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Monitoring tropospheric ozone from IASI at the continental scale: which information for the models?

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IASI has been operating aboard the MetOp platform since October 2006. It is a nadir-viewing Fourier transform spectrometer measuring thermal infrared radiances. One of its main targets for atmospheric chemistry is ozone and in particular tropospheric ozone. We developed an altitude-dependent Tikhonov-Phillips retrieval algorithm optimized to maximize the information one can extract from the lower part of the troposphere. The method is now well validated. Promising capabilities to monitor lower tropospheric ozone for air quality concerns have been demonstrated [1,2]. The step forward is now to use these observations with complementary model simulations in order to, first, evaluate the information that observations can bring to the model, and then to improve the description and the understanding of the situation over regions strongly affected by pollution. In this paper, we focus on two regions: China and Europe. China is considered because it is one of the largest source regions of pollution in the world. In Europe we consider in more details the Mediterranean basin that is a region very sensitive to the transport of pollution emitted in the North of Europe. Results of comparisons between models and observations (ECAM model for China and CHIMERE model for Europe) are presented. The strengths and weaknesses of the models in representing ozone distributions in these two regions are evaluated. In addition, to document the gain of using model and observations in synergy, a statistical evaluation of assimilated ozone fields over Europe is presented.

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[2] Dufour, G., Eremenko, M., Orphal, J., and Flaud, J.-M.: IASI observations of seasonal and day-to-day variations of tropospheric ozone over three highly populated areas of China: Beijing, Shanghai, and Hong Kong, Atmospheric Chemistry and Physics, 10, 3787-3801, doi:10.5194/acp-10-3787-2010, 2010.