

Figure S1: Relative change (in percent) of the root mean square error of mean sea level pressure induced by the SICE2D-NS, SICE2D-S and SICE2D-NS-CLIM experiments when compared to REF. Negative values mean that the root mean square error is smaller than in REF. a) SICE2D-NS, b) SICE2D-S, c) SICE2D-NS-CLIM.

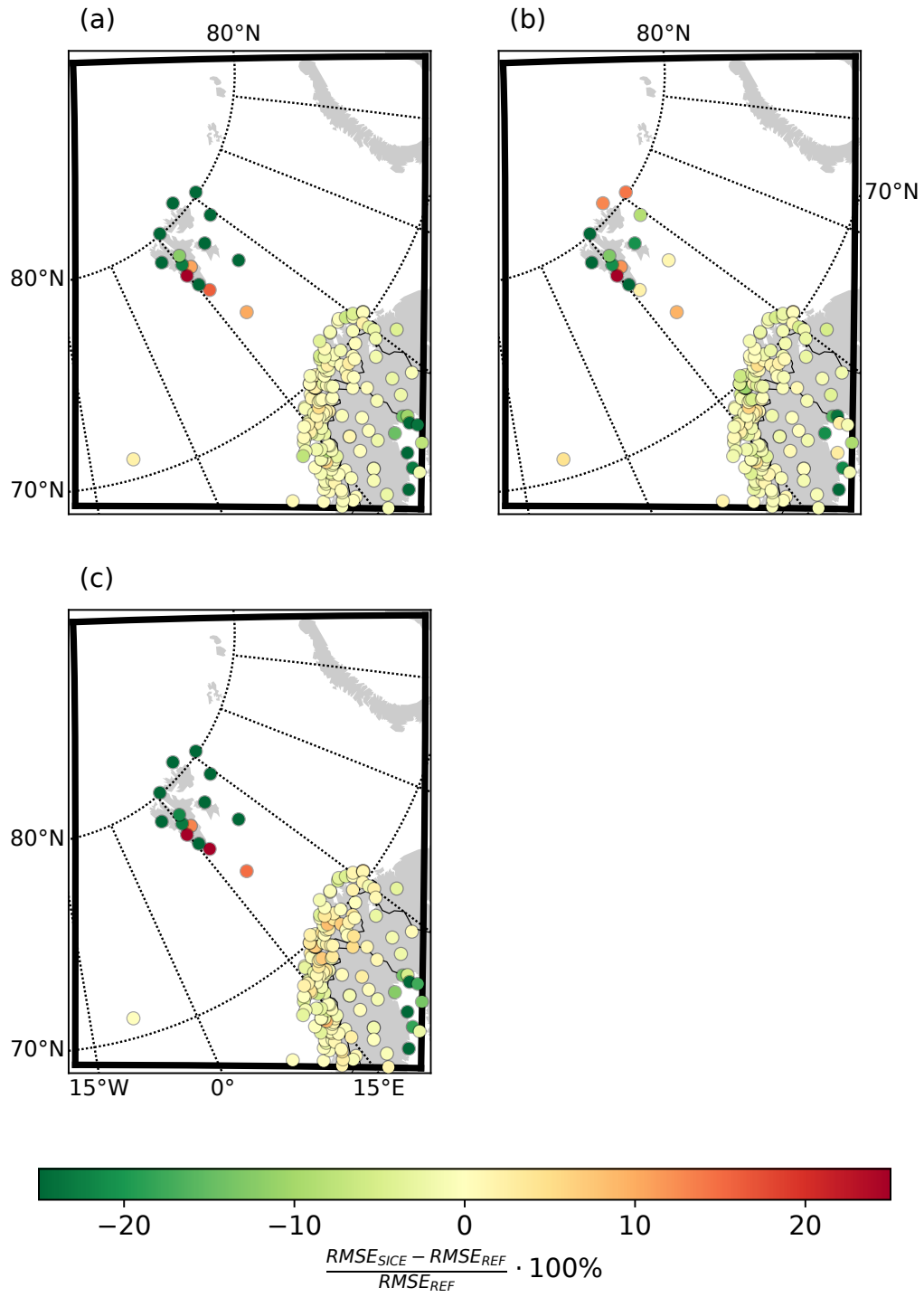


Figure S2: Same as Fig. S1 but for 2 metre temperature.

