Geophysical Research Abstracts
Vol. 15, EGU2013-5573, 2013
EGU General Assembly 2013

Chemical Weather Forecasting using the online fully integrated modeling system RAMS/ICLAMS – Comparison with the offline approach

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In the framework of chemical weather forecasting, the online approach consists of the coupled treatment of chemical parameters, simultaneously with the meteorological parameters, in a single integrated modelling system. This approach offers the possibility to simulate the links and feedbacks between atmospheric processes that are traditionally neglected in air quality models. These links include direct and indirect effects of gases and aerosols on radiation, clouds and precipitation that in turn re-modify atmospheric composition in a two way interactive pattern. Both meteorological and chemical components are expected to benefit from this approach. The extend to which this improvement can justify a thorough migration to integrated systems is the subject of the current work.
In this study we discuss the performance of the online Integrated Community Limited Area Modelling System (RAMS/ICLAMS) and compare the results with the offline use with CAMx model, for a month long summertime text period. The area under consideration is Europe and the Greater Mediterranean Region (GMR). In both on and off line simulations the same meteorological driver has been used (RAMS). The comparability of the two models is achieved with the implementation of same chemical mechanisms, meteorological fields, emissions, initial and boundary conditions. The differences in the model configurations are also taken into account in the comparison of the two modelling approaches. In this presentation, the advantages and disadvantages of simulating the regional atmospheric chemical composition by using the online versus the offline approach are analyzed and discussed.