



Tropical-Extratropical teleconnections in present and future climate: sensitivity to model resolution and stochastic parameterizations.

Susanna Corti (1), Paolo Davini (2,3), and Jost von Hardenberg (3)

(1) Institute of Atmospheric Sciences and Climate, National Research Council (ISAC-CNR), Bologna, Italy
(s.corti@isac.cnr.it), (2) Laboratoire de Météorologie Dynamique / IPSL, Ecole Normale Supérieure, Paris, France
(pdavini@lmd.ens.fr), (3) Institute of Atmospheric Sciences and Climate, National Research Council (ISAC-CNR), Torino, Italy (j.vonhardenberg@isac.cnr.it)

In this study we assess the impact of model resolution and stochastic parameterisations on the simulation of tropical-extratropical teleconnections. We present results from a large set of climate simulations carried out with the EC-Earth model in the framework of the Climate SPHINX project (Stochastic Physics High resolution eXperiments <http://www.to.isac.cnr.it/sphinx/>). Climate SPHINX includes atmosphere-only simulations grouped into three main blocks: (i) Present-day Atmosphere-only simulations (PDA) forced with observed SSTs (HADISST2.1.1 dataset), (ii) Future Scenario Atmosphere-only (FSA) forced by synthetic SSTs constructed following Mizuta et al. (2008) methodology; (iii) Past-to-Future coupled simulations.

PDA and FSA have been run at five different horizontal resolutions (from 125 to 16 km) and with the number of ensemble members decreasing with increasing resolution (20 to 2). PFC simulations (6 ensemble members) are run at 80km in the atmosphere and 1 degree in the ocean. For each resolution, half of the ensemble members have the stochastic physics parameterisations activated.

The atmosphere-only experiments extend for 30 consecutive years, from 1979 up to 2008 for PDA, while FSA experiments are run from 2039 up to 2068 and the PFC from 1850 up to 2100. Greenhouse gases (GHGs) and ozone concentrations as well as volcanic aerosol are set according to the CMIP5 Historical forcing and the RCP8.5 scenario.

Reference

Mizuta, R., Adachi, Y., Yukimoto, S., and Kusunoki, S.: Estimation of future distribution of sea surface temperature and sea ice using CMIP330multi-model ensemble mean, Technical Report of the Meteorological Research Institute, p. 28pp, 2008