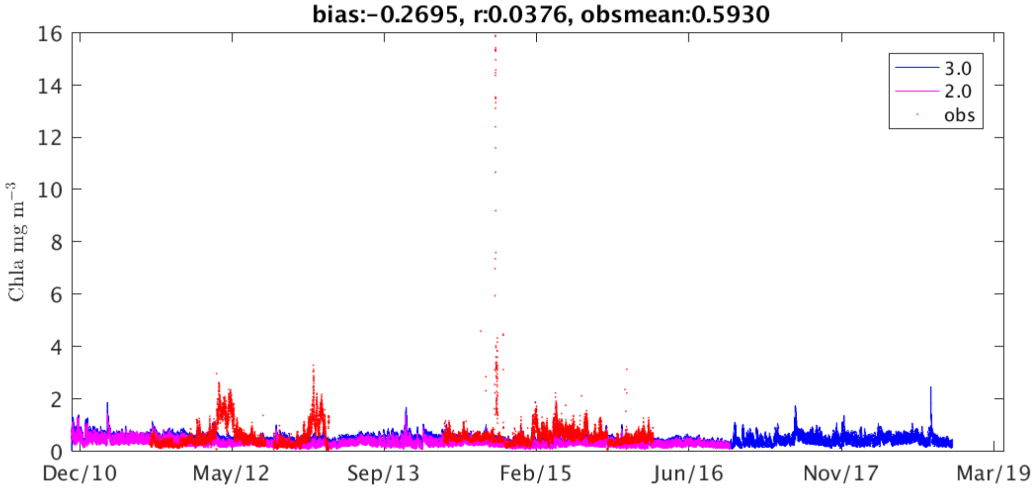
GBROTE_13m 3.0 d2:0.17, mape:303.9, rms:0.7526
bias:0.4410, r:-0.2350, obsmean:0.3825
GBROTE_13m 2.0 d2:0.15, mape:224.1, rms:0.6145
bias:0.2524, r:-0.2326, obsmean:0.3825



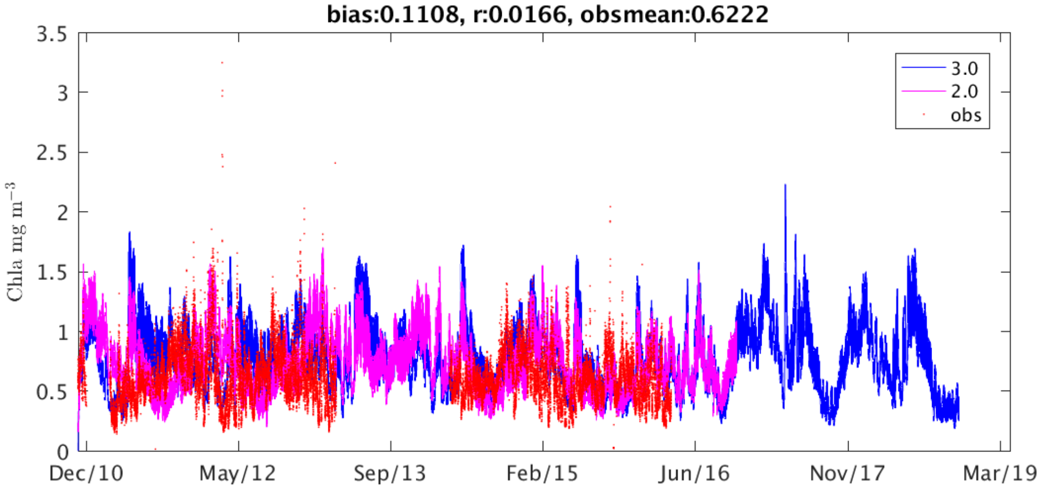
GBRHIS_42m 3.0 d2:0.32, mape:59.9, rms:0.5507
bias:-0.1605, r:0.0432, obsmean:0.6129
GBRHIS_42m 2.0 d2:0.35, mape:54.9, rms:0.5798
bias:-0.2353, r:0.0076, obsmean:0.6129



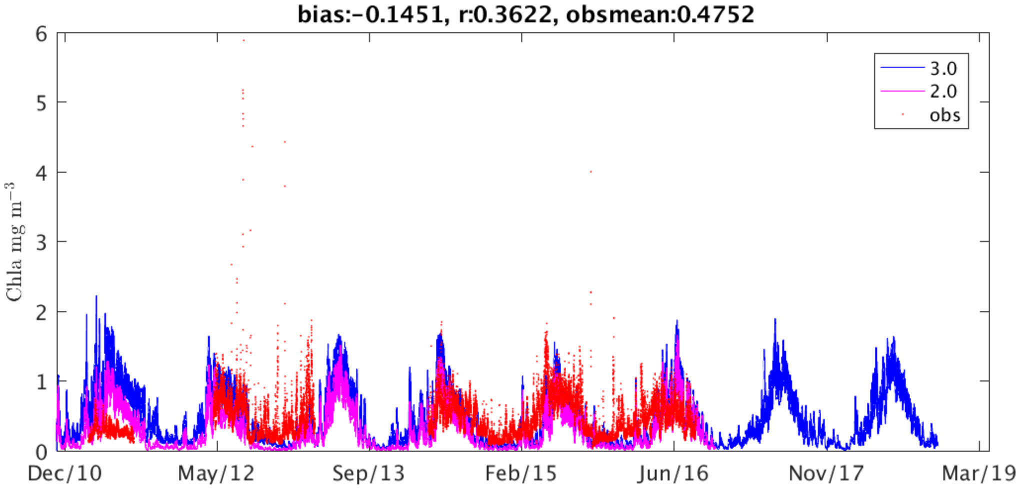
GBRHIS_13m 3.0 d2:0.22, mape:47.9, rms:0.6678
bias:-0.1870, r:0.0568, obsmean:0.5930
GBRHIS_13m 2.0 d2:0.26, mape:48.4, rms:0.6954
bias:-0.2695, r:0.0376, obsmean:0.5930



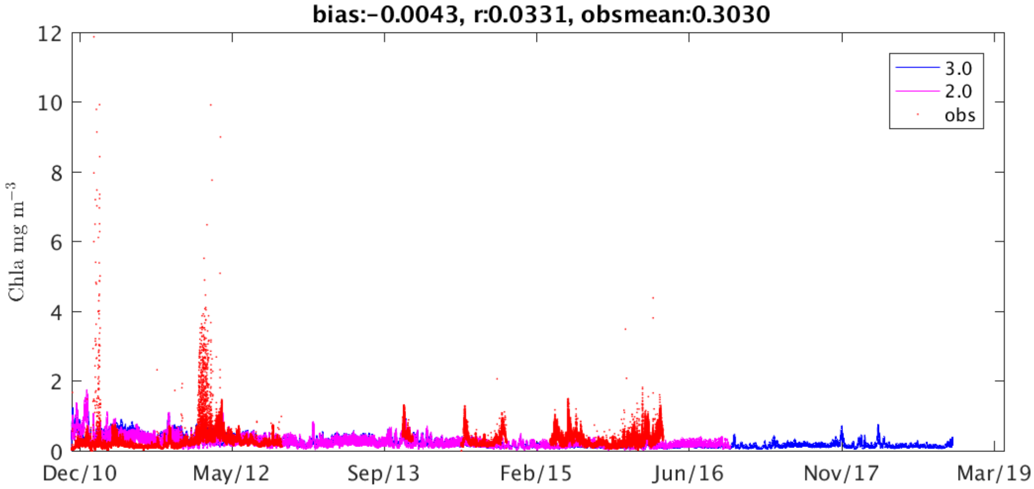
GBRCCH_72m 3.0 d2:0.41, mape:54.3, rms:0.3552
bias:0.1563, r:0.0914, obsmean:0.6222
GBRCCH_72m 2.0 d2:0.38, mape:55.6, rms:0.3431
bias:0.1108, r:0.0166, obsmean:0.6222

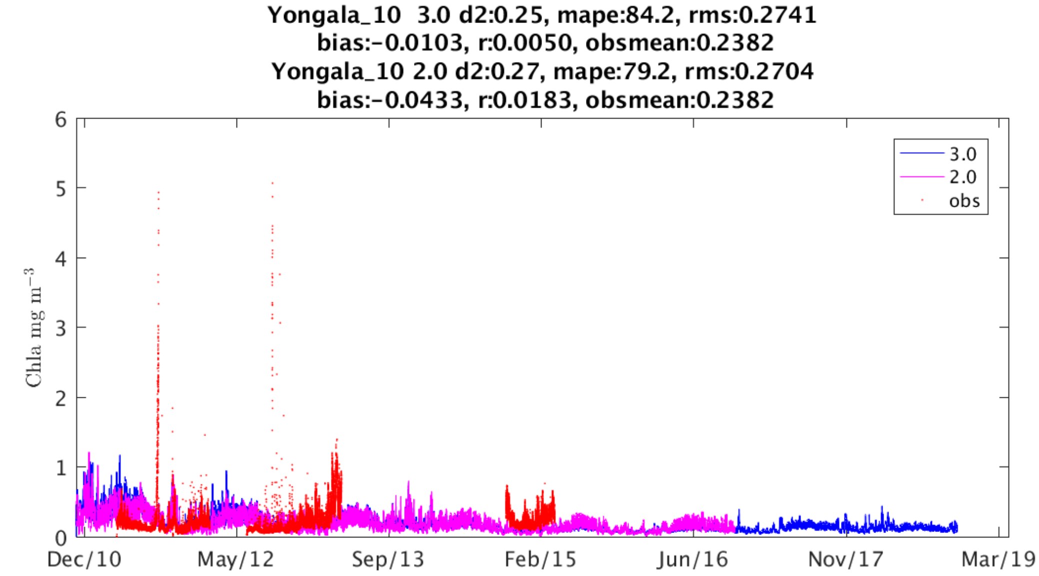


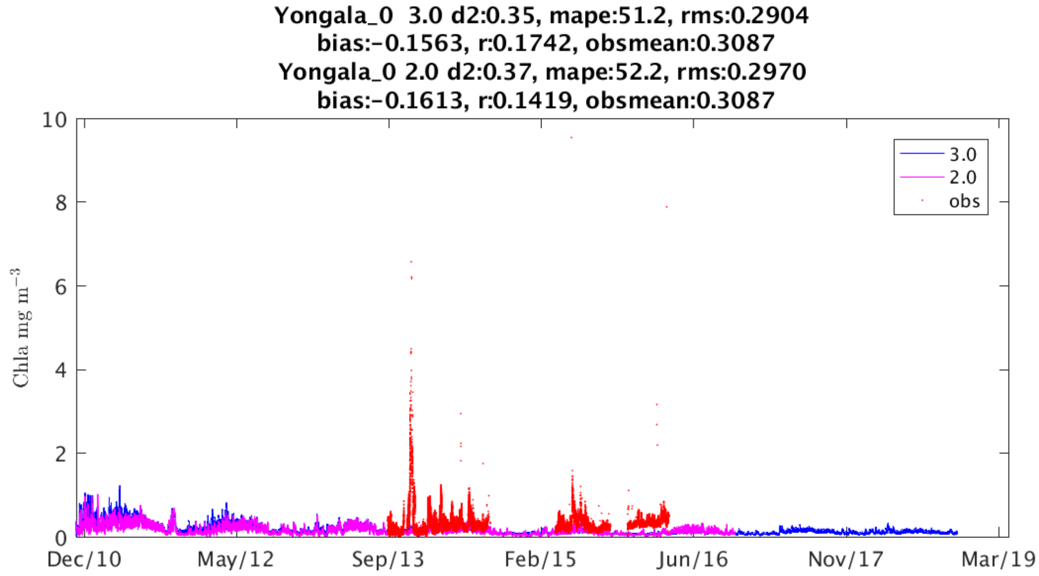
GBRCCH_22m 3.0 d2:0.57, mape:73.1, rms:0.4084
bias:−0.0009, r:0.3270, obsmean:0.4752
GBRCCH_22m 2.0 d2:0.59, mape:67.4, rms:0.3693
bias:−0.1451, r:0.3622, obsmean:0.4752

