EGU2020-4045
https://doi.org/10.5194/egusphere-egu2020-4045
EGU General Assembly 2020

On the dependency of simulated volcanically-forced variability to model configuration

Claudia Timmreck[1], Matthew Toohey[2], and Davide Zanchettin[3]
[1]Max-Planck-Institut für Meteorologie, Hamburg, Germany (claudia.timmreck@mpimet.mpg.de)
[2]University of Saskatchewan, Saskatoon Canada
[3]University Ca' Foscari of Venice, Mestre, Italy

Several uncertainties affect the simulation of the climatic response to strong volcanic forcing by coupled climate models, which primarily stem from model specificities and intrinsic variability. To better understand the relative contribution of both sources of uncertainties, the Model Intercomparison Project on the climatic response to Volcanic forcing (VolMIP) has been initiated as part of the CMIP6 protocol. VolMIP has defined a coordinated set of idealized volcanic perturbation experiments with prescription of the same volcanic forcing and coherent sampling of initial conditions to be performed to the different participating coupled climate models. However, as the VolMIP effort focuses on comparison across different models, an open question remains about how different configurations of the same model affect the comparability of results.

Here, we present first results of CMIP6 VolMIP simulations performed with the MPIESM1.2 in two resolutions. The low resolution (LR) configuration employs an atmospheric resolution of T63 (~200 km), and nominal ocean resolution of 1.5°. The high resolution (HR) configuration employs twice of the horizontal resolution of its atmospheric component (T127 ~100 km) with a spontaneously generated QBO, and an eddy-permitting ocean resolution of 0.4°.

In this contribution we illustrate results from the volc-pinatubo experiments, which focus on the assessment of uncertainty in the seasonal-to-interannual climatic response to an idealized 1991 Pinatubo-like eruption, and from the volc-long experiments, which are designed to investigate the long-term dynamical climate response to volcanic eruptions. We compare responses of different climate variables, e.g. near-surface air temperature, precipitation and sea ice on global and regional scale. Special emphasis will be placed on the volcanic impact on the tropical hydrological cycle.