Geophysical Research Abstracts
Vol. 19, EGU2017-17903, 2017
EGU General Assembly 2017

Long term variations and trends in tropospheric ozone and temperature values in Castilla y León (Spain)

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Tropospheric ozone is a secondary pollutant, formed by chemical reactions in the atmosphere involving nitrogen oxides (NO_x), carbon monoxide and volatile organic compounds, with a strong influence of solar radiation and temperature. Biogenic emissions and chemical reactions both depends on the temperature, and thus the gradual increase of the temperature due to climate change will have some effect on ozone levels, despite the fact that in many European cities, local emissions of ozone precursor compounds are decreasing.
In order to assess the extent to which the ozone content of the troposphere is changing due to human influence and climate variations, it is necessary to have a global description of the ozone distribution and time evolution. From a network of measuring ozone stations in Castilla y León region (Spain), data of the tropospheric ozone concentrations have been analyzed in this work. Information about annual, seasonal and diurnal patterns have been obtained, but our main interest is the study of long-term behaviour of ozone levels, its correlation with temperature and climate changes during a period of almost 20 years. Data from ground ozone and temperature have been analyzed for the period 1997-2016, which may seem short in climatic studies but constitutes a relevant interval in the Northern Hemisphere due to the occurrence of hot summers and extreme temperature events. During this period we found some of the warmest summer months in many European countries since instrumental records exist. Mean values trends in five selected locations, variations in spring-summer ozone maximum and temperature indices are strongly analyzed.

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