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Monitoring the spatial distribution and the evolution of tropospheric ozone in Eastern Asia with IASI

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Air quality monitoring from space gives a helpful complement to in situ measurements and regional chemical transport models (rCTM) in order to draw a more comprehensive picture of pollution processes. In the case of tropospheric ozone important progresses in the field of atmospheric sounding from space have been accomplished during the last decade, especially with thermal infrared (TIR) space-borne instruments. We primarily use IASI observations over Eastern Asia for monitoring distributions of ozone in the lower troposphere from the regional to the continental scale for air quality concerns. We combine IASI ozone observations with rCTM simulations in order to evaluate the processes that control the spatial and temporal distribution of lower tropospheric ozone, especially when large ozone amounts are observed. The part of the dynamical processes (vertical transport, impact of large source plumes, etc) and the chemical processes (photochemical production) is discussed. A first analysis of seasonal to daily variations of lower tropospheric ozone observed with IASI over Chinese megacities shows that the monthly variations of ozone are controlled by the Asian summer monsoon whereas the daily variations of ozone, especially in the North of China, are driven by stratospheric intrusion in winter and more likely by local photochemical production in spring and summer. The study has been extended and an overview of the situation is given at the continental scale of Eastern Asia.