*General Introduction*

**This is the data for an article that will be submitted to Geophysical Research Letters, named “The impact of sea-ice loss on Arctic climate feedbacks and their role for Arctic amplification.”** The simulations used here were taken from and described by Dai et al. (2019) and Dai & Song (2020). We used the Community Earth System Model, version 1 (CESM1) with the Community Atmosphere Model, version 4 (CAM4) available from the National Center for Atmospheric Research (NCAR). The atmospheric model was run with 2.5° lon × ~2.0° lat spacing with 26 vertical levels, and the sea-ice and ocean models were run with ~1.0° lon × 0.5° lat spacing. In the control experiment (CTL), CO2 levels were held constant at 284.7 ppmv. To analyze the influence of sea-ice loss on Arctic climate feedbacks, we ran two transient CESM1 simulations. The first simulation involves 1%/year increases in the atmospheric CO2 concentration, with fully-coupled, dynamic Arctic sea ice (referred to as 1%CO2). The second simulation is the same as the 1%CO2 run, except that CTL-derived fixed sea-ice fraction (instead of internally calculated ice fraction) is used to compute ice and water fractions in calculations of the grid-box mean values for the ice-atmosphere, ocean-atmosphere, and ice-ocean energy, momentum, and mass fluxes poleward of 30°N (referred to as FixedIce). The difference between the 1%CO2 and FixedIce experiments represents the impact of sea-ice loss on Arctic amplification and local Arctic climate feedbacks under positive radiative forcing.

*Description of this dataset*

“1pctCO2” represents the 1%CO2 experiment, “fixIce” represents the FixedIce experiment, and “piControl” represents the CTL climatology. The data in the included files are grouped and averaged by month.

*References*

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