



Impact of ground and satellite measurements on a regional meteorological-chemical model

P. Messina, M. D'Isidoro, F. Fierli, A. Maurizi and E. Orlandi

Institute of Atmospheric Sciences and Climate - National Research Council, Italy
(p.messina@isac.cnr.it)

The key question is how (and if) the assimilation of atmospheric chemical observations improves the capability of regional models in reproducing the distribution of tropospheric pollutants. The study is carried out using the BOLCHEM (BOLam + CHEMistry) which is based on the meteorological hydrostatic mesoscale model BOLAM (Bologna Limited Area Model) and two photochemical mechanisms: SAPRC90 and CB-IV. The meteorology is coupled online-one way with the chemistry.

A sequential Optimal Interpolation routine is implemented in this model for gaseous pollutants data assimilation such as ozone, nitrogen dioxide, carbon monoxide to estimate the correlation between the temporal-spatial resolution of observations and its impact on air-quality forecast through sensitivity tests.

We test and evaluate the performance of this simplified assimilation scheme using different approaches: (1) assimilation of ground-based and satellite measurements of O₃ and NO₂, and (2) Observing System Simulation Experiment (OSSE) of simulated satellite observations. The first approach aims at estimating the benefit gained from the use of existing observations, while the second one at evaluating the sensitivity to different satellite measurement geometries in data assimilation.