



Ozone pollution: What can we see from space? A case study

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Due to its impact on environment, tropospheric ozone received particular attention since several decades. Ground-based network associated with regional chemical transport models are used to monitor (forecast) surface ozone concentrations but coverage/representativeness/ accuracy issues remain. Recent satellite observations have demonstrated their capacity to probe tropospheric ozone, but there has been no explicit attempt to quantify their ability to measure ozone pollution within planetary boundary layer. We propose here to assess the ability of ozone sounders to detect a photochemical ozone pollution event that is supposed to be a favorable situation for satellite detection with high ozone amount and anti-cyclonic situations with few clouds and high thermal contrast. We have chosen an European ozone pollution event associated with a warm conveyor belt that efficiently transports photochemically produced ozone upwards. Ozone satellite products from GOME-2, IASI and OMI are analyzed here for their capacity to capture such an event. Also, in situ observations and regional chemical-transport models show increasing ozone concentrations in the continental and Mediterranean boundary layer and further transport to Central Europe and Scandinavia associated with upward transport. Satellite observations do not detect high ozone concentrations within the boundary layer due the weak sensitivity near the surface. Nevertheless, we have shown that the IR sounder IASI was able to detect, qualitatively and quantitatively, the ozone plume transported upwards by the warm conveyor belt suggesting that a quantification of upward transport of ozone pollution could be possible using current satellite observations. This should also encourage us to turn to different approaches such like the multispectral approach that is already promising and to prepare the next satellite generation.