

Understanding the multidecadal Northern Hemisphere climate variability from the perspective of Damped Stratosphere/Troposphere/Atlantic-Ocean coupled Oscillation.

*Nour-Eddine Omrani¹, Noel Keenlyside¹, Katja Matthes², Davide Zanchettin³, Johann Jungclauss⁴

1. Geophysical Institute, University of Bergen, and Bjerknes Center for Climate Research, Bergen, Norway, 2. Research Division Ocean Circulation and Climate, GEOMAR Helmholtz Centre for Ocean Research, Kiel, Germany., 3. Department of Environmental Sciences, Informatics and Statistics, University of Venice, Venice, Italy, 4. Ocean in the Earth System Department, Max Planck Institute for Meteorology, Hamburg, Germany

The Northern Hemisphere climate has shown several multidecadal trends. These trends include large scale North Atlantic warming seen in the last half of last century, shift of the wintertime NAO (or NAM) towards positive phase between 1960s and 1990s, polar stratospheric cooling and Arctic sea ice melting. Here we show using observational and long term model simulations that the most of these multidecadal climate trends can be understood in the framework of delayed coupled oscillatory mode between the stratosphere/troposphere coupled system and ocean. The mechanisms and the processes controlling this mode and the associated fluctuations in different climate components will be presented.

Keywords: Atlantic Multidecadal Variability (AMV and AMO), Stratosphere/troposphere coupling, Northern Annular Mode (NAM) and North Atlantic Oscillation (NAO), Arctic sea ice, Atlantic Meridional Overturning Circulation (AMOC)