Seasonal evolution of surface temperature changes over the Arctic Ocean under global warming in CMIP5 models

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We present some results of Laîné et al. (under review). It consists of a decomposition of multi-model ensemble mean surface temperature changes from 32 CMIP5 models, after 100 years of global warming under the rcp4.5 scenario. The decomposition derives from a surface energy budget analysis from which the radiative part is decomposed based on the radiative kernel method of Soden et al. (2008). The original article is considering different regional domains separately (land and oceanic domains for tropical and different Arctic sub-regions), whereas we present only the results for the Arctic Ocean (North of 60°N, excluding Greenland-Island-Norwegian-Labrador Seas).

We show that many different factors contribute to the Arctic Ocean surface temperature change and its seasonality (Fig. 1).

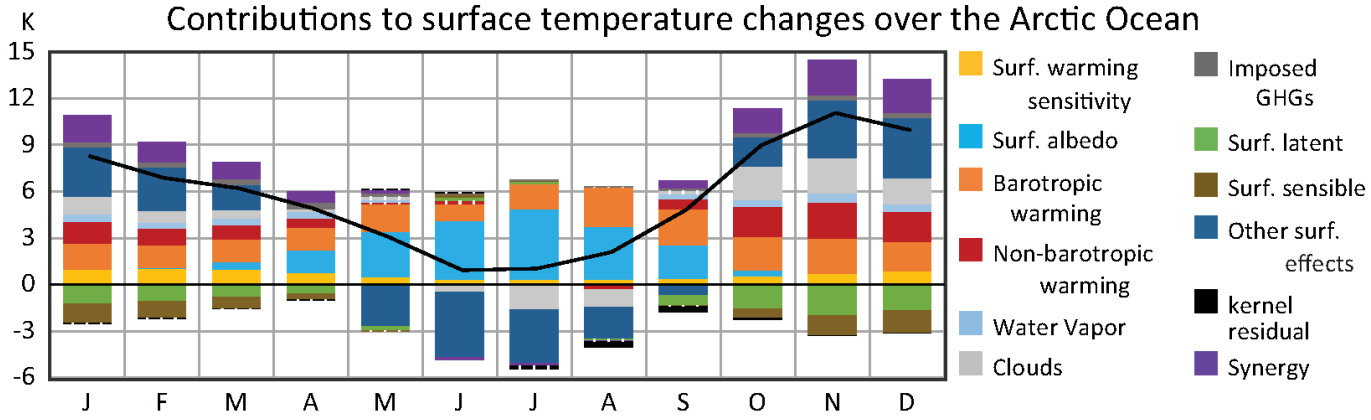

Fig.1: Contributions (color bars) to surface temperature changes (black line) for the Arctic Ocean. Striped bars indicate contributions for which the sign of the ensemble mean is not statistically robust among models.

Going beyond the analysis by Laîné et al. (under review), we show that the next step for better understanding the seasonal evolution of surface temperature changes over the Arctic Ocean would be to perform a similar surface temperature change analysis but for sea-ice and open-ocean portions of the grid cells separately.

References

Laîné A.; Yoshimori M.; Abe-Ouchi A. (under review) Surface Arctic Amplification Factors in CMIP5 Models: Land and Oceanic Surfaces, Seasonality. Submitted to Journal of Climate

Soden B.J.; Held I.M.; Colman R.; Shell K.M.; Kiehl J.T. and Shields C.A. (2008) Quantifying climate feedbacks using radiative kernels. Journal of Climate, 21 (14), 3504-3520