



Sensitivity study of a coupled dispersion - weather prediction model with case studies

A.Z. Gyongyosi (1), T. Weidinger (1), Zs. Ivanyi (2)

(1) Department of Meteorology, Eotvos Lorand University (zeno@nimbus.elte.hu), (2) Regional Environmental Center for Central and Eastern Europe

The "NIRE (Japan) Mesoscale Meteorological Model CO₂ Version", a three dimensional dispersion model of tracers (with simple dynamics) has been coupled to the limited area NCEP Workstation ETA meteorological model at the Eotvos University (Budapest), for planetary boundary layer research and air quality model development purposes. It is capable to determine the effect of anthropogenic sources of CO₂ such as point (e.g. large stacks) and area (traffic and heating in cities) sources. It is also able to analyze the effect of inhomogenities in surface parameters (as albedo, roughness length, heat capacity, etc) on mesoscale circulation and surface fluxes of tracers, momentum, vapor or heat, for example. The dynamics of the NIRE model (including boundary conditions and initialization) has been slightly modified during its implementation process at our Department. The ETA model is being run operational on real initial and boundary conditions taken from the NCEP/GFS model on a daily basis for a domain including the Carpatian Basin. The NIRE dispersion model is driven by the outputs of the ETA meteorological model providing realistic surface flux, vertical profile and surface budget informations. Some case studies are presented which investigate the effect of surface inhomogenities and human CO₂ sources. Sensitivity studies of different CO₂ parameterizations are also included.