

International conference on regional climate CORDEX2016

Report on parallel session A1 “Added Value of Downscaling”, 09:00-11:45, May 18^h

Chair - **G. Nikulin and J. Sanjay**; Rapporteur - **G. Nikulin**

Rene Laprise. A review of the challenges in identifying RCM’ added value has shown that still the added value has no unique definition and depends on many factors (e.g. time scale, variables). Often it’s hard to verify the added values with observations (a few high-resolution observational data sets) and additionally is difficult to identify it in climatological fields (time averaging removes fine scales). An ensemble of CRCM5 simulations (50, 25 and 12km) shows the added value in a number of specific weather processes over North America, among them: wind in the Gulf of Saint Lawrence, snowbelts around the Great Lakes, orographic precipitation and snow in the Rockies.

Silvina Soman. In South America, at interannual timescales the remote forcing is GCM dependent and RCMs cannot improve the GCM representation of the main modes of variability. At the intraseasonal timescales the main pattern of variability is associated with regional circulations, well reproduced by both GCMs and RCMs. However, the added value is found at synoptic time scales where RCMs outperform their driving GCMs when the rainfall variability features are associated to smaller scale processes like extremes.

Alejandro Di Luca. Using two added value metrics (mean square error - MSE and spatial correlation), it’s shown that the overall performance of RCMs in Australia is generally superior compared with the corresponding driving GCM data. Although many factors (season, region, scale, RCM etc.) influence the added value, the AV of MSEs is dominated by the large scale term while the AV of spatial correlations is dominated by the small scale term.

Pinghouinde Michel Nikiema. The improved performance of the CORDEX-Africa RCMs in comparison with GCMs in West Africa is not obvious and does not occur everywhere for all variables and timescales. Although, for temperature the CORDEX RCMs exhibit larger cold temperature biases compared to the CMIP5 GCMs, for precipitation the RCM ensemble simulates a better spatial distribution, smaller biases and more fine-scale details. Additional analysis of principal components of different modes of variability reveals that the CORDEX RCMs mostly follow the CMIP5 GCM ensemble.

Bedassa Regassa Cheneka. Two categories of the added value are defined, namely: “real added value” when used with respect to observed data and “potential added value” by aggregating the model output into a coarse regional climate model. These categories are applied to a downscaling of a MPI-ESM seasonal hindcast by COSMO-CLM over eastern Africa. Potential added value is highly valuable over highland areas while the real added value is more seen over the lowland areas compared with the highlands area.

Filippo Giorgi. The added value of RCM downscaling over the Alpine region is presented using the Euro and Med CORDEX RCMs ensembles. The RCMs show a good performance in the reference period, consistency with observed trends and the AV compared to the driving GCMs. The RCMs also show the AV in the simulation of climate change signals. For future climate projections RCMs provide multiple lines of evidence pointing to an increase of summer precipitation over the mountainous regions of the European Alps under global warming, even with general drying of the region projected by GCMs. There is good RCM agreement in the mesoscale signal and a plausible driving underlying process: increased instability and convection.

Cheng-Ta Chen. A RCM is used to explore the AV of regional downscaling in tropical cyclone activities over the North-West Pacific for the recent/past climate and also for future climate projections.

Melissa Bukovsky. The North America-CORDEX and NARCCAP RCM simulations are used to search for the AV in both ensembles and also to highlight differences between them. Focus is on precipitation and the local processes and phenomena that govern its distribution and intensity across the North America Monsoon region. The AV of the RCM simulations is found at higher resolution (25 vs 50 km), for example distribution of precipitation and low-level flow in southwest US.

Ana Casanueva. A large ensemble of Euro-CORDEX simulations at two resolutions (12 and 50km) indicates the AV of the 12km simulations over Spain and Alps in spatial patterns of precipitation when metrics as spatial correlation and RMSM are used. Applying bias correction to both the 12 and 50km simulations does not provide significant AV of hi-res simulations. Comparing of RCMs and ESD results is not fair if percentiles and intensity depended indicators are used (both have close relationship to the mean and usually affected by the method calibration) but non-optimized parameters such dry spells for example.