



Impact of greenhouse effect and global radiation on diurnal temperature range between 1950 and 2000

K. Makowski, M. Wild, A. Ohmura

Institute of Atmospheric and Climate Science, ETH Zurich (makowski@env.ethz.ch)

In the presented study, we analyzed diurnal temperature range (DTR) time series of about 150 stations in and around Europe during the second half of the twentieth century. Besides data from meteorological services most of the analyzed data is obtained from the European Climate Assessment and Dataset Project (ECA&D). We focused on the analysis of the impacts of greenhouse effect and global radiation on the development of the diurnal temperature range. The specific period has been chosen for different reasons. Apart from the fact that it has the best collection of data, it contains as well a crucial period of temperature decrease and the subsequent increase in the middle of the supposedly greenhouse effect active decades as a period of major changes in global radiation development from global dimming to global brightening. So far the results seem to indicate that on the average, the DTRs in Europe showed a decrease up to the late 1980s, after which the DTRs at the most of the investigated stations levelled off or increased. The general change of DTR trends and the moment of turnover in the trends is inline with the observed changes in global radiation. This was particularly evident in north western and Eastern Europe thus indicating that the rapid economic decline and reduction in air pollution respectively in Eastern Europe might be one of the key factors causing the overall change. Our results also suggest that increasing trend of DTRs appear to be induced by increasing daily maximum temperatures, which is again attributed to solar brightening.