Supplementary Material to

An Integrated Assessment Modeling Framework for Uncertainty Studies in Global and Regional Climate Change: The MIT IGSM-CAM (version 1.0)

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IGSM-CAM Sea Surface Temperatures

In the IGSM-CAM framework, CAM is driven the IGSM sea surface temperature (SST) anomalies instead of the full field because the IGSM SSTs exhibit significant regional biases, mainly associated with the coupling of the ocean model to a two-dimensional, zonal-mean atmosphere. Figure S1 shows the differences between the IGSM SST and the merged Hadley-OI SST observational dataset (Hurrell et al., 2008) for winter and summer over three different decades. It reveals that the bias differs between seasons but that it is fairly constant over the last 110 years. This means that the seasonal cycle of the IGSM SSTs is biased but that the anomalies from, for example, pre-industrial era agree well with the observations. In order to correct the IGSM SST seasonal cycle and to provide more realistic SSTs to the three-dimensional atmosphere, CAM is driven by IGSM SST anomalies from a control simulation corresponding to pre-industrial forcing with an observed 12-month SST climatology corresponding to pre-industrial observed seasonal cycle. The dataset used in this study is the merged Hadley-OI sea surface temperature, a surface boundary dataset designed for uncoupled simulations with CAM, consisting of a merged product based on the monthly mean Hadley Centre SST dataset version 1 (HadISST1) and version 2 of the National Oceanic and Atmospheric Administration (NOAA) weekly Optimum Interpolation (OI) SST analysis.
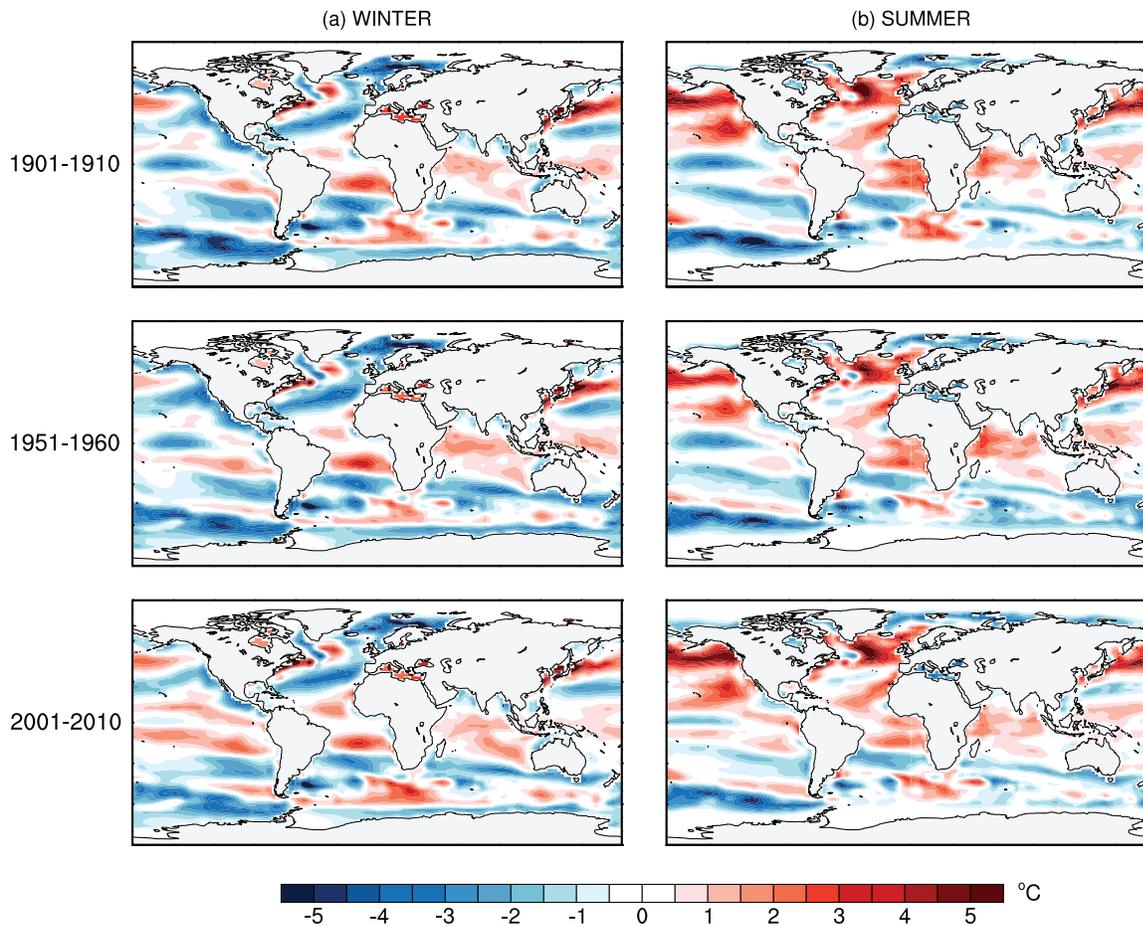
Fig. S1. Decadal mean differences between the IGSM sea surface temperature and the merged Hadley-OI sea surface temperature observational dataset for (a) winter and (b) summer over the 1901-1910, 1951-1960 and 2001-2010 periods.

Reference

Hurrell JW, Hack JJ, Shea D, Caron JM, Rosinski J (2008) A new sea surface temperature and sea ice boundary dataset for the Community Atmosphere Model. J Climate 21(19):5145–5153, DOI 10.1175/2008JCLI2292.1