Geophysical Research Abstracts
Vol. 18, EGU2016-3502, 2016
EGU General Assembly 2016

Sea Ice Trends in the AO-UMUKCA model: Interplay of Forcing and Internal Variability

Amna Jrrar (1), Luke Abraham (2,3), David Holland (1,4), John Pyle (2,3)

(1) Center for Global Sea Level Change, NYUAD Institute, NYU Abu Dhabi, United Arab Emirates (amna.jrrar@gmail.com), (2) Centre for Atmospheric Science, Chemistry Department, University of Cambridge, UK, (3) NCAS-Climate, University of Cambridge, UK, (4) EFDL, New York University, New York

While Arctic Sea is showing a declining trend particularly in summer. Antarctic sea is showing a modest increase, a very controversial observation in a warming climate. Several studies have attributed these changes to internal variability.
Hence in this paper we investigate sea ice trends in both hemispheres as simulated in a version of the Atmosphere-Ocean coupled chemistry climate model AO-UMUKCA under two different atmospheric forcing scenarios.
One simulation is a pre-industrial control, where atmospheric forcing is fixed at 1850 level. The second simulation is also a time slice experiment but forced with the year 2000 atmospheric forcing (TS2000).
The model simulates a significant reduction in NH Sea Ice Extent (SIE) under the TS2000 scenario, but shows negligible difference in SH SIE between the two scenarios.
In agreement with observational studies, we find that NH SIE and distribution are connected to the Arctic Oscillation and the Dipole Anomaly in both simulations, particularly in summer time. While SH winter SIE shows a high correlation with zonal wave-3 pattern and the Pacific South American mode, particularly in TS2000.
Connections between SIE and oceanic modes of variability in both hemispheres are also detected. Total NH SIE shows significant correlation with Atlantic Multidecadal Oscillation (AMO) on interannual and decadal timescales, but shows significant correlation with the Inter Pacific Decadal Oscillation (IPO) on multi-decadal timescale only. However, total SH SIE shows significant correlation only with IPO on decadal and multi-decadal scales. The SIE response to oceanic modes is comparable in both simulations.