We apologize for not following the abstract length requipement listed in the preparation guidelines. The new abstract has been halved to stay under the 250-word limit.

Abstract :
The ozone vertical profiles variability in the Paris area is analyzed using 21 days of lidar monitoring of the lower troposphere ozone vertical profiles and planetary boundary layer (PBL) vertical structure evolution in summer 2022. Characterization of the pollution regional transport is based on daily ozone analysis of the Copernicus Atmospheric Service (CAMS) ensemble model and on backward trajectories. The CAMS simulations of the ozone plume between the surface and 3 km are consistent with the ozone measurements. Comparisons with tropospheric ozone column retrieved by the satellite observations of Infrared Atmospheric Sounding Interferometer (IASI) show that IASI observations can capture the day to day variability of the 0-3 km ozone column only when the maximum altitude of the ozone plume is higher than 2 km.
The lidar ozone vertical structure above the city center is also in good agreement with the PBL growth during the day and with the formation of the residual layer during the night. The analysis of four ozone pollution events shows that the thickness of the PBL during the day and the advection of regional scale plumes above the PBL can significantly change the ozone concentrations above Paris. Advection of ozone poor concentrations in the free troposphere during a Saharan dust event is able to mitigate the ozone photochemical production. On the other hand, the advection of a pollution plume from continental Europe with high ozone concentrations > 140 µg.m^{-3} maintained high concentrations in the surface layer despite a temperature decrease and cloud cover development.