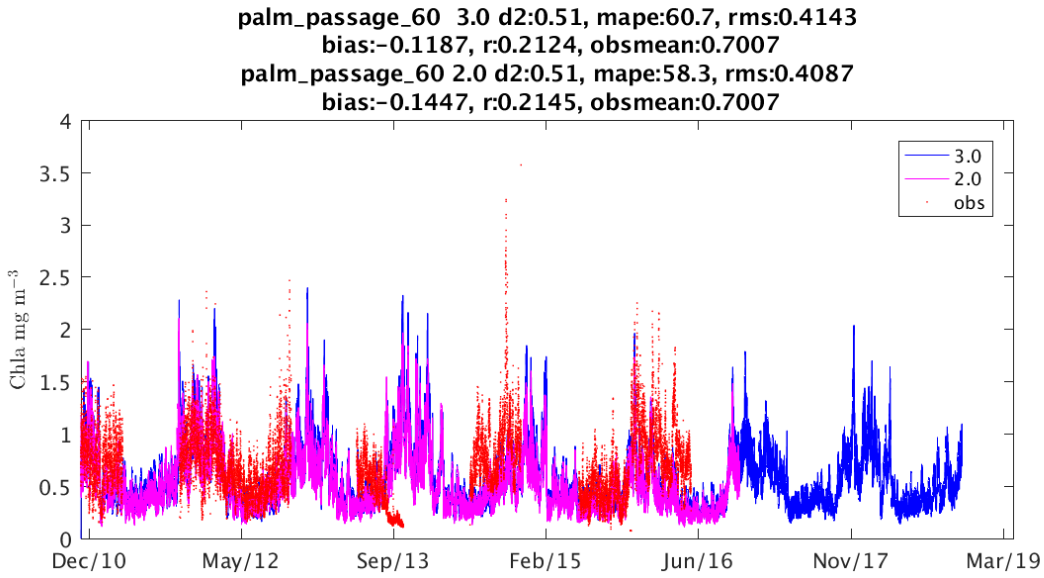


Yongala_26 3.0 d2:0.31, mape:93.7, rms:0.3211
bias:−0.0001, r:0.0065, obsmean:0.3030
Yongala_26 2.0 d2:0.32, mape:88.0, rms:0.3181
bias:−0.0043, r:0.0331, obsmean:0.3030

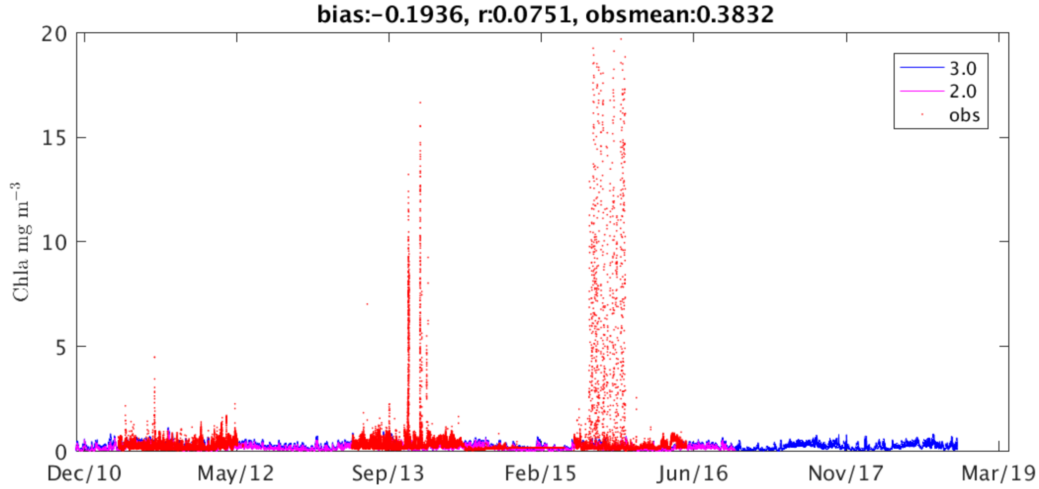



Yongala_10 3.0 d2:0.25, mape:84.2, rms:0.2741
bias:-0.0103, r:0.0050, obsmean:0.2382
Yongala_10 2.0 d2:0.27, mape:79.2, rms:0.2704
bias:-0.0433, r:0.0183, obsmean:0.2382
Chla mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

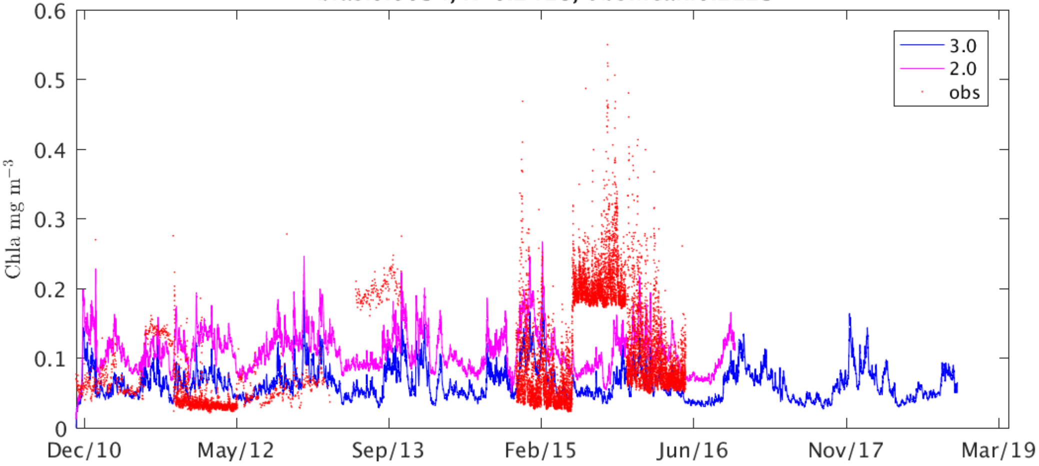

Yongala_0 3.0 d2:0.35, mape:51.2, rms:0.2904
bias:-0.1563, r:0.1742, obsmean:0.3087
Yongala_0 2.0 d2:0.37, mape:52.2, rms:0.2970
bias:-0.1613, r:0.1419, obsmean:0.3087
Chla mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

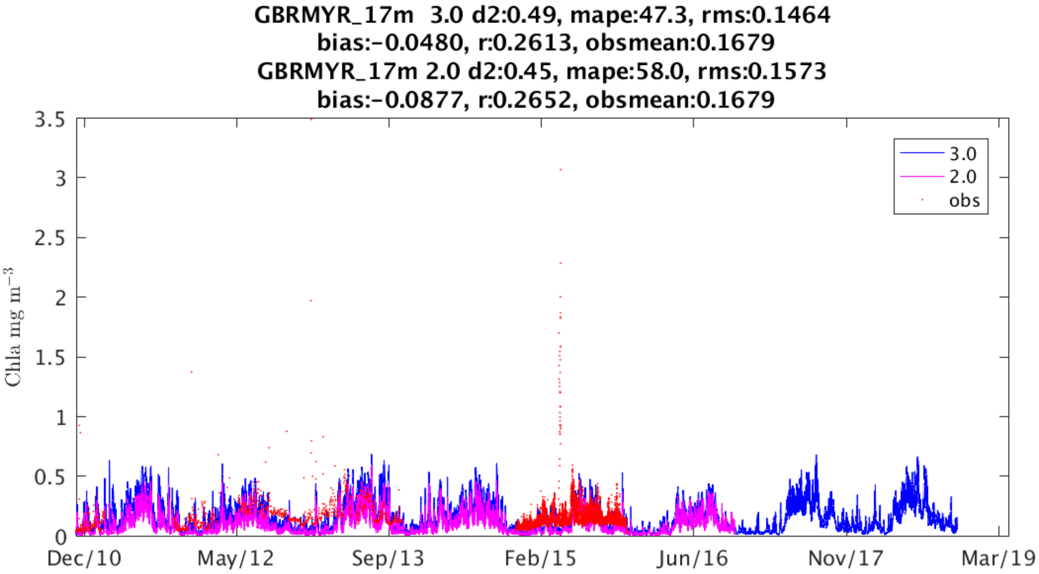

palm_passage_60 3.0 d2:0.51, mape:60.7, rms:0.4143
bias:-0.1187, r:0.2124, obsmean:0.7007
palm_passage_60 2.0 d2:0.51, mape:58.3, rms:0.4087
bias:-0.1447, r:0.2145, obsmean:0.7007
Chla mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

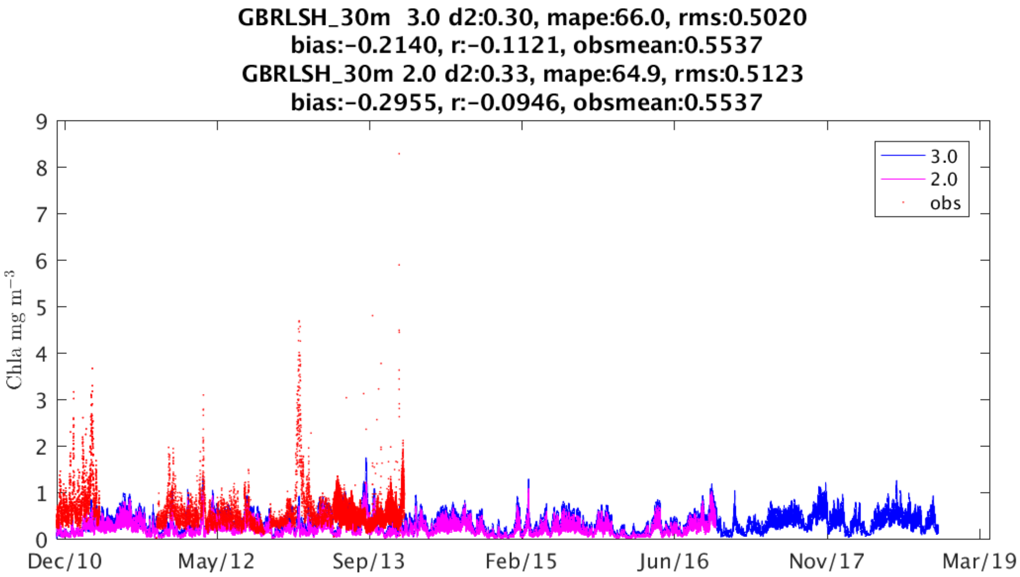
palm_passage_15 3.0 d2:0.09, mape:66.8, rms:1.0897
bias:-0.1422, r:0.0324, obsmean:0.3832
palm_passage_15 2.0 d2:0.11, mape:59.8, rms:1.0911
bias:-0.1936, r:0.0751, obsmean:0.3832



GBRMYR_200m 3.0 d2:0.40, mape:59.4, rms:0.0931
bias:-0.0440, r:-0.1409, obsmean:0.1123
GBRMYR_200m 2.0 d2:0.21, mape:102.3, rms:0.0888
bias:0.0034, r:-0.2418, obsmean:0.1123




GBRMYR_17m 3.0 d2:0.49, mape:47.3, rms:0.1464
bias:-0.0480, r:0.2613, obsmean:0.1679
GBRMYR_17m 2.0 d2:0.45, mape:58.0, rms:0.1573
bias:-0.0877, r:0.2652, obsmean:0.1679
Chla mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


GBRLSH_30m 3.0 d2:0.30, mape:66.0, rms:0.5020
bias:-0.2140, r:-0.1121, obsmean:0.5537
GBRLSH_30m 2.0 d2:0.33, mape:64.9, rms:0.5123
bias:-0.2955, r:-0.0946, obsmean:0.5537
Chla mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

