EMS Annual Meeting Abstracts
Vol. 19, EMS2022-549, 2022, updated on 29 Mar 2023
https://doi.org/10.5194/ems2022-549
EMS Annual Meeting 2022


# Air temperature and humidity records-based indices as signals of seasonal changes

**Branislava Lalić** and Ana Firanj Sremac
Faculty of Agriculture, University of Novi Sad, Serbia (branislava.lalic@polj.edu.rs)

The astronomical and meteorological definitions of spring, summer, autumn, and winter are unique and quantitative. Nevertheless, in everyday life, season transition is more related to human perception of seasons than astronomical parameters (like the timing of equinox or solstice) or calendar. If any kind of vegetation is present, human perception of seasons strongly relays on changes in plant development: spring – the start of the growing season and intensive leaf appearance; summer – the intensive leaf development and flowering of gardens/yield formation in the field/crop harvest; autumn – a slowdown of development, and harvesting; winter – dormancy. If there is no vegetation whatsoever, human perception of seasons is probably based on one of the thermal comfort indices. For example, ten values of the universal thermal climate index (UTCI) that describe thermal stress categories corresponding to specific human physiological responses to the thermal environment can be associated with seasons and their transition.

Fitzjarrald et al. (2001) found the onset of spring in Eastern USA using springtime minimum in the afternoon relative humidity and first date when tendency Bowen ratio falls below one. Adopting an alternate approach, Lalic et al. (2022) linked changes in extreme values and inflection points of afternoon relative humidity and normalized daily temperature range (DTR/Td) with the growing stages of plants.

This study intends to offer indices based on daily air temperature and humidity records, which can be used as unique and quantitative descriptors of the timing of season transitions. As a case study, the timing of extreme values and inflection points of selected indices calculated using climate station data will be compared with phenology dynamics of dominant plants.

Literature

Fitzjarrald, D. R., Acevedo, O. C., Moore, K. E., 2001: Climatic Consequences of Leaf Presence in the Eastern United States. *J. Climate*, *14* (4), 598–614. https://doi.org/10.1175/1520-0442(2001)014<0598:CCOLPI>2.0.CO;2

Lalic, B., Fitzjarrald, D. R., Firanj Sremac, A., Marcic, M., Petric, M., 2022: Identifying Crop and Orchard Growing Stages Using Conventional Temperature and Humidity Reports, Atmosphere (Accepted for publication).