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Ground-level ozone in Croatia 2007 – 2017: measurements and modelling

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Ozone pollution represents a serious problem in many European countries, especially in countries of the Mediterranean region. Changing climate circumstances, early and prolonged summer periods, and changing weather circulation patterns bring additional stress to the environment ecosystems and human health.
In this paper we analyse ground-level ozone trends over period 2007-2017 based on available measurements and regional air quality modelling results. Ozone measurements are currently performed at 9 urban and 11 rural stations spatially distributed over the country to encompass three distinctive areas of Croatia: continental, mountainous and Adriatic, including islands. Nevertheless, at the beginning of the analysed period there were only two measurement sites in urban areas. Therefore, to assess the ozone pollution in Croatia over the longer period it was necessary to utilise air quality transport models. For that purpose we used EMEP and LOTOS – EUROS CTM models. As ozone is largely a regional scale pollutant resolution scale used for calculation by EMEP model is 50 km x 50 km. The default model resolution of LOTOS-EUROS model is 25 km x 25 km. Both models are open-source chemical transport models that are used for a wide range of applications supporting scientific research, regulatory purposes and air quality forecasts. Meteorological data used for both chemical transport models are ECMWF IFS fields.
The purpose of the work is twofold: to compare model outputs with measurements and evaluate models' performance, and to establish longer term (10-20 year) trends of ground-level ozone based on model calculations in order to assess environmental and health related impacts of high ozone concentrations.