22. Simulated NOx assessment against NRS: Yongala and NSI

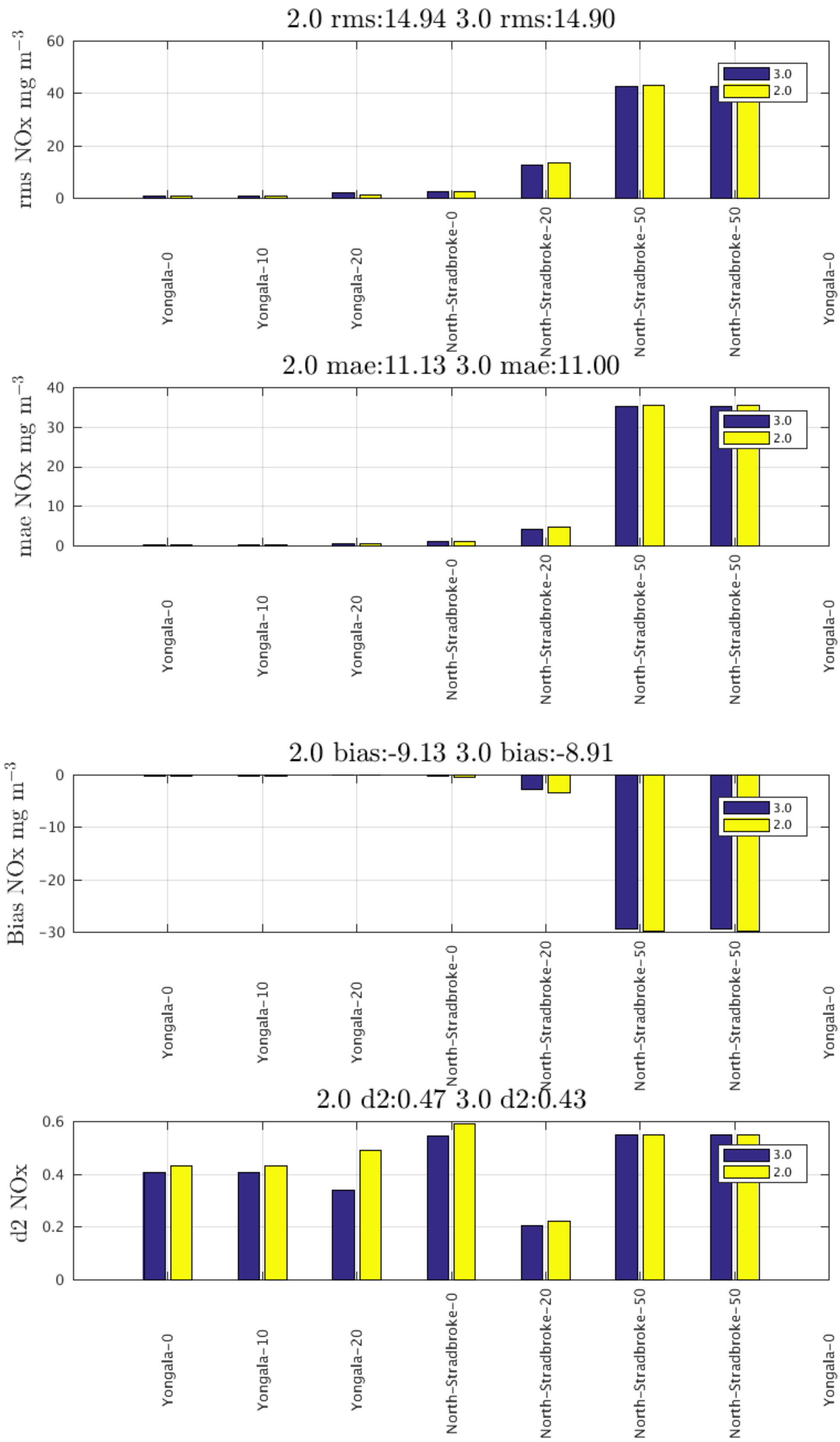
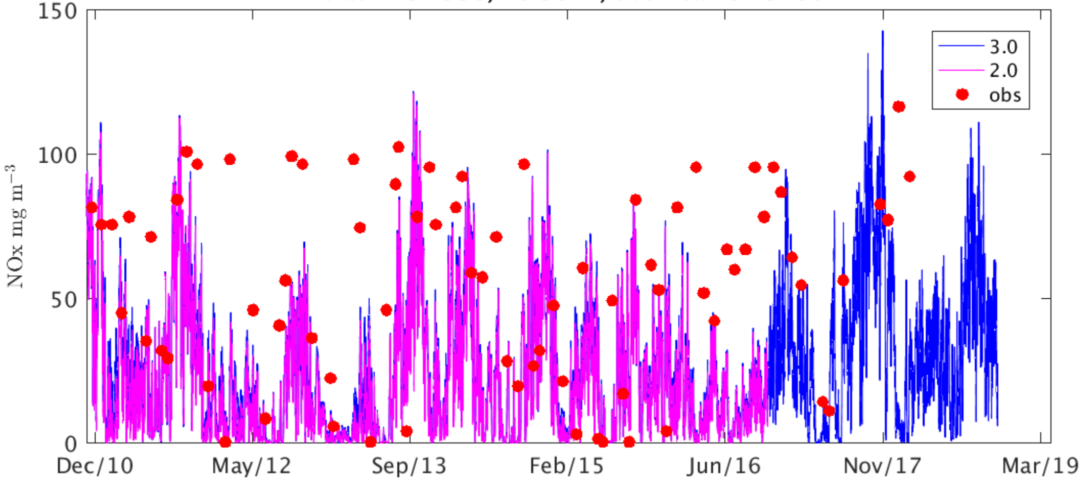
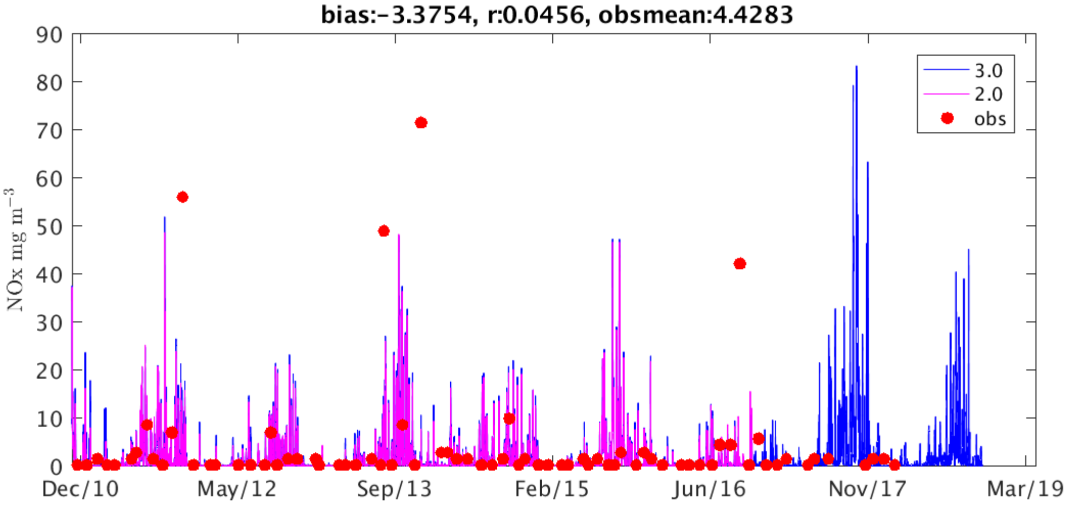


Figure 18 Metrics for NRS NOx against model version 3p0 and 2p0 until 2014 for model version 3p0 and 2p0 d2 = Willmott index see Statistical metric page 27.mae:mean absolute error, rms root mean square

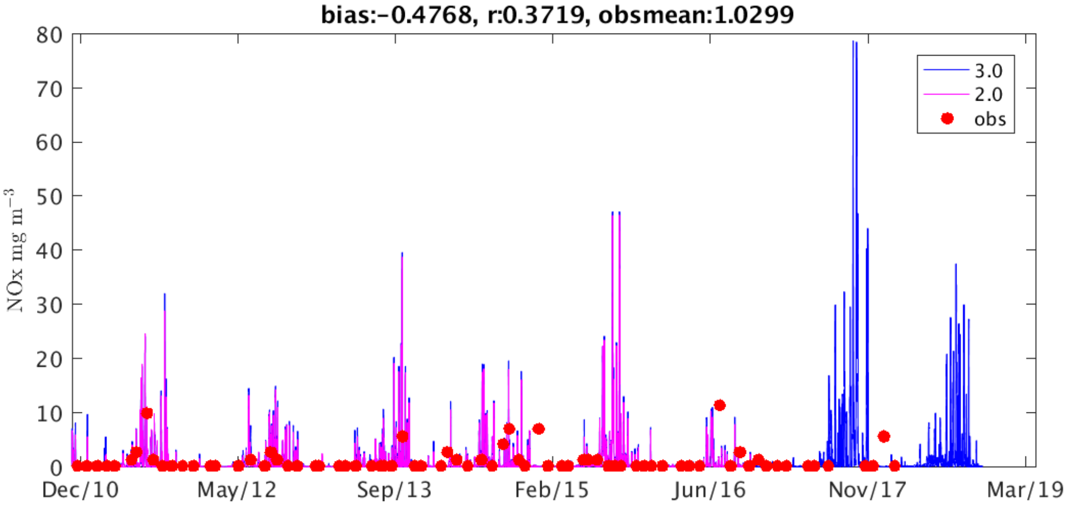
North_Stradbroke_50 3.0 d2:0.55, mape:116.2, rms:42.8284
bias:-29.3199, r:0.3570, obsmean:56.3039
North_Stradbroke_50 2.0 d2:0.55, mape:120.1, rms:42.9826
bias:-29.7958, r:0.3641, obsmean:54.3766

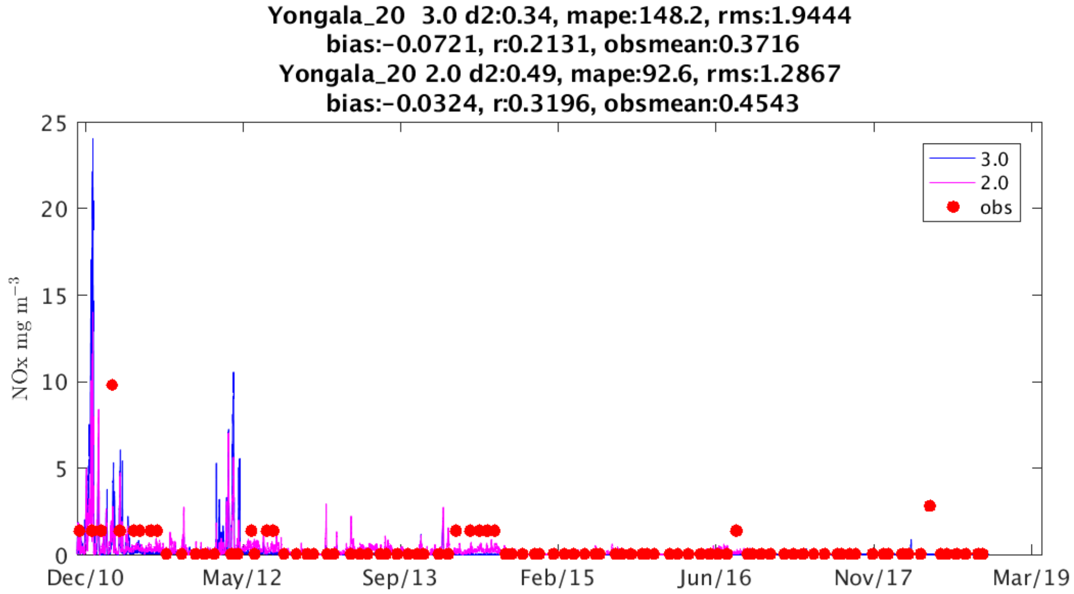


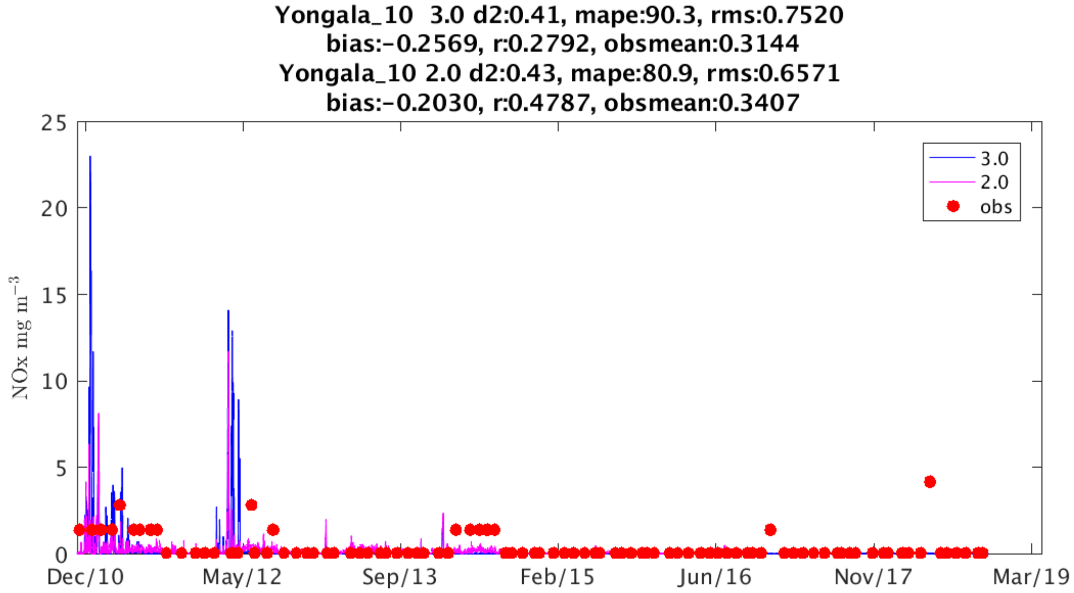
North_Stradbroke_20 3.0 d2:0.21, mape:96.0, rms:12.5846
bias:-2.8284, r:0.0675, obsmean:3.9712
North_Stradbroke_20 2.0 d2:0.22, mape:100.4, rms:13.6062
bias:-3.3754, r:0.0456, obsmean:4.4283