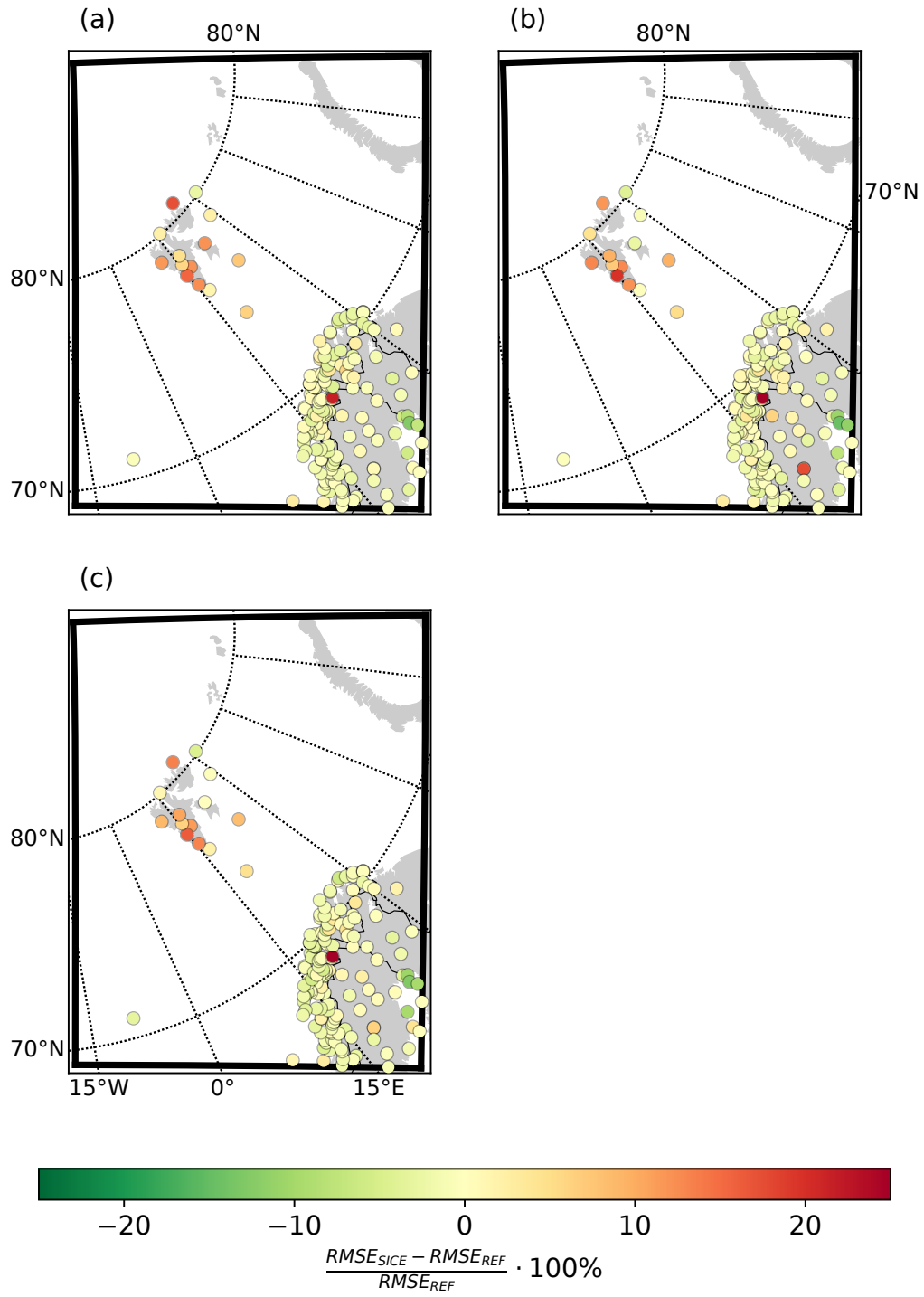


Figure S3: Same as Fig. S1 but for 10 metre wind speed.

