

Multi-decadal Variability of Sea Ice from CMIP6 Experiment by MRI-ESM2

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Sea ice could vary in long-term affected by some climate internal variability or external forcing. But, it has not been made abundantly clear now. The relationships among sea ice variability, climate internal variability and external forcing are under discussion. The purpose of this study is to clear the relationships from CMIP6 experiments.

We conducted the CMIP6 experiments including pre-industrial control(CNTL) run and historical runs using MRI-ESM2. The resolutions of the atmospheric model are 1.125 degree in horizontal direction and 80 vertical layers (TL159L80). The ocean model used MRI-COM4.4, and which resolutions are 0.3-0.5 degree in meridional direction, 1 degree in zonal direction and 61 vertical layers.

The CNTL indicates the multi-decadal variability in the temperature and the sea ice extent. The Arctic amplification occurs once or three times per century, indicating the relatively lower sea ice extent. An amplitude of temperature changes in the Arctic reaches 1 degree C and a range of sea ice variation is 1,000,000 km².

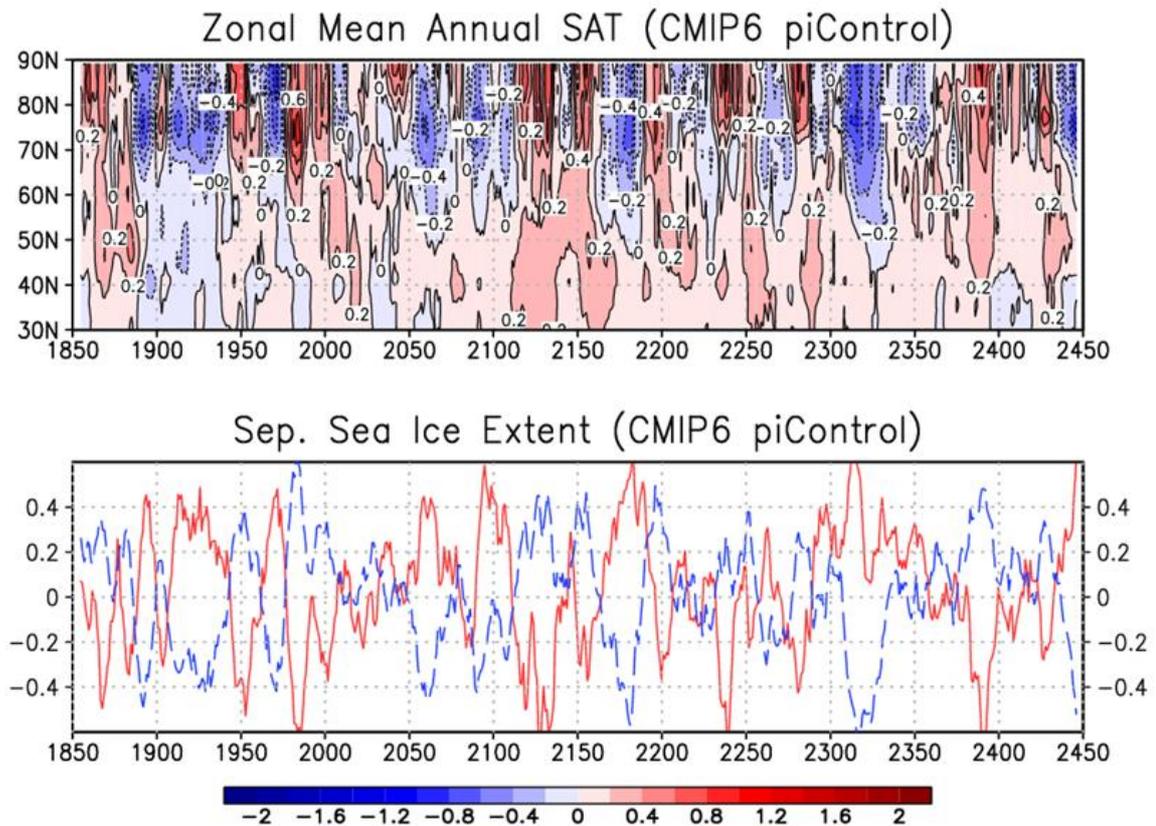


Figure 1. 10 year sunning mean zonal mean zonal surface temperature (degree C) in CNTL run (upper panel). 10 year running mean Arctic temperature anomaly (dashed line, degree C) and 10 year running mean september sea ice extent anomaly (solid line, 10⁶ km²) in CNTL run (lower panel). The climate averaged from 1901 to 2000.