North_Stradbroke_0 3.0 d2:0.54, mape:96.3, rms:2.5793
bias:-0.3079, r:0.3055, obsmean:0.9751
North_Stradbroke_0 2.0 d2:0.59, mape:84.9, rms:2.4294
bias:-0.4768, r:0.3719, obsmean:1.0299




Yongala_20 3.0 d2:0.34, mape:148.2, rms:1.9444
bias:-0.0721, r:0.2131, obsmean:0.3716
Yongala_20 2.0 d2:0.49, mape:92.6, rms:1.2867
bias:-0.0324, r:0.3196, obsmean:0.4543
NOx mg m^-3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


Yongala_10 3.0 d2:0.41, mape:90.3, rms:0.7520
bias:-0.2569, r:0.2792, obsmean:0.3144
Yongala_10 2.0 d2:0.43, mape:80.9, rms:0.6571
bias:-0.2030, r:0.4787, obsmean:0.3407
NOx mg m^-3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

23. Simulated NH4 assessment against NRS: Yongala and NSI

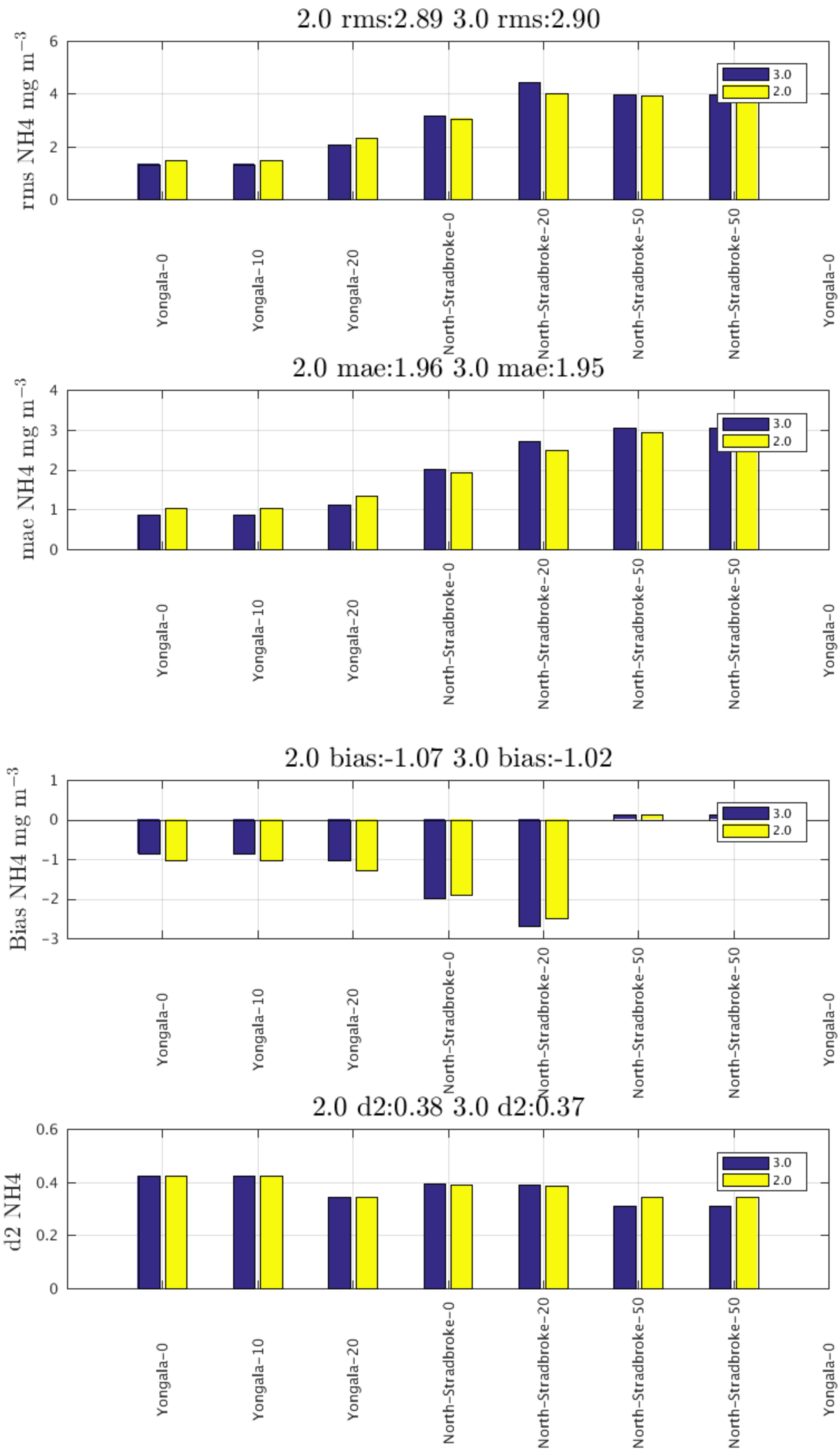
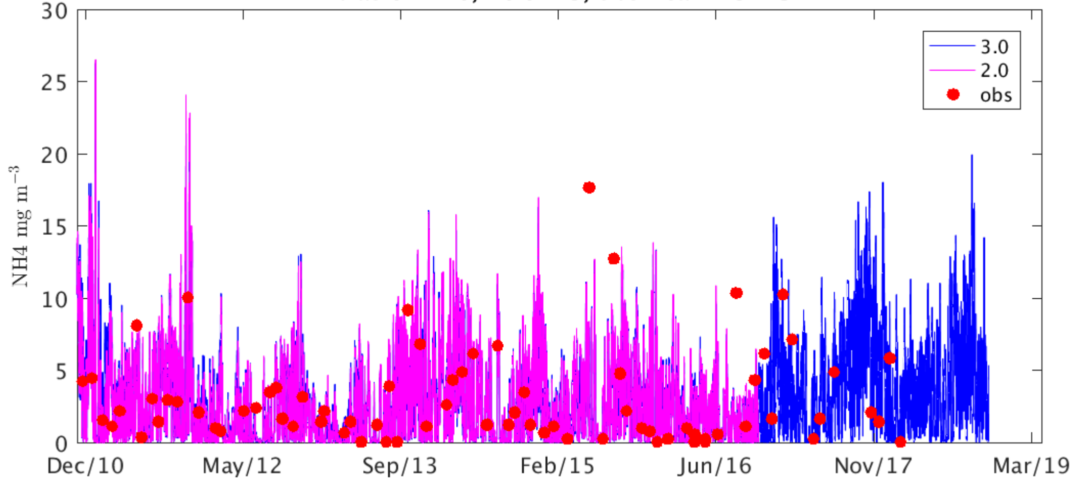
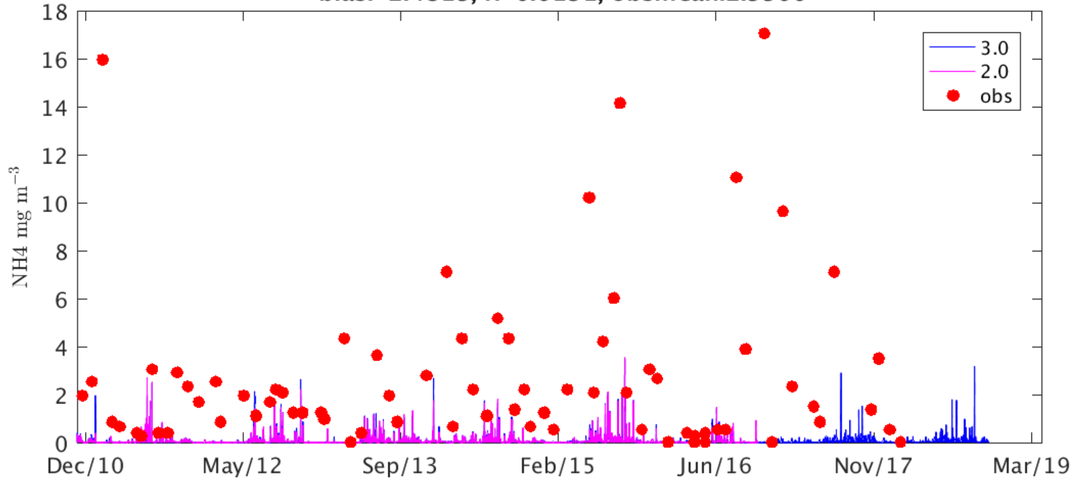


Figure 19 Metrics for NRS NH4 for model version 3p0 and 2p0 d2 = Willmott index see Statistical metric page 27.mae:mean absolute error, rms root mean square

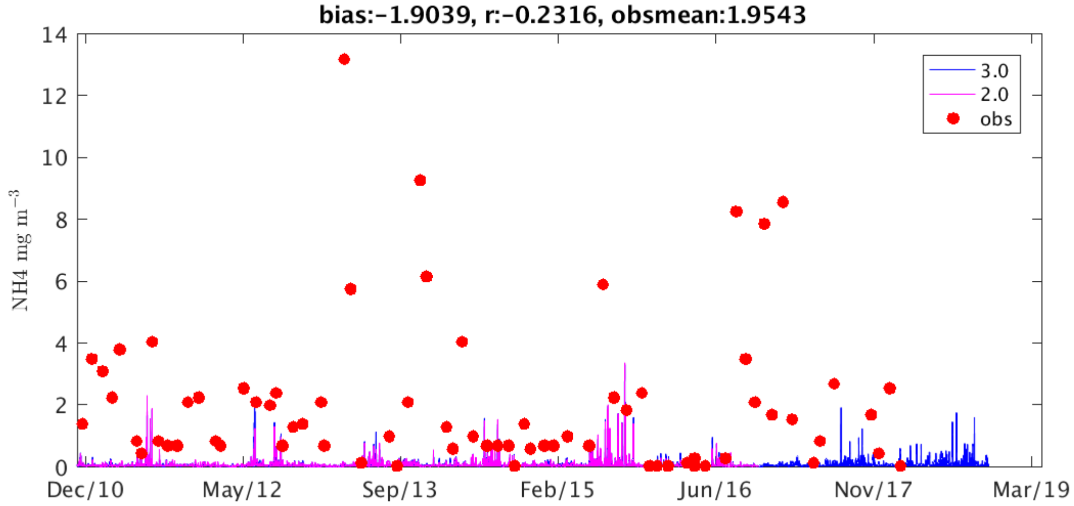
North_Stradbroke_50 3.0 d2:0.31, mape:168.9, rms:3.9650
bias:0.1315, r:-0.0367, obsmean:3.0019
North_Stradbroke_50 2.0 d2:0.34, mape:164.3, rms:3.9159
bias:0.1140, r:0.0275, obsmean:2.8723

