Geophysical Research Abstracts
Vol. 17, EGU2015-11688, 2015
EGU General Assembly 2015

The representation of location by regional climate models in complex terrain

Douglas Maraun (1) and Martin Widmann (2)

(1) GEOMAR Helmholtz Centre for Ocean Research, Ocean Circulation and Climate Dynamics, Kiel, Germany (dmaraun@geomar.de), (2) School of Geography, Earth and Environmental Sciences, University of Birmingham, United Kingdom

To assess potential impacts of climate change for a specific location, one typically employs climate model simulations at the grid box corresponding to the same geographical location. But based on regional climate model simulations, we show that simulated climate might be systematically displaced compared to bservations. In particular in the rain shadow of moutain ranges, a local grid box is therefore often not representative of observed climate: the simulated windward weather does not flow far enough across the mountains; local grid boxes experience the wrong airmasses and atmospheric circulation. In some cases, also the local climate change signal is deteriorated. Classical bias correction methods fail to correct these location errors. Often, however, a distant simulated time series is representative of the considered observed precipitation, such that a non-local bias correction is possible. We illustrate the problem based on regional climate model simulations for Europe. Especially over complex topography such as the rain shadow of the Alps, local grid-box values often do not represent observed climate. A non-local bias correction, for the Alps based on simulated data from the windward side of the main mountain ridge, considerably improves the representation. These findings also clarify limitations of bias correcting global model errors, and of bias correction against station data.