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High resolution isoprene emissions over Europe in past and future climate

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Isoprene is a key tropospheric species, well known as the dominant biogenic hydrocarbon emitted in the atmosphere, with global annual emissions of about 400-600 Tg (Guenther et al. 2006). It is highly reactive, enhances tropospheric ozone formation in polluted environments and contributes to secondary aerosol formation. The emissions of isoprene (and other biogenic VOCs) depend on the type and abundance of plants, and are modulated by meteorological parameters. Climate changes can therefore affect the spatiotemporal and interannual variation of these emissions. In this study we propose to use the MEGAN-MOHYCAN model (Muller et al. 2008, Stavrakou et al. 2014) to calculate the isoprene fluxes emitted by vegetation in past and future climate over the European (EURO-CORDEX) domain at a resolution of 12.5 km. More specifically, isoprene emissions over 1979-2012 will be calculated based either on ECMWF reanalysis data or on meteorological output from the ALARO-0 climate model (Giot et al., 2015). The impact of solar radiation changes, observed at European stations (Sanchez-Lorenzo et al., 2015), on the modelled emissions will also be investigated. MEGAN-MOHYCAN simulations will be performed over the period 2040-2100 based on input from ALARO-0 model driven by the RCP8.5 scenario. The isoprene interannual variability and emission trends will be derived and thoroughly discussed.

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