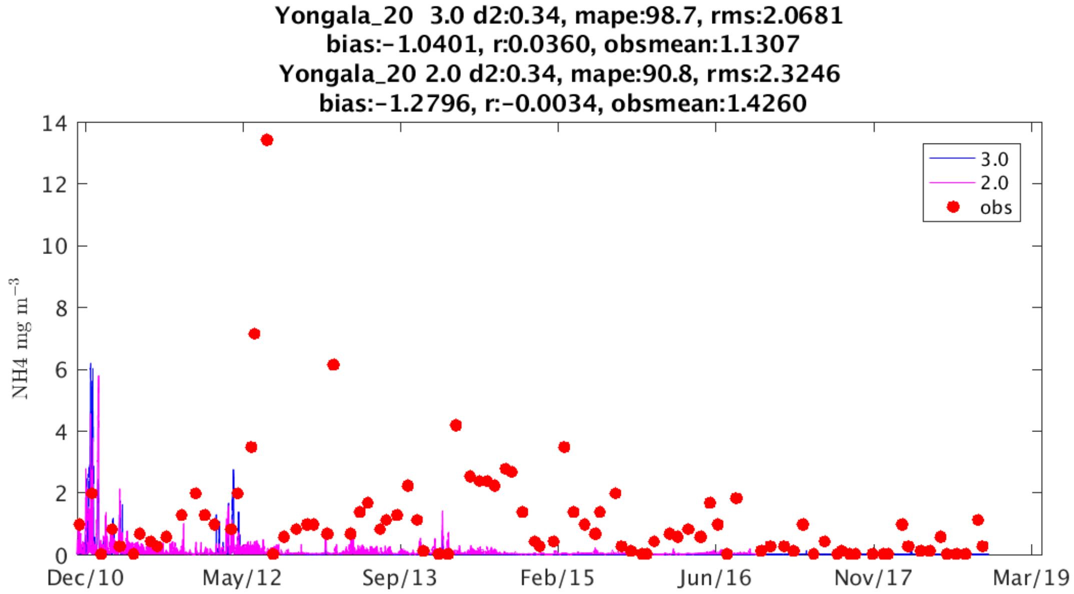


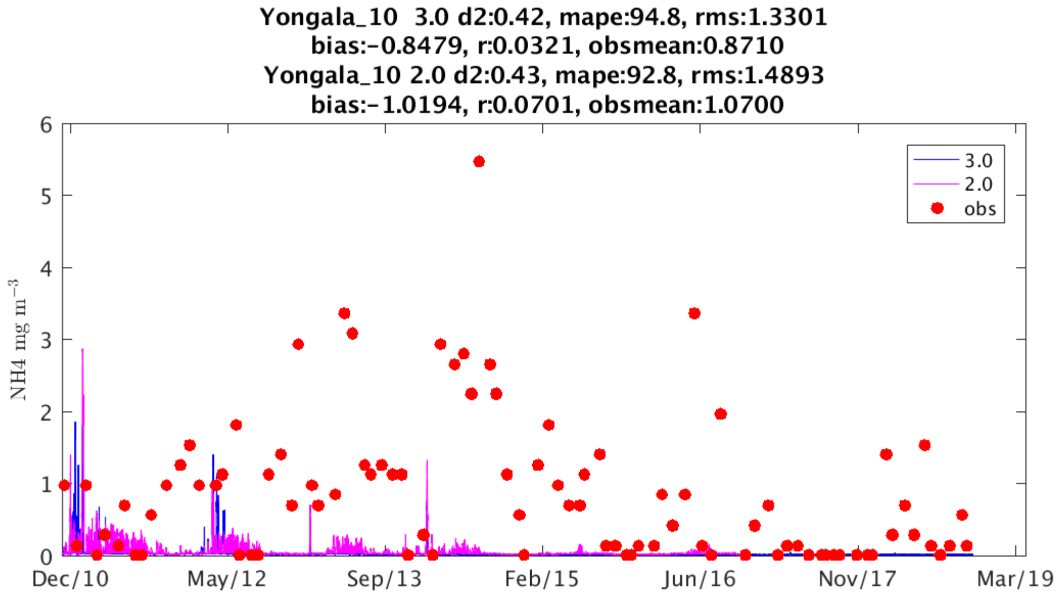
North_Stradbroke_20 3.0 d2:0.39, mape:94.1, rms:4.4470
bias:-2.7033, r:-0.0254, obsmean:2.7669
North_Stradbroke_20 2.0 d2:0.38, mape:93.5, rms:3.9994
bias:-2.4815, r:-0.0191, obsmean:2.5500



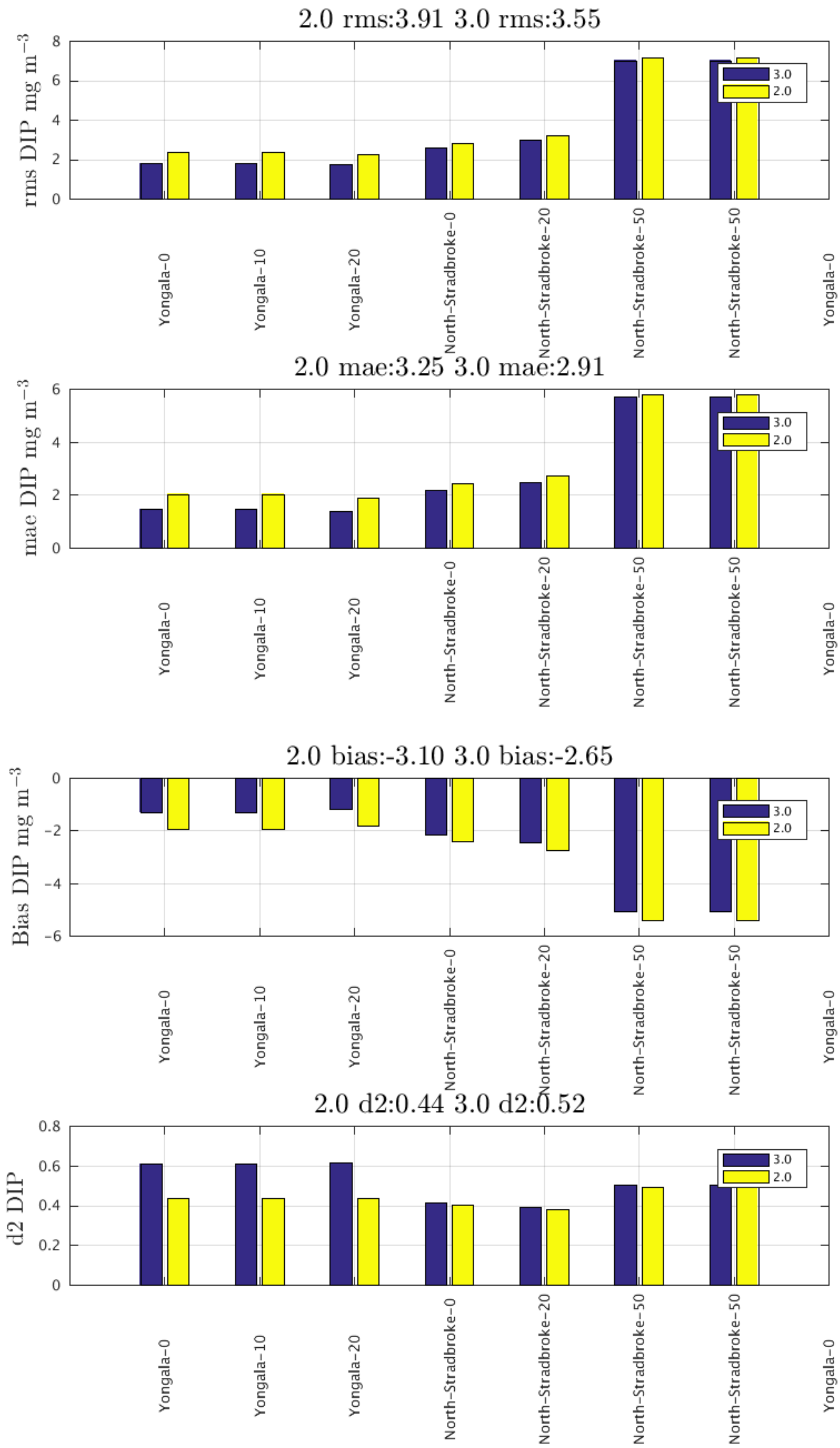
North_Stradbroke_0 3.0 d2:0.39, mape:93.1, rms:3.1746
bias:-1.9830, r:-0.2707, obsmean:2.0403
North_Stradbroke_0 2.0 d2:0.39, mape:94.4, rms:3.0627
bias:-1.9039, r:-0.2316, obsmean:1.9543




Yongala_20 3.0 d2:0.34, mape:98.7, rms:2.0681
bias:-1.0401, r:0.0360, obsmean:1.1307
Yongala_20 2.0 d2:0.34, mape:90.8, rms:2.3246
bias:-1.2796, r:-0.0034, obsmean:1.4260
NH4 mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

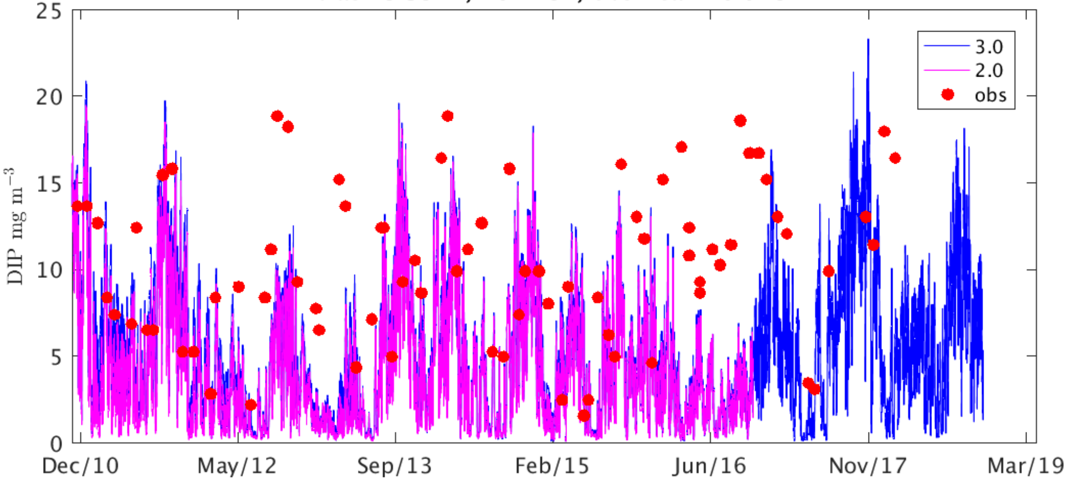

Yongala_10 3.0 d2:0.42, mape:94.8, rms:1.3301
bias:-0.8479, r:0.0321, obsmean:0.8710
Yongala_10 2.0 d2:0.43, mape:92.8, rms:1.4893
bias:-1.0194, r:0.0701, obsmean:1.0700
NH4 mg m^{-3}
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

24. Simulated DIP assessment against NRS: Yongala and NSI

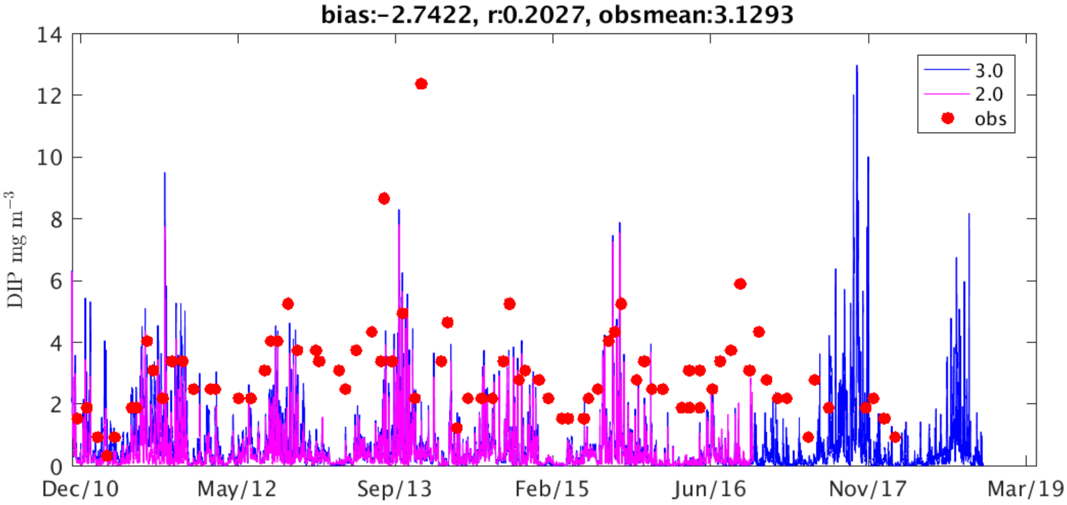


Metrics for IMOS NRS DIP for model version 3p0 and 2p0 d2 = Willmott index see Statistical metric page 27.mae:mean absolute error, rms root mean square