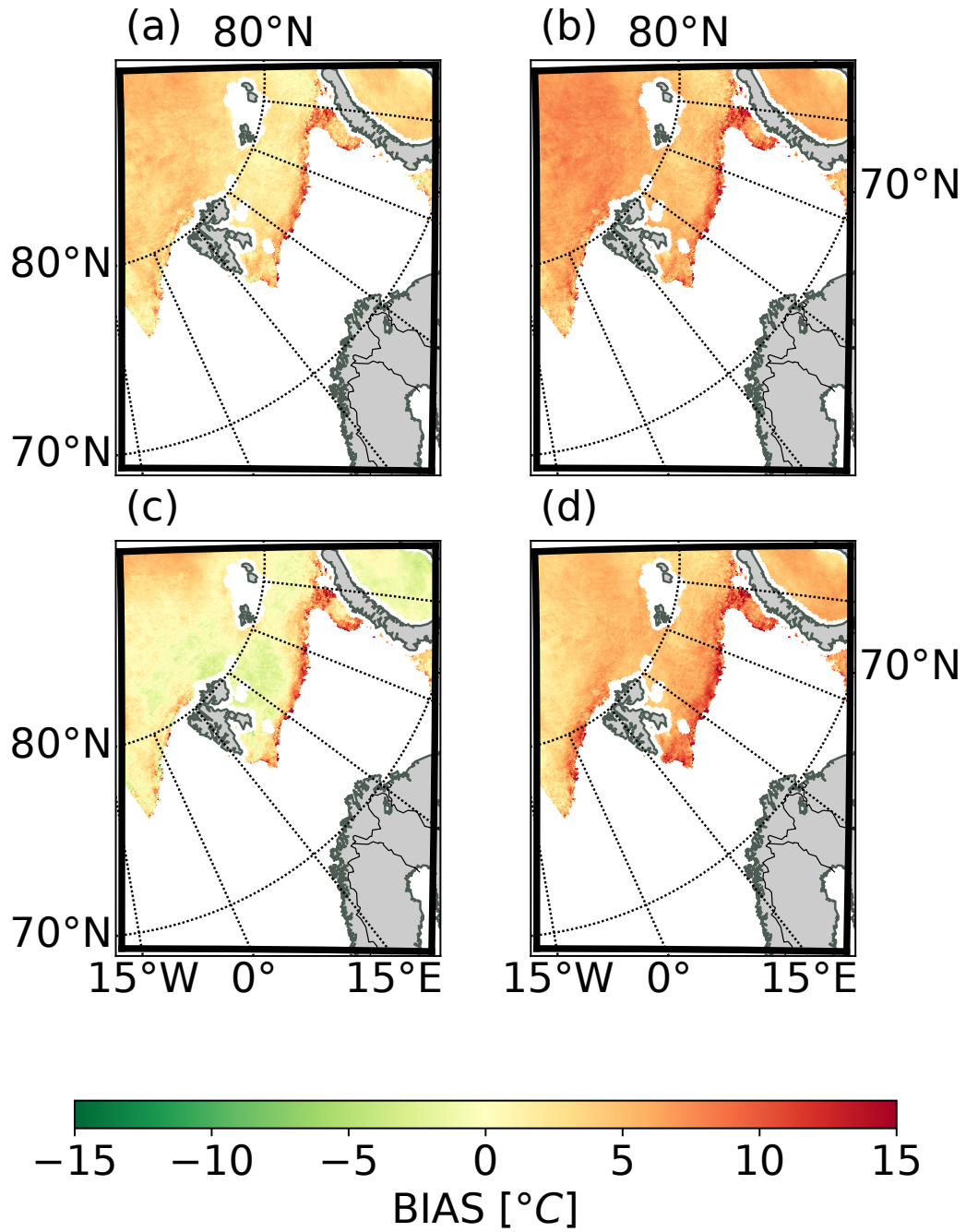


Figure S4: Spatial distribution of the mean error of the ice surface temperature for HARMONIE-AROME experiments REF, SICE2D-NS, SICE2D-S and SICE2D-NS-CLIM after 24 hours of forecast compared to VIIRS ice surface temperature product over the time period from 1 March 2013 to 30 April 2013. The mean error is calculated as the forecasted value minus observed value. a) REF; b) SICE2D-NS; c) SICE2D-S; d) SICE2D-NS-CLIM.

