The paper "Tuning and assessment of the HYCOM-NORWECOM V2.1 modelling system" by Samuelsen et al describes changes and testing of a selection of biogeochemical paramaterisations within the model for Arctic and Barents Sea regions. The subject is appropriate for the journal and while the substance of the paper is fairly weak, the analysis is performed very well,using appropriate statistical metrics. The writing is continuously deteriorating throughout the paper and needs major improvement, which will probably allow to shorten the paper quite a bit. This applies particularly to the discussion, which appears unsorted, repetitive and unclear. Hence I recommend publication after major revision with respect to the writing.

Comments:

Throughout the paper, please be careful with the usage of the word "data". Both model output and observations are data and sometimes it is rather confusing if "data" is used without further specification, particularly if the application of the word switches between modelled and observational data. I recommend for most cases to replace the word data with the word "observations" (where applicable) and use model data or model output at others.

I would recommend using names for the model versions discussed rather than the use of: the current version, this version,the original version, the version from 1998 ….

Revise title to somehow include "Arctic" and "biogeochemical"

Detailed comments:

p8400 l 5 has -have
l 7 The model revisions
l 13/14 rm sentence "probably as a result...
l 24 BGC models are less accurate – what does that mean?
8401 l 5/6 this sentence doesn't make sense
8402 l 8/9 suggest: ...for forecasting and regularly evaluated using in sutu....and sea ice.
L 21 derived from GlobalNEWS model output
L24 proved ??? => provided?
8403 L5 determine => determines
L10 is – are
L11 and silicate => and nitrate?
L16/17 rephrase
L23 the same as - derived from (or add "in")
8404 L20 runs, to limit the computational cots, as the 15km …
8405 suggest putting table 3 in an appendix
L 5-7 confusing, rephrase
L19 In the case that....=> In case of several …
L20 Rm sentence One caveat...modelled chlorophyll superfluous

2.3 what data???

8406 L9 -11 shorten: A combination of metrics ** and ** was used..
...are defined as:
Eq 6 what is n

2.5 put in appendix with table 3

8407 L21 .. no skill => is this shown somewhere?
L23 both runs????? there are 16 runs, do you mean both resolutions?
L24 (Fig.5). - what about the few showing a positive bias?

8408 L1 ..is overestimated => Is this shown?
L 2 We have also observed => found (keep the word observed for the observations)
L3-5 In addition … - this has already been stated (do not repeat)

3.2 Parameter alterations ???? better title?
L 8 Many of the parameter …
L9 as seen in Figs 4 and 5 – Can't see the improvement in those figures, pls clarify

8410 revised run – revised model/ or revised parameterisation
L7 regions. In the Norwegian Sea observations are available throughout...
L16 show – shows

Watch the use of data, data, data....

L25 has -have
8411 last paragraph of 3.3 What about the influence of ice algae ? Make note

Discussion:

Try to minimize repetition, use concise sentences, please review for grammar

8412 L 2 claims to the accuracy – what does that mean? ...accuracy can be relaxed ???
L 7 research vessels

paragraph on the quality of the observational data can be shortened

L13 here the – here, are the
outspell HPLC
L 5 to 24 shorten, this has limited relevance to the paper
L24-28 this is a known issue, does not need that much detail (does not moer or less depend on the resolution, it does depend on the resolution)

4.2 restructure and shorten: suggest:
parameter changes with little impact are:
with high impact …
not analyzed ..

E.g. sentence
Changes in the zooplankton mortality also had little effect on the results, this is the closure term in the model and it is a bit surprising that this term only had a small effect on the model results.

Can be shortened to

Somewhat surprisingly, changes in the zooplankton mortality closure term had little effect on the results.

8415 L 7 Ice front => ice edge ?
L 9 large error => error of what?
L7-14 rephrase, shorten
L 15 severe – clear
L18 showed – shown
L 20 The model is late ??? The spring bloom is simulated late
L 23 What does phyto convection mean
8416 The meaning of the first paragraph is not clear, rephrase
also rephrase L 9-11
Last sentence is unnecessary and can be removed.

Table 2 This table is somewhat confusing
Do the ratios need to be given in mg/mg and mmol/mmol ?? Maybe one conversion info as a table footnote is sufficient >
For several runs two representations are given for pi21, should one be pi23?
For N14 => diatomer – diatoms

Fig 3 fall and autumn refer to the same season :-) I think the first should be spring and summer

Fig 4 If not defined in caption refer to text: Model efficiency (ME, see text)
Fig 3-7 dataset => observations

Fig.8 what does "Data" mean ?