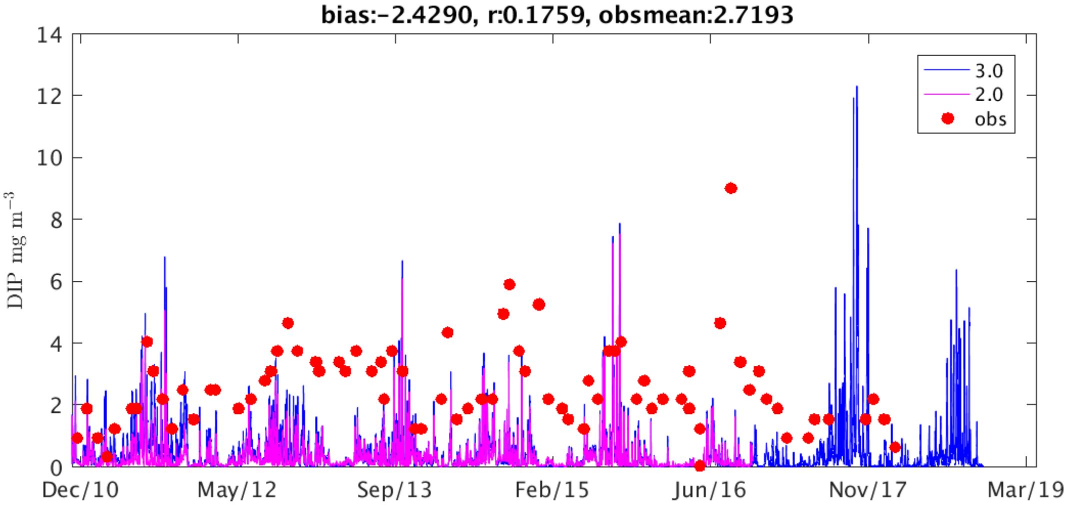
North_Stradbroke_50 3.0 d2:0.50, mape:55.7, rms:7.0137
bias:-5.0577, r:0.2643, obsmean:10.3234
North_Stradbroke_50 2.0 d2:0.49, mape:58.1, rms:7.1660
bias:-5.3971, r:0.2787, obsmean:10.0484

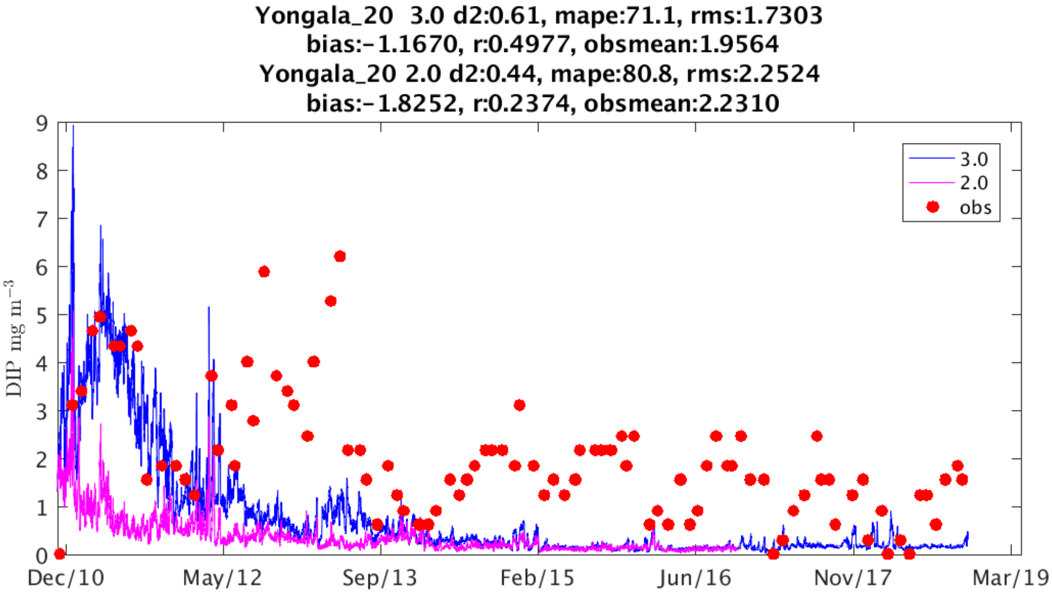


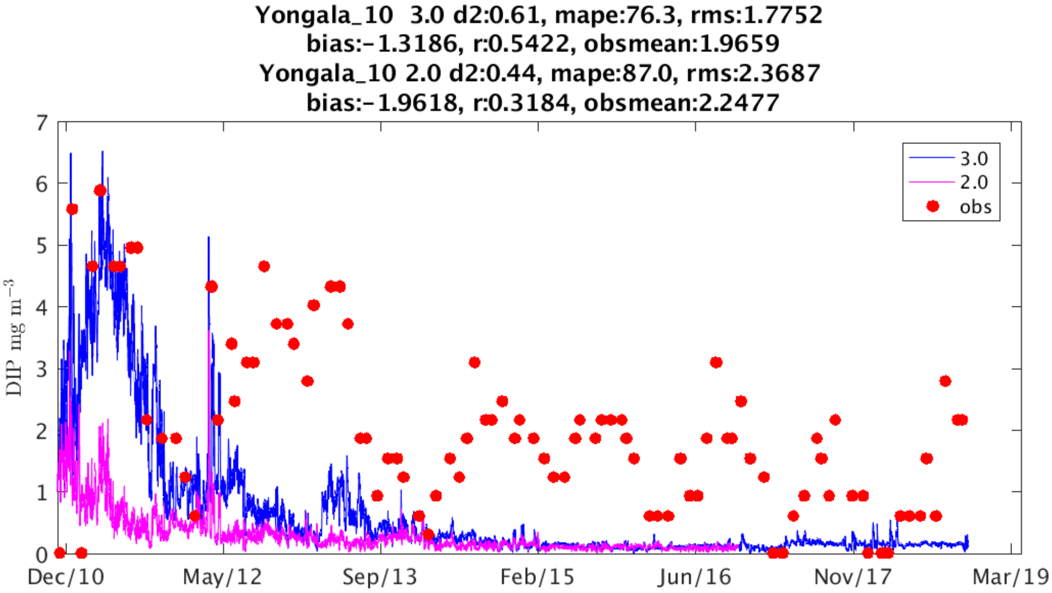
North_Stradbroke_20 3.0 d2:0.39, mape:80.4, rms:2.9800
bias:-2.4585, r:0.1857, obsmean:2.9916
North_Stradbroke_20 2.0 d2:0.38, mape:86.5, rms:3.2297
bias:-2.7422, r:0.2027, obsmean:3.1293



North_Stradbroke_0 3.0 d2:0.41, mape:82.3, rms:2.5701
bias:-2.1489, r:0.1245, obsmean:2.5681
North_Stradbroke_0 2.0 d2:0.40, mape:87.5, rms:2.7917
bias:-2.4290, r:0.1759, obsmean:2.7193

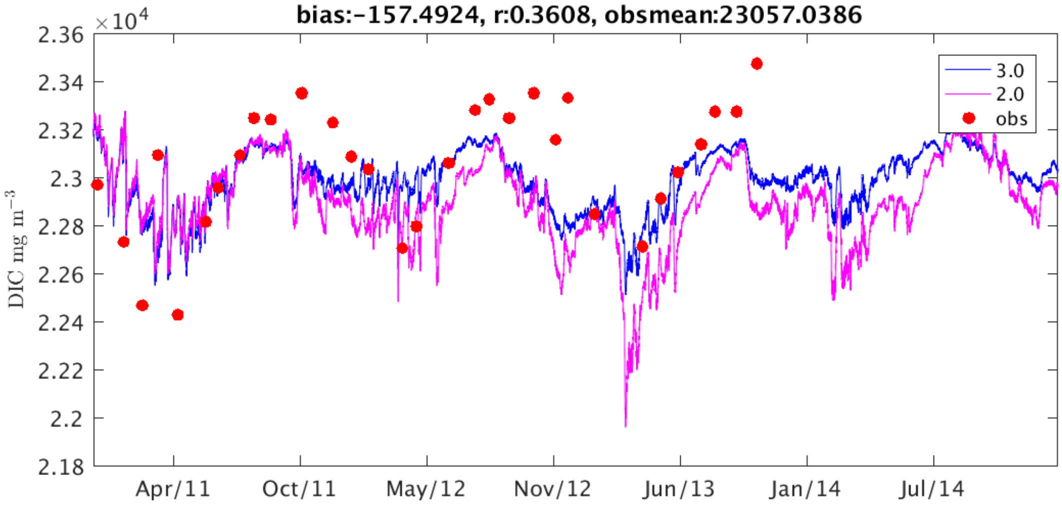



Yongala_20 3.0 d2:0.61, mape:71.1, rms:1.7303
bias:-1.1670, r:0.4977, obsmean:1.9564
Yongala_20 2.0 d2:0.44, mape:80.8, rms:2.2524
bias:-1.8252, r:0.2374, obsmean:2.2310
DIP mg m^-3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

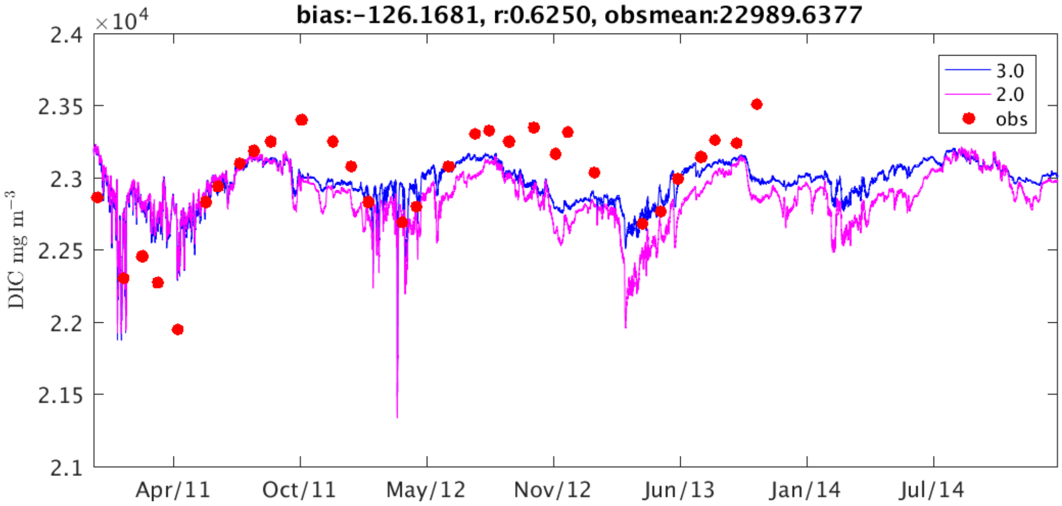

Yongala_10 3.0 d2:0.61, mape:76.3, rms:1.7752
bias:-1.3186, r:0.5422, obsmean:1.9659
Yongala_10 2.0 d2:0.44, mape:87.0, rms:2.3687
bias:-1.9618, r:0.3184, obsmean:2.2477
DIP mg m^-3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