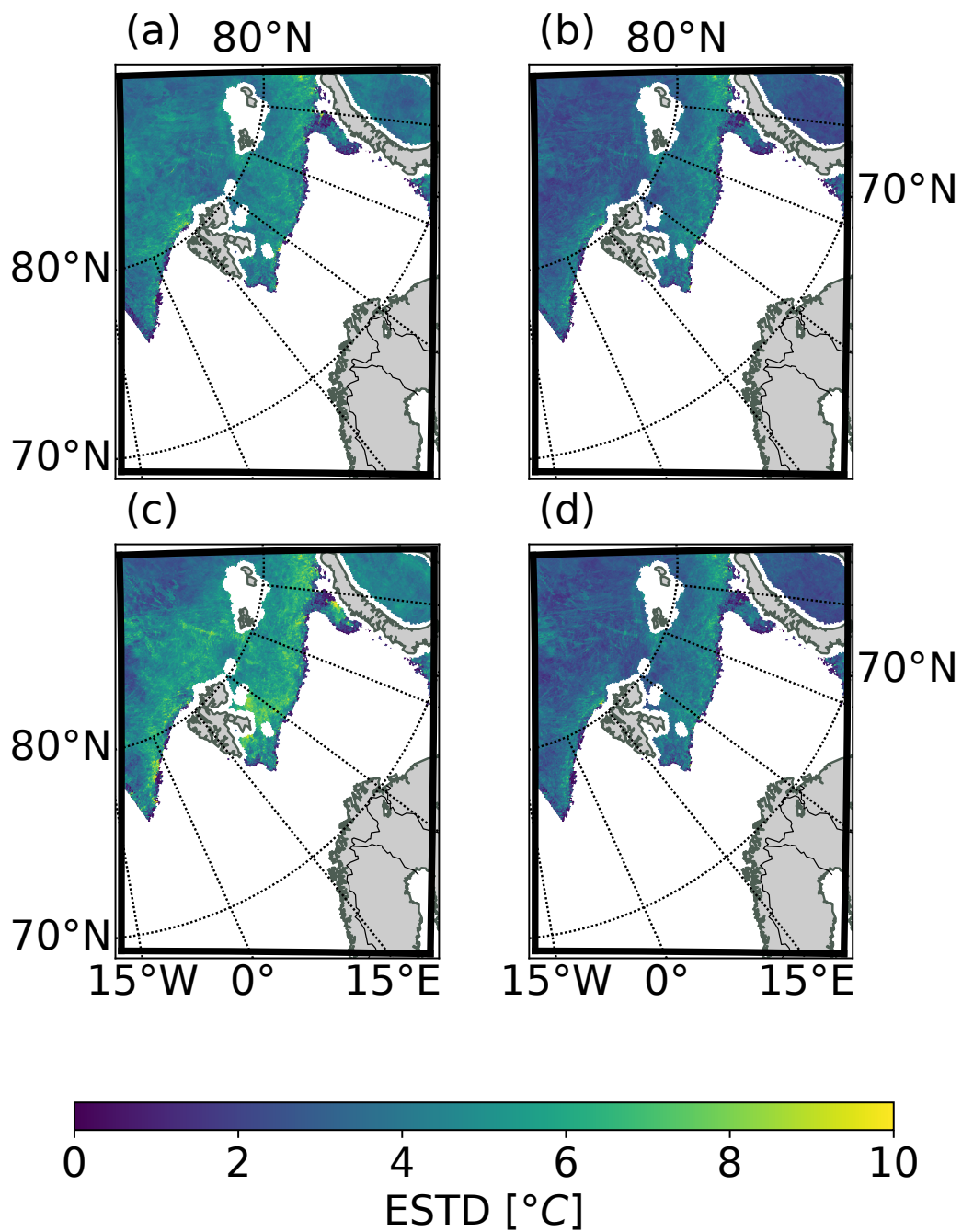


Figure S5: Same as Fig. S1 but showing the spatial distribution of the standard deviation of errors.

