



Contribution of European aviation on the air pollution field of the Mediterranean region with the use of an online coupled integrated modeling system

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Air quality in and around airports is an important issue because of the critical physical and chemical processes that take place and their impact on environment and human health. Given the forecasted increase of air traffic, analysis and prediction of local and regional features of air pollution produced by airports becomes a crucial area of air pollution modeling. In this presentation, the contribution of the European aviation on the air pollution field of the Mediterranean region is analyzed using the new modeling tool, the Integrated Community Limited Area Modeling System (ICLAMS). The modeling system uses the approach of "online coupling" of meteorological and chemical mechanisms which studies the processes that take place in the atmosphere in an integrated way and in the same spatial and temporal resolution.

The model was tested for July 2005 for Europe and the Mediterranean Region. Two simulations have been performed, one with emissions from all anthropogenic activities and the second excluding the emissions from aviation. The comparison of the model results, with and without the aviation emissions, gave the opportunity to assess the impact of airport operations on the air pollution levels of the region and downwind areas, under characteristic summer meteorological conditions. The area that is influenced by the emissions from the airport operations is very large, and the most effected region is the Eastern Mediterranean and several areas in North Africa. The prevailing west – northwest circulation over West and Central Europe favors the transport of pollutants towards East, South East Europe and North Africa leading to perturbations in the atmospheric composition especially up to 4 – 5 km above surface. The ozone field is altered by the aviation emissions with perturbations in its daytime values that reach 8 ppb. The atmospheric concentrations of NO₂ and other gases are also effected.