



Long-term variability in thermal comfort conditions based on the Universal Thermal Climate Index over Romania

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At European level, the efforts toward integration and harmonization of indices/procedures for monitoring extreme events are translated in several projects, INDECIS (www.indecis.eu) being one of these, funded under the ERA4CS umbrella. The project aims to develop a set of common indicators, among – at least- the project partners, regarding the monitoring and early warning of extremes events like heat/cold waves, droughts and flashflood.

One of the indices proposed in INDECIS for investigating the bio-meteorological aspects of heat/cold events is the Universal Thermal Climate Index. The UTCI is a thermal comfort indicator based on human heat balance models and designed to be applicable in all seasons and climates and for all spatial and temporal scales (Bröde et al. 2012). Furthermore, this index showed good skills for global probabilistic forecasting of this index at 4-6 days lead time (Pappenberger et al, 2015), making of UTCI a good candidate for the development of a harmonized monitoring and early-warning heat/health system.

In Romania the official heat/cold monitoring and warning procedures employ, for the thermal stress, the indices THI (Temperature-Humidity Index) – for the warm season (May-September) and WCI (Wind Chill Index) for the cold season. It is thus of interest to investigate the added-value brought by UTCI and the way to provide this information in addition to the official use of THI and WCI.

As a first step, the long-term variation in the thermal comfort conditions is assessed for the Romanian territory using UTCI for warm and cold seasons. The daily values of UTCI are derived from ROCADA (Dumitrescu and Birsan, 2015) – a gridded observation-based dataset at a spatial resolution of 10km over the period 1961-2013. The results are analyzed using the probability distribution function (PDF) of annual and seasonal daily values of UTCI for 3 periods (1961-1980, 1981-2000, 2001-2013). The changes in the number of days with high/low values of UTCI are also investigated for the selected periods against the long-term mean values (1961-2013). A comparison with the results produced by using the THI and WCI is presented. Furthermore, the analysis for the warm season is detailed in the case of 6 cities in Romania, characterized by different thermal stress level during summer (i.e. number of days with THI above the alert threshold).

References

- Bröde, P., et al (2012). *Int.J.Biomet.*, 56:3, 481-494.
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