



A novel approach for detecting heat waves: the Standardized Heat-Wave Index.

Marco Cucchi (1), Marcello Petitta (1,2,3), and Sandro Calmanti (2)

(1) Amigo s.r.l., Roma, Italy (marco.cucchi@amigoclimate.com), (2) ENEA, SSPT-MET-CLIM, Roma, Italy, (3) EURAC, Institute for applied remote sensing, Bolzano, Italy

Extreme temperatures have an impact on the energy balance of any living organism and on the operational capabilities of critical infrastructures. The ability to capture the occurrence of extreme temperature events is therefore an essential property of a multi-hazard extreme climate indicator. In this paper we introduce a new index for the detection of such extreme temperature events called SHI (Standardized Heat-Wave Index), developed in the context of XCF project for the construction of a multi-hazard extreme climate indicator (ECI). SHI is a probabilistic index based on the analysis of maximum daily temperatures time series; it is standardized, enabling comparisons over space/time and with other indices, and it is capable of describing both extreme cold and hot events.

Given a particular location, SHI is constructed using the time series of local maximum daily temperatures with the following procedure: three-days cumulated maximum daily temperatures are assigned to each day of the time series; probabilities of occurrence in the same months the reference days belong to are computed for each of the previous calculated values; such probability values are thus projected on a standard normal distribution, obtaining our standardized indices.

In this work we present results obtained using NCEP Reanalysis dataset for air temperature at sigma 0.995 level, which timespan ranges from 1948 to 2014. Given the specific framework of this work, the geographical focus of this study is limited to the African continent. We present a validation of the index by showing its use for monitoring heat-waves under different climate regimes.