EMS Annual Meeting Abstracts
Vol. 16, EMS2019-478, 2019

Representation of climate variability and extremes in reanalyses - an intercomparison

Jan Keller (1,2) and Andreas Hense (3)

(1) Hans-Ertel-Centre for Weather Research, Climate Monitoring and Diagnostics, Germany, (2) Deutscher Wetterdienst (DWD), Offenbach, Germany, (3) Institute for Geosciences and Meteorology, University of Bonn, Germany

The assessment of climate variability and the probability of associated weather extremes are a key issue in the development of adaption strategies to encounter the effects of climate change. It is therefore important to provide comprehensive data sets which allow for monitoring regional climate also in areas where no in situ measurements are available. The sparseness of point-based observations are becoming particularly evident when investigating high-impact weather events and extremes as these often occur at of have impact on smaller scales. Gridded data sets originating from mere interpolation are prone to errors and up to now do not use multivariate approaches to cover several parameters at once. In this regard, reanalysis data sets constitute a valuable source of information on past weather. Over the last decade, these data have become an integral part of the analyses of climate and its extremes for scientists in various disciplines.

In order to assess the value of reanalyses with respect to representing climate variability and extremes, we compare the performance of several global and regional reanalysis data sets for the European continent. Our approach focuses on different high-impact weather scenarios in which extreme weather poses a risk to public safety and well-being such as draughts, heat and cold waves as well as heavy precipitation events. We therefore calculate climate indices for these climate extremes separately from each reanalysis data set as well as from observations for a period covering the last decades. The reanalysis estimates are then evaluated against the observation-based indices to identify the potential in representing climate variability and especially high-impact weather and climate extremes as well as to provide guidance with respect to the choice of the best reanalysis for a specific purpose.