25. Simulated DIC assessment against NRS Yongala

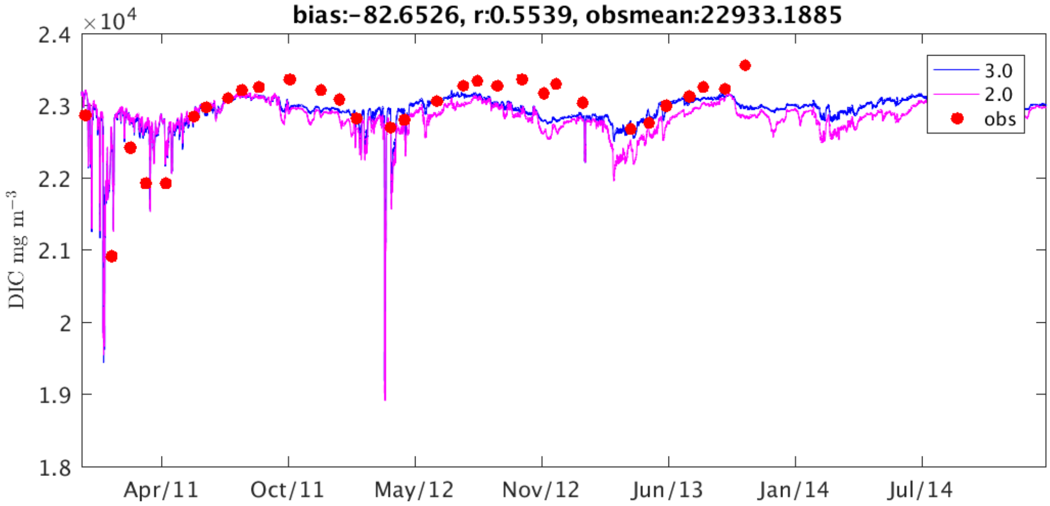
Yongala_26 3.0 d2:0.58, mape:0.9, rms:251.8943
bias:-75.8681, r:0.4184, obsmean:23057.0386
Yongala_26 2.0 d2:0.56, mape:1.1, rms:299.8606
bias:-157.4924, r:0.3608, obsmean:23057.0386



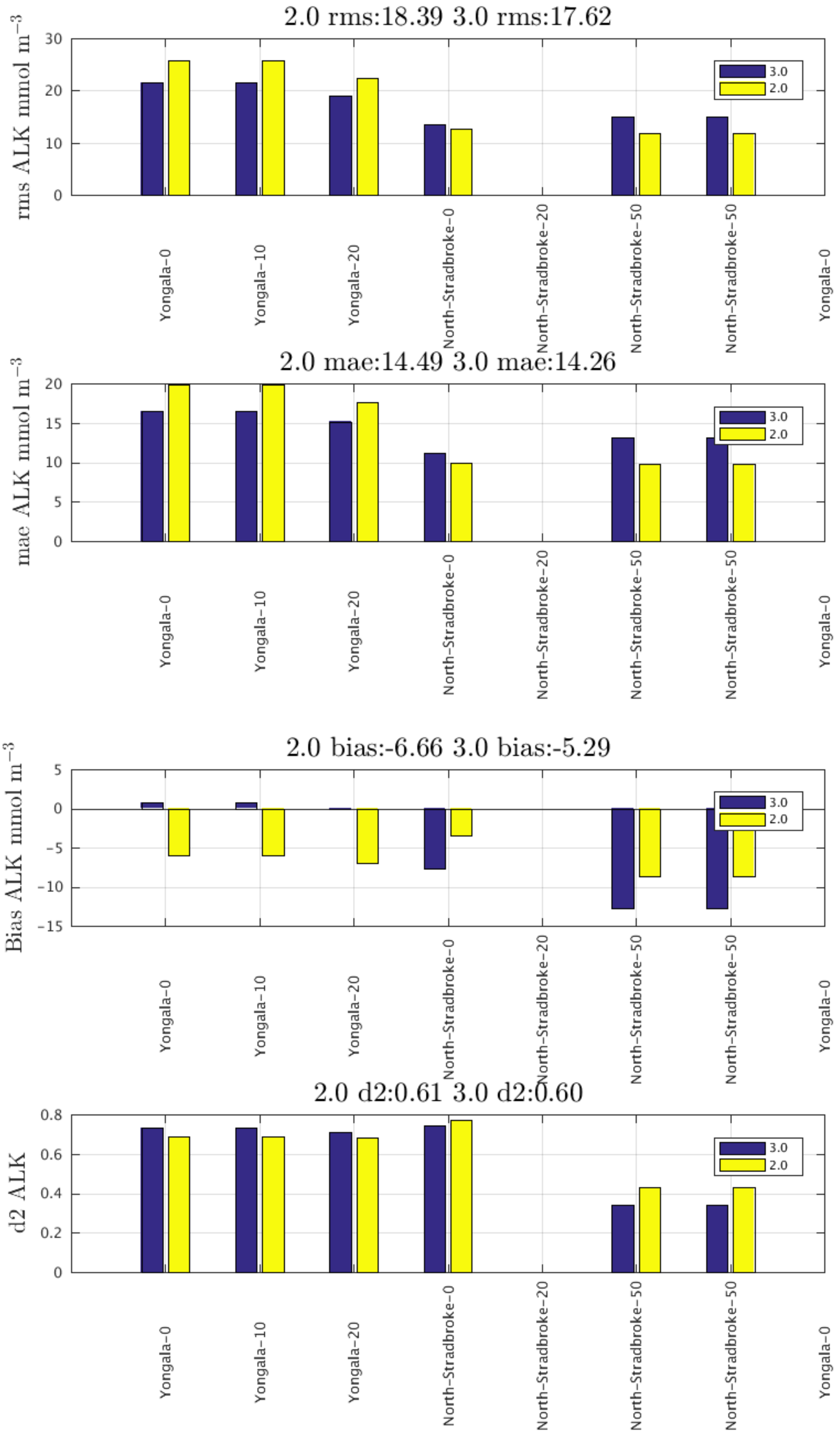
Yongala_10 3.0 d2:0.76, mape:0.9, rms:258.2364
bias:-44.3495, r:0.7547, obsmean:22989.6377
Yongala_10 2.0 d2:0.69, mape:1.1, rms:310.3398
bias:-126.1681, r:0.6250, obsmean:22989.6377

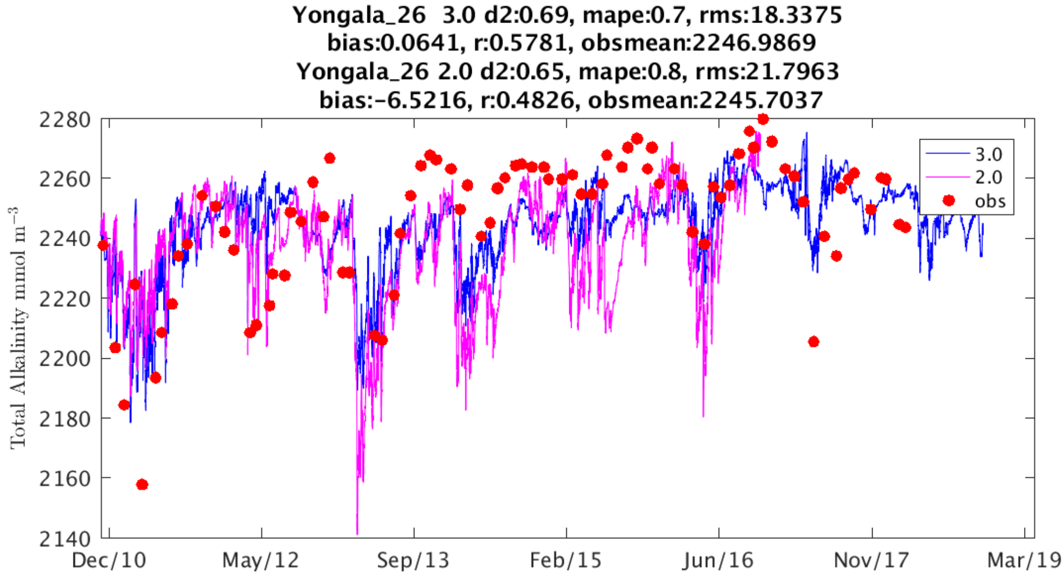


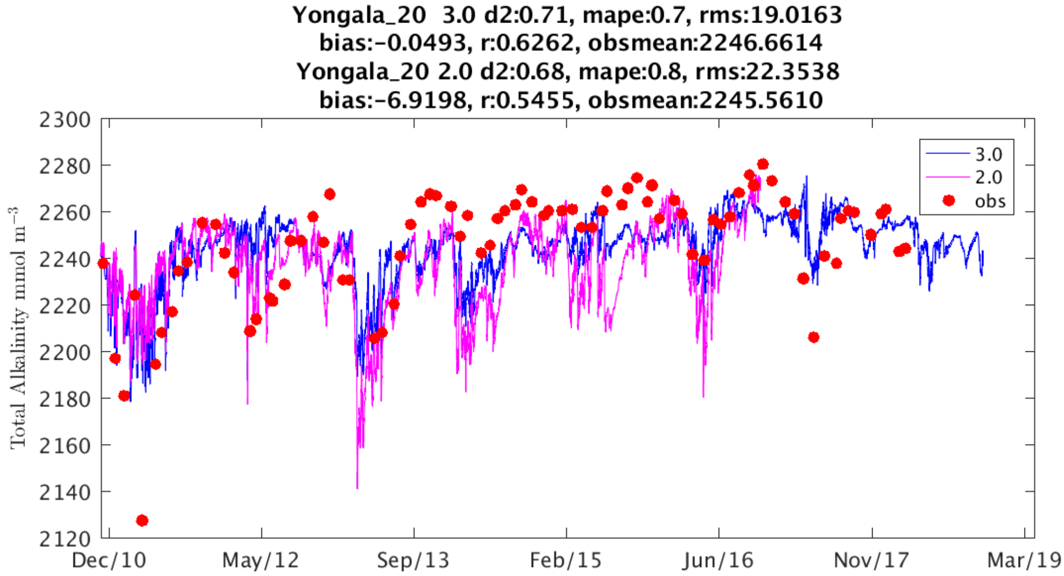
Yongala_0 3.0 d2:0.64, mape:1.2, rms:409.6874
bias:-2.2563, r:0.7140, obsmean:22933.1885
Yongala_0 2.0 d2:0.57, mape:1.4, rms:452.0324
bias:-82.6526, r:0.5539, obsmean:22933.1885

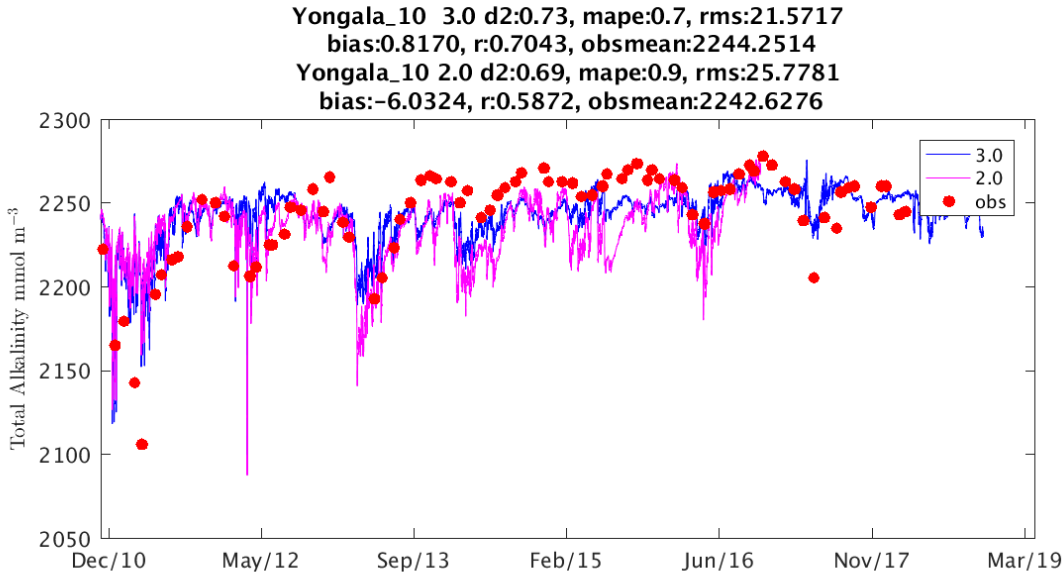


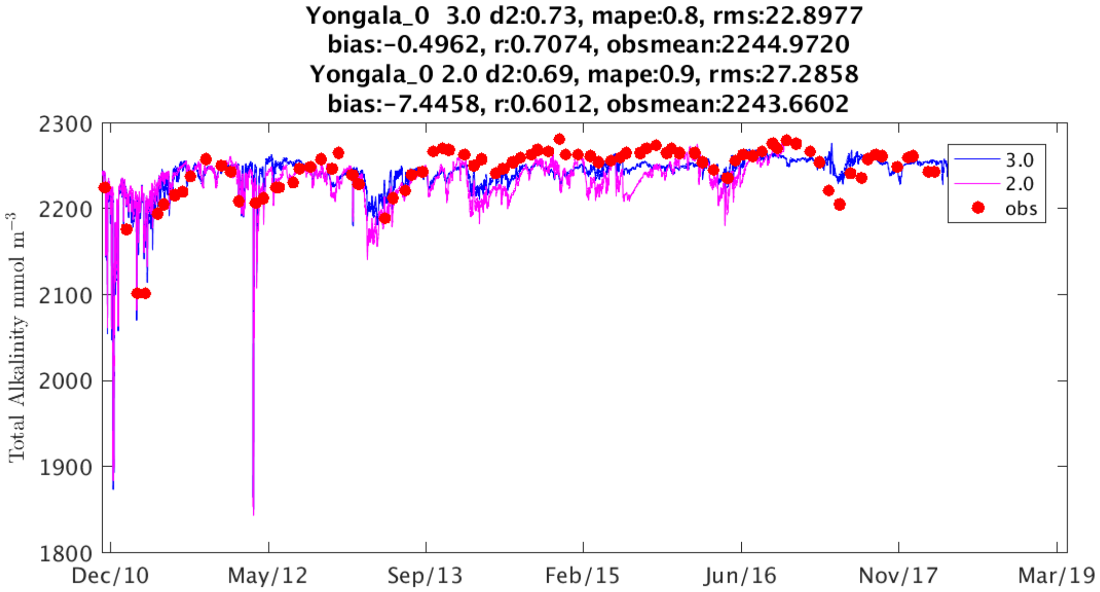
26. Simulated alkalinity assessment against NRS Yongala North Stradbroke

