DKT Abstracts
DKT-10-129, 2015
10. Deutsche Klimatagung

Correcting bias and variance of sea surface temperatures for use in downscaling

P. Hoffmann (1,2), J.J. Katzfey (2), K.C. Nguyen (2), J.L. McGregor (2), and M. Thatcher ()

(1) Universität Hamburg, Fachbereich Mathematik, Germany (peter.hoffmann@uni-hamburg.de), (2) CSIRO, Ocean and Atmosphere, Aspendale, Victoria, Australia

Bias correction is a widely used method to deal with the deficiencies of climate models in representing the current climate. While it is often applied to prepare the output of the global or regional climate models (GCMs/RCMs) for climate impact assessment, it is also used recently to correct the GCM output before it is downscaled by the RCMs. For most RCMs, 3D atmospheric fields as well as sea surface temperatures (SSTs) should be corrected in order to create forcing fields. However it is difficult to keep all fields physically consistent after the correction. The Conformal-Cubic Atmospheric Model (CCAM), a global stretched-grid RCM, is able to run with SST-only forcing. Therefore, only the monthly SSTs, obtained from the GCM, need to be corrected, simplifying the technique. In previous studies, a simple bias correction was applied to the SSTs for climate projections conducted with CCAM, removing just the climatological bias, while the bias in the temporal variability was still present. Since the latter is important for the tropics where the climate is largely influenced by interseasonal and interannual ocean-atmosphere interactions such as El-Nino Southern Oscillation (ENSO), different methods of bias correction were tested, including application of a correction to both the mean and the interannual variance. Modifications are made to the method to account for problems arising in regions with large SST gradients and near the ice edges. Results suggest that the simple correction of the mean and variance gives similar patterns of change between the corrected and uncorrected SSTs.

A series of sensitivity studies was conducted by running CCAM globally at 100 km resolution forced by the mean and variance bias-corrected SSTs; the mean bias-corrected SST only; and SSTs without any bias correction. A description of the new bias correction method and the comparison of the CCAM results obtained in the sensitivity studies will be presented with a focus on rainfall.