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A tropospheric ozone pollution outbreak over East Asia in springtime 2009 analyzed by synergism of innovative multispectral satellite observations, in situ measurements and models

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Air quality is a crucial societal issue in East Asia, which is seriously aggravating in the 21st century. The main gaseous pollutant is tropospheric ozone. Rapid population growth and economic development in regions as the North China Plain is leading to emission of large quantities of ozone precursors. In consequence, a greater production of tropospheric ozone is transported beyond the urban scale, thus causing transboundary pollution. However, analysis of transboundary pollution is difficult due to a complete absence of measurements over the East China Sea and few available ozone observations over China.
Advanced analysis of satellite observations is a new very promising approach to analyse the evolution and transport of tropospheric ozone pollution plumes at the regional scale. Recently, an innovative multispectral approach has been developed, which combines IASI IR observations and GOME2 UV measurements (Cuesta et al., 2013). This unique multispectral approach has allowed the observation of ozone plumes in the lowermost troposphere (below 3 km of altitude), for the first time from space.
The current presentation will show the characterization of a major lowermost tropospheric ozone event over East Asia (including China and Japan) during the springtime of 2009, based on a unique synergism of innovative multispectral satellite observations, ground-based measurements and state-of-the-art regional model simulations. We will assess the dynamics of lower tropospheric ozone over East Asia, studying the associated transport patterns, meteorological conditions and atmospheric composition. A key question that will be addressed is the identification the origin of the pollution outbreak and the evolution of photo-chemical production along transboundary transport.