



## **Seasonal variability of diurnal temperature range in Egypt with links to atmospheric circulations and sea surface temperature**

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The diurnal temperature range (DTR) is an important climate-change variable. Seasonal and annual variability of DTR in Egypt was investigated based on a monthly dataset of 40 observatories distributing across the country. The trends were calculated using the Rho spearman rank test at the 95 % level of significance. The trends at the independent individual scale were compared with a regional series created for the whole country following the Thiessen polygon approach. A cross-tabulation analysis was performed between the trends of the DTR and the trends of maximum and minimum temperatures to account for directional causes of variability of the DTR at seasonal and annual scales. The physical processes controlling the DTR variability were also assessed in terms of large atmospheric circulations representing in the indices of the North Atlantic Oscillation (NAO), the East Atlantic (EA) pattern, El Niño Southern Oscillation (ENSO) index and the EAWR (East Atlantic/West Russia) Pattern. Also, the variability of the DTR was linked with anomaly of Sea Surface Temperature (SST). A cooling trend was observed in Egypt with strong behavior in winter and summer rather than fall and spring. The upwarding trend of the mean minimum temperature was mainly responsible for variability of the DTR rather than the mean maximum temperature. Also, the EA and the EAWR indices were the main indices accounted for most of variation in the DTR in Egypt, particularly in summer.

**Key words:** trend analysis, temperature variability, Diurnal temperature range, atmospheric circulation, sea surface temperature, Egypt.