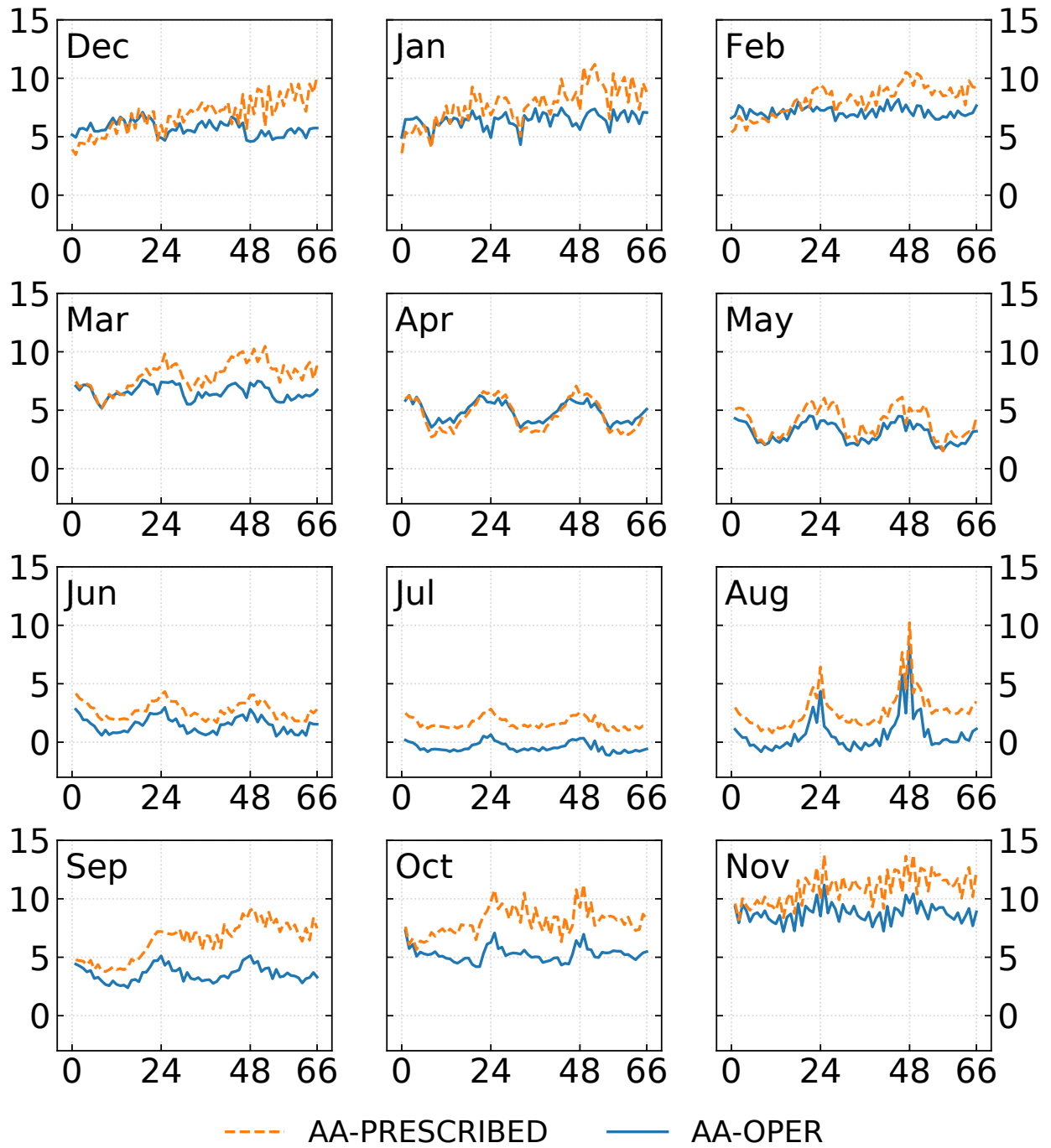


Figure S6: Monthly values of the mean error as a function of lead time for AA-PREScribed and AA-OPER forecasts initialized at 0000 UTC compared to MODIS ice surface temperature product over the time period from 1 December 2015 to 1 December 2016. X-axis – forecast lead time from 0000 UTC (h); Y-axis – ice surface temperature mean error (°C).

