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3D evaluation of simulated tropospheric ozone forecasted by an ensemble of regional CTM in the context of the GEMS project.

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Regional Chemical Transport Models are central tools of air quality policy. In the case of ozone, their operational use for short-term forecast and monitoring implies to identify and reduce their uncertainties. Classically, RCTM are evaluated against surface observations since their primary goal is to simulate surface ozone concentrations. Free tropospheric performances of such models are less evaluated. Nevertheless, in the case of ozone, free tropospheric concentrations are crucial from the point of view of 1) regional climate change, 2) air quality: it is important to evaluate long-range transport of pollutants from source regions and the downward exchange between free troposphere and the boundary layer, which is poorly documented at the moment.
The GEMS European project gives the opportunity to evaluate an ensemble of 6 RCTM (and the IFS-MOZART model) to simulate vertical profiles of tropospheric ozone concentrations. To conduct such model evaluation, profiles provided by ozone sondes and made on board commercial aircrafts (MOZAIC program) are very precious, nevertheless their spatio-temporal coverage remains weak. The new generation of nadir viewing infrared sounder (TES, IASI) is now operational and it opens new perspectives to study free tropospheric ozone. Their higher sensitivity to the free tropospheric ozone concentrations or maybe, in some cases to the boundary layer concentrations can be a good constraint for models.
Among the objectives of this work, we want first evaluate skills of RCTM to model free tropospheric concentrations at various temporal scale, more specifically, in the context of the GEMS project the impact of boundary conditions on the forecasted ozone values is evaluated as well as the ability of the IASI measurements to be used for model evaluation and future assimilation will be discussed.