EMS Annual Meeting Abstracts
Vol. 16, EMS2019-150-1, 2019

Atlantic Multidecadal Variability and North Atlantic storm track

Paolo Ruggieri (1), Alessio Bellucci (1), Dario Nicolì (1), Panos Athanasiadis (1), Christophe Cassou (9), Frederic Castruccio (10), Gokhan Danabasoglu (10), Paolo Davini (2), Guillaume Gastineau (3), Jens Grieger (4), Ben Harvey (5), Dan Hodson (5), Christopher O'reilly (6), Belen Rodriguez-Fonseca (7), Yohan Ruprich-Robert (8), Emilia Sanchez Gomez (9), Rowan Sutton (5), and Simon Wild (8)

(1) CMCC, CSP division, Bologna, Italy (paolo.ruggieri@cmcc.it), (9) CERFACS [Toulouse] (France), (10) National Center for Atmospheric Research (United States), (2) CNR Institute of Atmospheric Sciences and Climate (Italy), (3) Laboratoire d'Océanographie et du Climat : Expérimentations et Approches Numériques (France), (4) Institut für Meteorologie Wissenschaftlicher Mitarbeiter (Germany), (5) National Centre for Atmospheric Science (Reading) (United Kingdom), (6) University of Oxford [Oxford] (United Kingdom), (7) Universidad Complutense de Madrid, Dpto de Fisica de la Tierra y Astrofisica (Spain), (8) Barcelona Supercomputing Center - Centro Nacional de Supercomputacion (Spain)

The influence of the Atlantic Multidecadal Variability (AMV) on the North Atlantic storm track and related impacts on the European climate are assessed via a coordinated analysis of idealised simulations with state-of-the-art coupled models. The rationale for the approach is that the modulation of sea surface temperature by the AMV modifies temperature gradient and land-sea thermal contrast in the core of the Atlantic extratropical storm track region. Consequent changes of the growth of eddies and their propagation can lead to modifications of the mean position and speed of the low-level jet.
The data used are obtained from a multi-model ensemble of AMV$\pm$ experiments conducted under the framework of the Decadal Climate Prediction Project component C (DCPP-C). These experiments are performed nudging the surface of the Atlantic ocean (temperature and salinity) to states defined by imposing observed (ERSST) AMV$\pm$ anomalies onto the respective model climatology.
The focus of the analysis is on the AMV-driven modifications to high frequency atmospheric eddies and their feedback on the mean flow. The signature of these dynamical changes on anomalous temperature and precipitation over Europe is also inspected. Most model experiments indicate an equatorward shift of the jet and of the transient eddy kinetic energy and a deceleration of the jet by the transient eddies in response to AMV+. A robust finding is the reduction of the meridional heat flux (v'T') in the region of strong baroclinicity.
The analysis will shed light on a potential combination of dynamical (jet displacement) and thermodynamic (advection of thermal anomalies) AMV impacts on Europe. The potential outcome of this analysis is informative of the processes generating uncertainty of impacts in the multi-model DCPP-C framework.