



Winter Precipitation Forecast in the European and Mediterranean Regions Using Cluster Analysis

Sonja Totz (1), Eli Tziperman (2), Dim Coumou (1,3), and Karl Pfeiffer (4)

(1) Potsdam Institute for Climate Impact Research, Germany (sonja.totz@pik-potsdam.de), (2) Department of Earth and Planetary Sciences, and School of Engineering and Applied Sciences, Harvard University, Cambridge, MA, USA, (3) Department of Water and Climate Risk, Institute for Environmental Studies, VU University, Amsterdam, Netherlands, (4) Atmospheric and Environmental Research, Inc., Lexington, MA, USA

The Mediterranean climate is especially vulnerable to climate change due to its unique topography and geographical location. Climate models predict a reduction in winter precipitation and a very pronounced increase in summertime heat waves.

We developed a new cluster-based empirical forecast method to predict precipitation anomalies in winter for the Mediterranean and European regions. The advantage of this approach is that both the magnitude and spatial structure of the precursors are utilized in generating the predictions. The cluster-based method achieves higher forecast skill in time and pattern correlation than a CCA-based prediction algorithm using the same predictor fields for both methods. Furthermore the cluster-based method performs better than the NMME models in terms of pattern and time correlation. It is a very general method that can also readily be applied to other atmospheric variables such as temperature and precipitation anomalies in other regions or even possibly to forecast extreme weather.