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Tropospheric ozone budget within the planetary boundary layer over Mediterranean region during summer

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Many model studies have been performed over the Mediterranean region (Med), but they show very different ozone concentrations over this region, particularly in summer. Several processes, i.e. local photochemistry, long-range transport, vertical transport, etc., play an important role in determining ozone concentration in different parts of Med, i.e. Western, Central, and Eastern. So far these processes have not been analyzed systematically over all parts. To investigate the relative importance of these processes over the three parts, budget diagnostic terms for horizontal transport, dry deposition and vertical mixing, and chemical net production have been added to the WRF-chem model. These ozone budget terms are used to analyze how different processes influence the ozone concentration within the planetary boundary layer (PBL) for the summer (JJA) of 2012.
The preliminary results show that the net chemical processes in Western and Eastern parts contribute about 50% more to the surface ozone budget over Med compared to the Central part. The net local horizontal transport over Med has small negative contribution to the surface ozone budget over the Western and Eastern parts, while the Central part has a positive contribution from horizontal transport. This implies a net export of ozone from the Eastern and Western parts, and a small net import into the Central region. The details of each process will be investigated through a set of sensitivity studies with respect to horizontal transport and specific chemical reactions