WRF forecast sensitivity to spatial resolution

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The Weather Research and Forecasting (WRF) model dynamically downscales NCEP FNL Operational Global Analysis data in order to assess the grid size resolution effect on the simulated variables. Simulations were conducted over Europe for the year 2015 using 36km, 12km and 4km grid size resolutions. The sensitivity analysis assesses the grid size resolution effect on the simulated mean, maximum and minimum daily temperatures as well as precipitation. The simulated data are evaluated using reanalysis dataset. The statistical variables used are the bias, mean absolute error, root mean square error and the index of agreement for each grid cell. Results show that model performance for mean and maximum temperature, is better when increasing the spatial resolution from 36Km to 12Km but no significant change is found when the spatial resolution is further increased to 4Km, in general. In addition, model performance for minimum temperatures and precipitation does not change significantly when moving to higher spatial resolution grids (i.e., 12Km and 4Km) compared to the 36Km domain.

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