



EC-EARTH: an Earth System Model based on the ECWMF Integrated Forecasting System

F. Selten (1), R. Bintanja (1), S. Yang (2), C. Severijns (1), T. Semmler (3), K. Wyser (4), X. Wang (1), and W. Hazeleger (1)

(1) Global Climate Division, Royal Netherlands Meteorological Institute, De Bilt, Netherlands (selten@knmi.nl), (2) Danish Climate Centre, Danish Meteorological Institute, Copenhagen, Denmark, (3) Met Éireann, Dublin, Ireland, (4) Rossby Centre, Swedish Meteorological and Hydrological Institute, Norrköping, Sweden

EC-EARTH is the name of an Earth system model that is being developed by a number of institutes in Europe. It is based on the Integrated Forecast System of the European Centre for Medium Range Weather Forecasts (ECWMF). The ECMWF model delivers the best weather forecasts in the world by an objective measure. However, when applied to climate time scales, the performance is not better than the state-of-art climate models by an objective metrics.

In the Numerical Weather Prediction version, the top of the atmosphere fluxes (TOA) are not balanced with observed sea surface temperatures as a lower boundary condition. After consultation of experts at ECMWF, a set of parameters was identified that could be used to reduce the model biases and close the TOA heat budget. We describe a set of tuning experiments and show the subsequent improvements in the simulated climate by an objective metrics. The adjusted model at T159L62 resolution coupled to the NEMO2/ORCA1 ocean model outperforms the mean CMIP3 model using this metrics. Additional transient integrations show the extent to which 'fast processes' contribute to the errors in the mean state and variance.