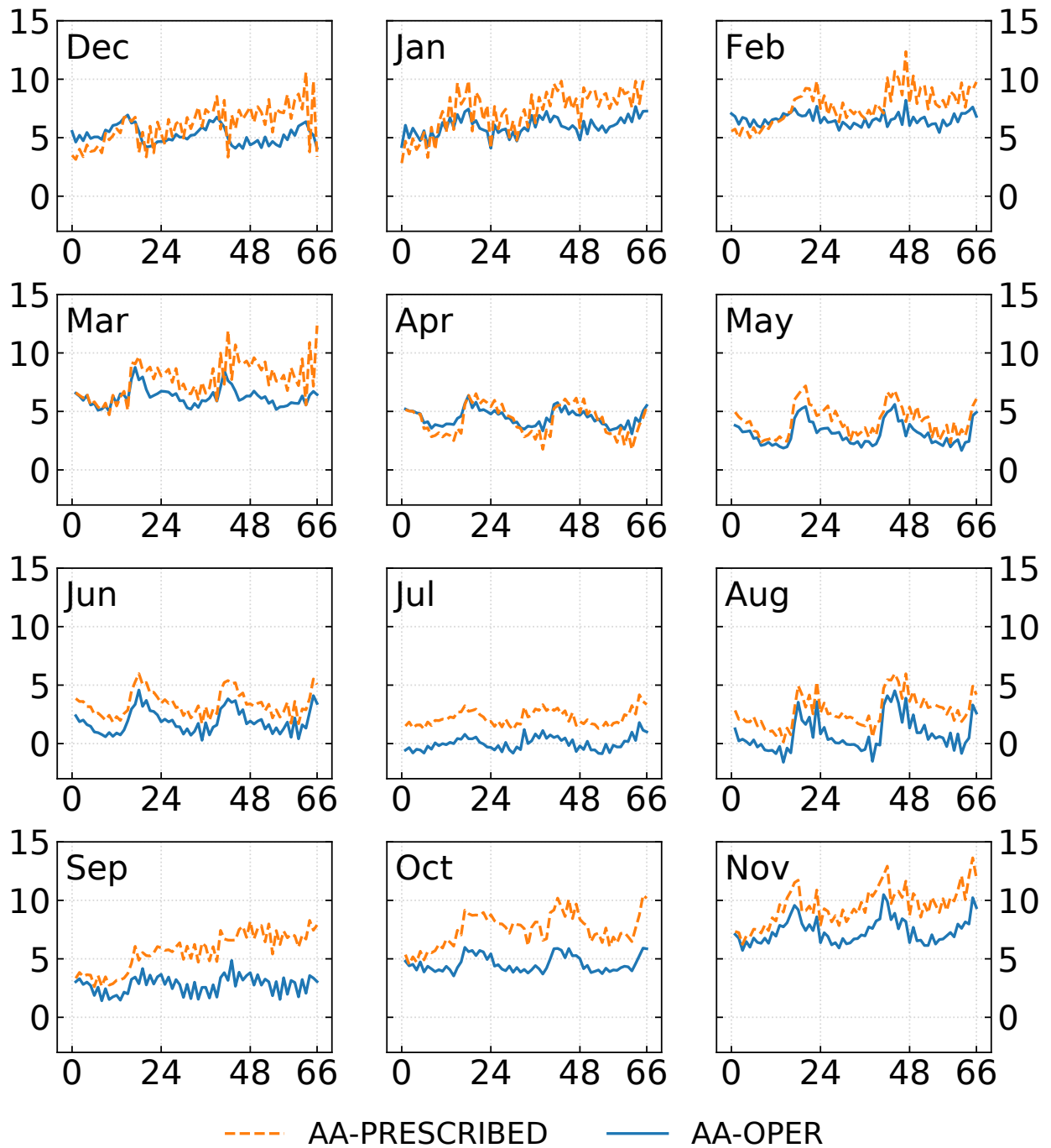


Figure S7: Monthly values of the mean error as a function of lead time for AA-PREScribed and AA-OPER (snow-free SICE configuration) forecasts initialized at 0000 UTC compared to VIIRS ice surface temperature product over the time period from 1 December 2015 to 1 December 2016. X-axis – forecast lead time from 0000 UTC (h); Y-axis – ice surface temperature mean error ($^{\circ}\text{C}$).

