



## **Summertime tropospheric ozone assessment over the Mediterranean region using WRF-Chem model and the thermal infrared IASI/MetOp sounder**

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Over the Mediterranean region, elevated and alarming tropospheric ozone ( $O_3$ ) values are recorded especially in summer. We use the Weather Research and Forecasting model coupled with Chemistry (WRF-Chem) model, and the Infrared Atmospheric Sounding Interferometer (IASI) to understand and interpret the factors and emissions sources responsible of the high  $O_3$  concentrations observed in the boundary layer and free troposphere in this region during summer 2010. Using two modeled  $O_3$  tracers (inflow to the model domain and local anthropogenic emissions), we show that between the surface and 2 km,  $O_3$  is mostly formed from anthropogenic emissions and above 4 km, is mostly transported into the region. To study the source of this transport, we analyze IASI and WRF-Chem  $O_3$  data in the free troposphere. Taking longitude cross sections at the west and east part of the basin, we are able to detect clear events of stratosphere to troposphere exchanges (STE) in the eastern part of the basin favored by low relative humidity and high potential vorticity modeled data from ERA-interim. This study shows the usefulness of using  $O_3$  tracers in models for the Mediterranean region, which allows the quantification of the different  $O_3$  sources. It also shows that using IASI and WRF-Chem in an integrated study help in understanding  $O_3$  at different levels in the atmosphere.