

Data and Methodology

Data

The data come from the Hellenic National Meteorological Service station network, which is part of the WMO Global Observing System. The temperature data come from 52 meteorological stations and the sunshine duration data from 44 meteorological stations of the HNMS's network. The precipitation data come from 157 meteorological stations, 89 stations belong at the Public Power Corporation S.A.- Hellas and 68 stations at the HNMS.

Weather observations are frequently exposed to artificial influences caused by station relocations, changes in the instrumentation, etc. introducing inhomogeneities, so the WMO recommends homogenization since the analysis of climate data to detect changes and trends is more reliable when homogenized datasets are used (WMO, 2011, 2014). The time series used were homogenized (e.g. Mamara et al., 2014) using the HOMER software, a recently developed method for homogenizing monthly and annual climate time series, which includes the best features of some other methods tested on the HOME benchmark (Venema et al., 2012).

Methodology

High resolution climate maps were created after geospatial analysis and interpolation of the homogenized data. An interpolation method namely MISH (Meteorological Interpolation based on Surface Homogenized Data) developed only for meteorological purposes (Szentimrey & Bihari, 2014) was applied. In this method 20 independent topographic variables were used as predictors of the meteorological parameters. These variables are: the elevation derived from a 90 m digital elevation model (DEM), the first 15 principal components proposed by the AURELHY (Analyse Utilisant le Relief pour les besoins del' Hydrométéorologie) method, the latitude, the incoming solar irradiance, the Euclidian distance from the coastline and the land to sea percentage. The spatial interpolation has been performed with a 30''=0.0083333° resolution (≈730 m at 38° N). Further information is provided in Mamara et al. (2016).

References

Mamara, A., Argiriou, A. A., Anadranistakis, M. (2013). Homogenization of mean monthly temperature time series of Greece. International Journal of Climatology, 33(12). http://doi.org/10.1002/joc.3614

Mamara, A., Argiriou, A. A., Anadranistakis, M. (2014). Detection and correction of inhomogeneities in Greek climate temperature series. International Journal of Climatology, 34(10), 3024.

Mamara, A., Anadranistakis, M., Argiriou, A.A., Szentimrey, T., Kovacs, T., Bezes, A., Bihari, Z. (2016). High Resolution Air Temperature Climatology for Greece for the Period 1971-2000. Meteorological Applications, Accepted for publication.

Szentimrey, T., Bihari, Z. (2014). Manual of interpolation software MISH v1.03. Hungarian Meteorological Service. pp. 59.

Venema, V. K. C., Mestre, O., Aguilar, E., Auer, I., Guijarro, J. A., Domonkos, P., Vertacnik, G., Szentimrey, T., Stepanek, P., Zahradnicek, P., Viarre, J., Müller-Westermeier, G., Lakatos, M., Williams, C. N., Menne, M. J., Lindau, R., Rasol, D., Rustemeier, E., Kolokythas, K., Marinova, T., Andresen, L., Acquaotta, F., Fratiannil, S., Cheval, S., Klancar, M., Brunetti, M., Gruber, C., Prohom Duran, M., Likso, T., Esteban, P., Br sma, T.,Willett, K. (2012). Benchmarking homogenization algorithms for monthly data. Clim. Past, 8, 89–115. http://doi.org/10.5194/cp-8-89-2012

WMO-No 100, (2011). Guide to Climatological Practices. Geneva, Switzerland.

WMO-No 1131, (2014). Climate Data Management System Specifications. Geneva, Switzerland.