



Evidence for increasing DTR during the early 20th century

K. Makowski (1), M. Wild (1), A. Sanchez-Lorenzo (2) and A. Ohmura (1)

(1) Institute for Atmospheric and Climate Science, ETH Zurich, (2) Group of Climatology, University of Barcelona

The diurnal temperature range (DTR), which is defined as difference between daily maximum and minimum temperature, is considered as suitable measure to investigate the development of local and regional changes in the energy balance. Most dominant influence of shortwave and longwave radiative change in the mid latitudes are reflected in the daily maximum and daily minimum respectively. Following the recent findings of an increasing DTR over Western Europe since 1985, which is subsequent to the well known decrease since 1950, we extended our investigations back to the first half of the 20th century using station based data from the dataset of the European Climate Assessment and Dataset (ECA&D) project. We used data from all available stations that started measurement in at least in 1920. To avoid any bias we normalized the time series to the period 1960-1990, before calculating the overall mean anomaly time series. We found three characteristic trend periods in our results. Between 1950 and nowadays the annual series supports our earlier findings of decrease and increase. Additionally we found strong evidence for an earlier increase of DTR between 1925 and 1950. To investigate the cause of the observed changes we compare the DTR time series to available long-term sunshine duration and global radiation measurements. We found a strong qualitative agreement in all series and high correlation between sunshine duration and DTR series.