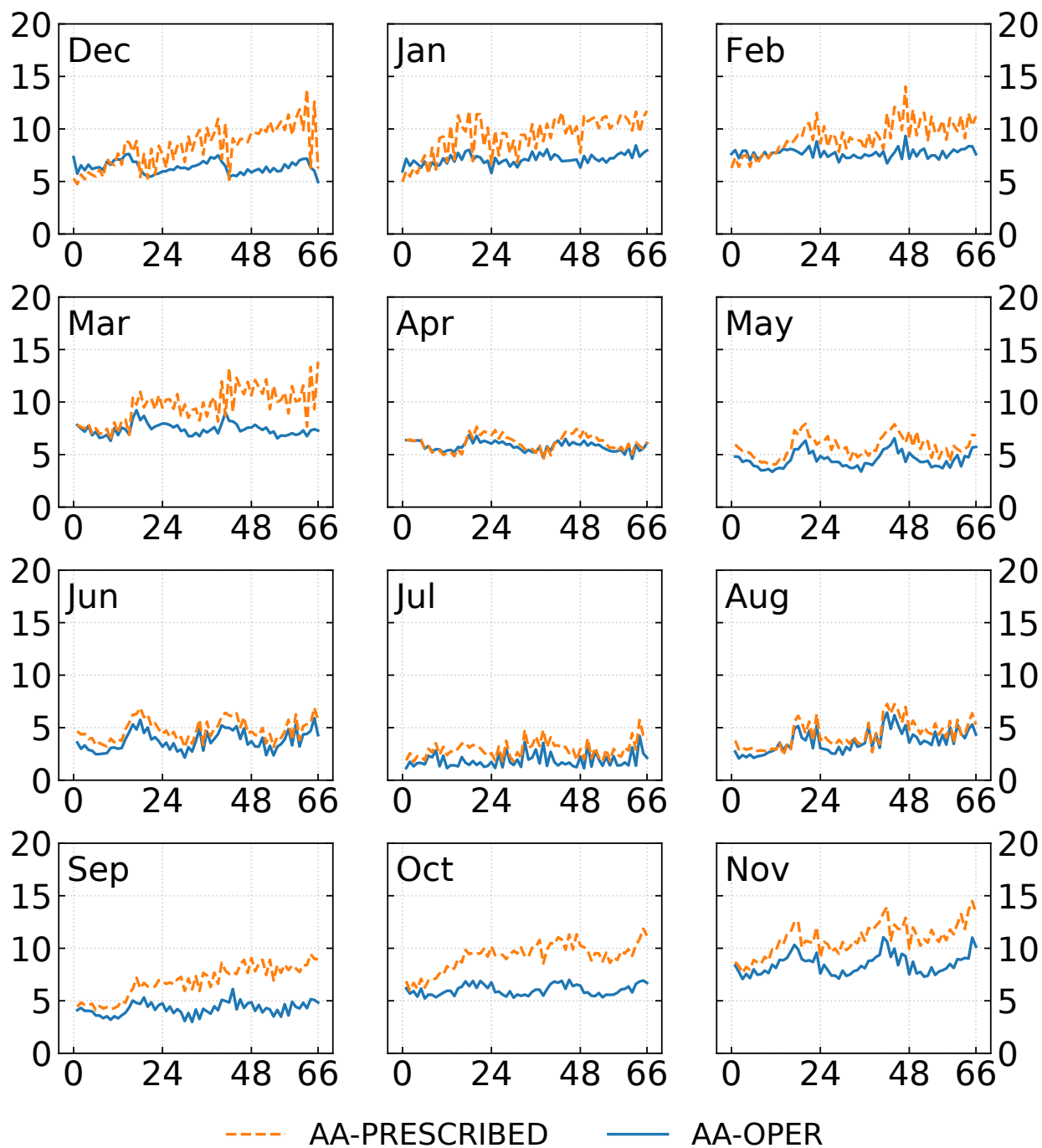


Figure S8: Same as Fig. S7 but showing the root mean square error (RMSE).