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## Diurnal temperature range over Europe between 1950 and 2005

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**Abstract.** It has been widely accepted that diurnal temperature range (DTR) decreased on a global scale during the second half of the twentieth century. Here we show however, that the long-term trend of annual DTR has reversed from a decrease to an increase during the 1970s in Western Europe and during the 1980s in Eastern Europe. The analysis is based on the high-quality dataset of the European Climate Assessment and Dataset Project, from which we selected approximately 200 stations covering the area bordered by Iceland, Algeria, Turkey and Russia for the period 1950 to 2005. We investigate national and regional annual means as well as the pan-European mean with respect to trends and reversal periods. 17 of the 24 investigated regions including the pan-European mean show a statistical significant increase of DTR since 1990 at the latest. Of the remaining 7 regions, two show a non-significant increase, three a significant decrease and two no significant trend. Changes in DTR are affected by both surface shortwave and longwave radiation, the former of which has undergone a change from dimming to brightening in the period considered. Consequently, we discuss the connections between DTR, shortwave radiation and sulfur emissions which are thought to be amongst the most important factors influencing the incoming solar radiation through the primary and secondary aerosol effect. We find reasonable agreement between trends in SO<sub>2</sub> emissions, radiation and DTR in areas affected by high pollution. Consequently, we conclude that the trends in DTR could be mostly determined by changes in emissions and the associated changes in incoming solar radiation.

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