EMS Annual Meeting Abstracts
Vol. 9, EMS2012-136, 2012
12th EMS / 9th ECAC


# 2001-11 high-resolution drought climatologies for Europe

J. Spinoni (1), T. Antofie (1), P. Barbosa (1), A. De Jager (1), A. Klein Tank (2), F. Micale (1), G. Naumann (1), G. Sepulcre-Canto (1), A. Singleton (1), G. Van der Schrier (2), and J. Vogt (1)

(1) JRC-IES, Ispra(VA), Italy (jonathan.spinoni@jrc.ec.europa.eu), (2) Royal Netherlands Meteorological Institute , AE De Bilt, The Netherlands

The DESERT action of JRC-IES is developing a European Drought Observatory (EDO) for real-time monitoring, assessing, and forecasting of droughts throughout Europe. Currently, 10-day and monthly maps and trends of soil moisture anomalies, vegetation vigor (fAPAR), SPI, and a combined drought indicator are available in the EDO's mapserver (http://edo.jrc.ec.europa.eu). Our goal is to test other indicators for EDO, to provide more comprehensive information on drought. The test period is 2001-11 because of the high data quality and quantity for 2001-11. We collected more than 9,000 daily temperature and precipitation records for Europe from three datasets: JRC-MARS, ECA&D (www.ecad.eu), and GHCN-NCDC. After an extended quality check, we blended the datasets into a new one of approximately 4,700 series: we cross-completed the series using a local Gaussian weighted interpolation using seven geographic parameters. After jack-knife validation, temperature daily mean absolute error is 0.4 ˚C, error on precipitation monthly sum is 9%, and the reconstruction method correctly detects if a day is wet or dry in the 98.2% of the cases. We calculated seven drought indicators on the stations for the last 11 years: Standardized Precipitation-Evapotranspiration Index (SPEI), Reconnaissance Drought Index (RDI), modified Palfai Aridity Index (mPAI), Effective Drought Index (EDI), Climatic Water Balance (CWB), FAO-UNEP Aridity Index, consecutive dry days. SPEI, RDI, EDI, and mPAI need long-term data to be derived: we extended the 2001-11 temperature and precipitation records to 1951-2011 by means of a Gaussian weighted reconstruction model using the E-OBS grids (ECA&D project). We interpolated the indicators on a 0.25˚x0.25˚ grid for 2001-11 using Kriging with multiple external drifts.
We compared the indicators for common time intervals directly on the grids. SPEI and RDI perform similarly; whilst mPAI, CWB, and EDI may be strongly different, especially in hot and dry regions. 2001-11 monthly drought climatologies are available on request.