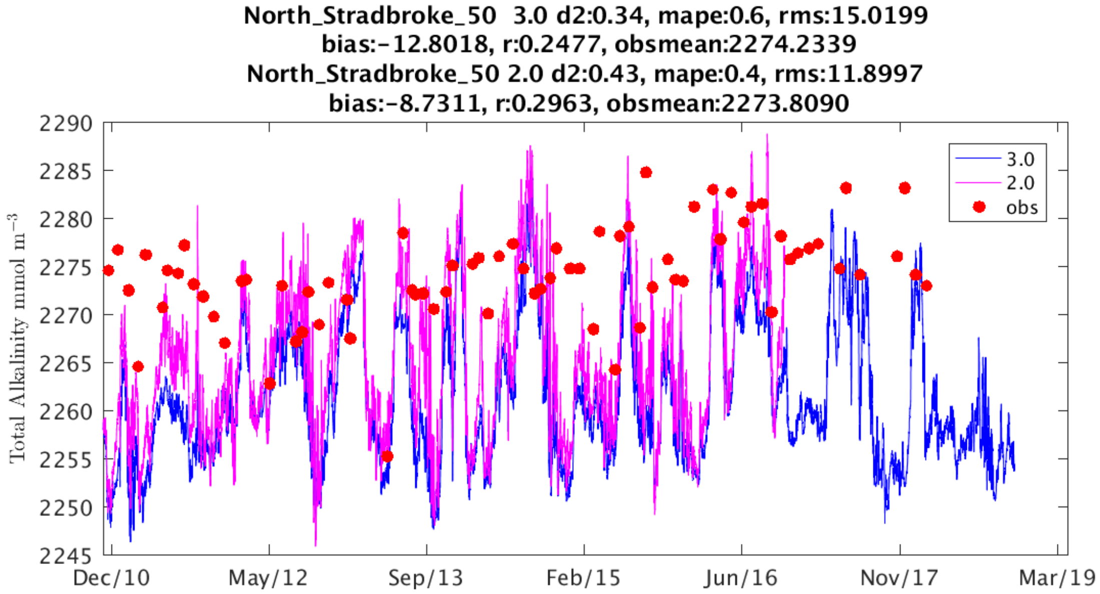


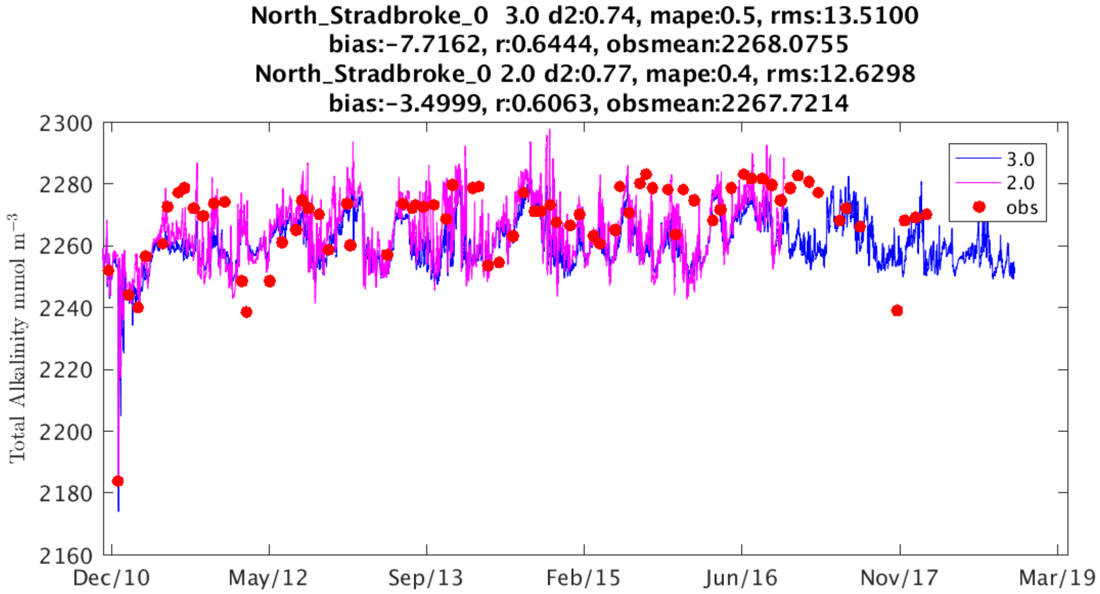

Yongala_26 3.0 d2:0.69, mape:0.7, rms:18.3375
bias:0.0641, r:0.5781, obsmean:2246.9869
Yongala_26 2.0 d2:0.65, mape:0.8, rms:21.7963
bias:-6.5216, r:0.4826, obsmean:2245.7037
Total Alkalinity mmol m^-3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


Yongala_20 3.0 d2:0.71, mape:0.7, rms:19.0163
bias:-0.0493, r:0.6262, obsmean:2246.6614
Yongala_20 2.0 d2:0.68, mape:0.8, rms:22.3538
bias:-6.9198, r:0.5455, obsmean:2245.5610
Total Alkalinity mmol m^-3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


Yongala_10 3.0 d2:0.73, mape:0.7, rms:21.5717
bias:0.8170, r:0.7043, obsmean:2244.2514
Yongala_10 2.0 d2:0.69, mape:0.9, rms:25.7781
bias:-6.0324, r:0.5872, obsmean:2242.6276
Total Alkalinity mmol m^-3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

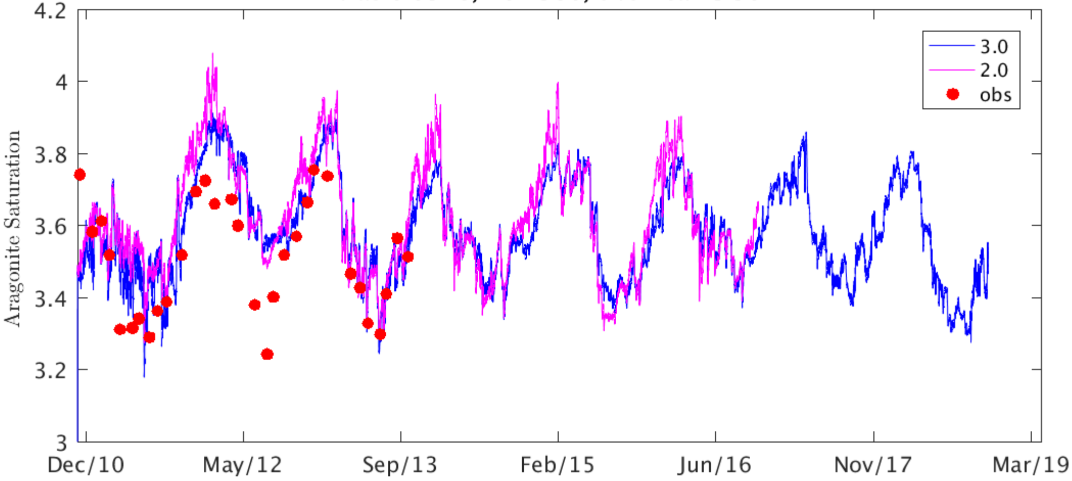

Yongala_0 3.0 d2:0.73, mape:0.8, rms:22.8977
bias:-0.4962, r:0.7074, obsmean:2244.9720
Yongala_0 2.0 d2:0.69, mape:0.9, rms:27.2858
bias:-7.4458, r:0.6012, obsmean:2243.6602
Total Alkalinity mmol m^-3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19


North_Stradbroke_50 3.0 d2:0.34, mape:0.6, rms:15.0199
bias:-12.8018, r:0.2477, obsmean:2274.2339
North_Stradbroke_50 2.0 d2:0.43, mape:0.4, rms:11.8997
bias:-8.7311, r:0.2963, obsmean:2273.8090
Total Alkalinity mmol m^-3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

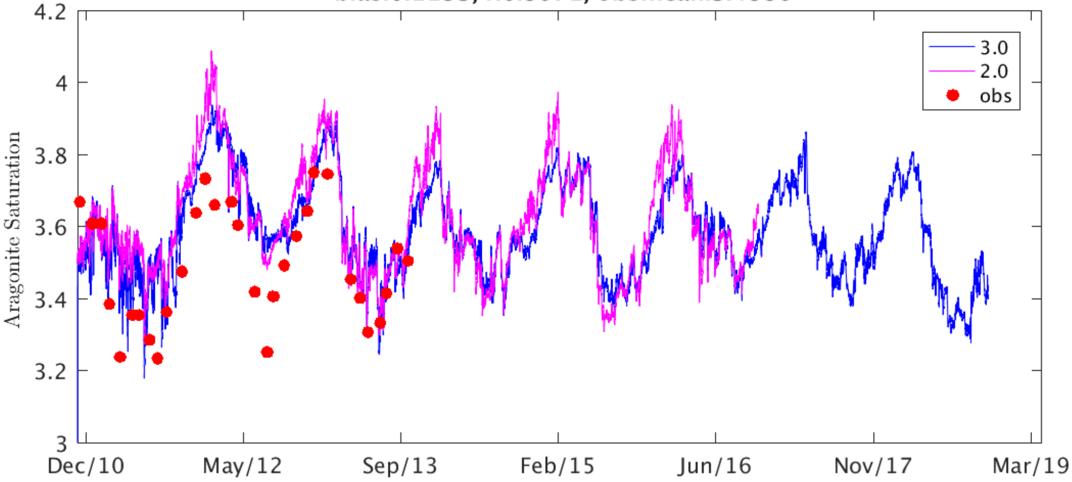

North_Stradbroke_0 3.0 d2:0.74, mape:0.5, rms:13.5100
bias:-7.7162, r:0.6444, obsmean:2268.0755
North_Stradbroke_0 2.0 d2:0.77, mape:0.4, rms:12.6298
bias:-3.4999, r:0.6063, obsmean:2267.7214
Total Alkalinity mmol m^-3
3.0
2.0
obs
Dec/10
May/12
Sep/13
Feb/15
Jun/16
Nov/17
Mar/19

27. Simulated aragonite assessment against Yongala

Yongala_20 3.0 d2:0.80, mape:3.1, rms:0.1338
bias:0.0666, r:0.7046, obsmean:3.5042
Yongala_20 2.0 d2:0.79, mape:3.5, rms:0.1433
bias:0.0946, r:0.7560, obsmean:3.5042



Yongala_10 3.0 d2:0.80, mape:3.3, rms:0.1377
bias:0.0909, r:0.7704, obsmean:3.4880
Yongala_10 2.0 d2:0.79, mape:3.8, rms:0.1515
bias:0.1153, r:0.8071, obsmean:3.4880



28. Wakmatha transect line for carbon chemistry assessment