H13-147
EVALUATION OF FOUR LAGRANGIAN MODELS AGAINST THE CROSS-APPALACHIAN AND EUROPEAN TRACER EXPERIMENTS

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In this study, a comparison of model performance of four state-of-the-practice Lagrangian dispersion models: CALPUFF, SCIPUFF, HYSPLIT, and FLEXPART is presented. These models were used to simulate the dispersion of the tracer cloud for the European Tracer Experiment (ETEX) and the Cross-Appalachian Tracer Experiment (CAPTEX). Dispersion simulations for each of the modeling systems were done using a common meteorological dataset derived from the NCAR/PSU MM5 model. Statistical evaluation procedures used for model verification follow a hybrid approach based upon the procedures used in the second Atmospheric Transport Model Evaluation Study (ATMES-II) and the NOAA Data Archive of Tracer Experiments and Meteorology (DATEM) project. Verification scores show that the NOAA HYSPLIT model performed best overall, followed by the SCIPUFF and FLEXPART models. CALPUFF performance was significantly poorer than the other three models in the ETEX experiment and improved in CAPTEX.

H13-212
WIND VERIFICATION IN PO VALLEY

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Near-surface wind is a critical parameter for atmospheric dispersion: besides advection of pollutants, it affects surface energy budget, turbulence and mixing height. In Po Valley (Northern Italy) wind speed is often very low, and relatively small errors in the meteorological driver can strongly affect the performance of air quality models. An intercomparison study of CTM models has shown that all models applied on this region underestimate aerosol concentrations, especially during winter months when calm winds and strong inversions often occur. In this work, 4 different meteorological models were used to produce wind analysis (hindcast simulations), and results were compared with a network of surface observations. Some systematic errors, such as overestimation of winter wind speed, turned out to affect all models; increased resolution and the use of data assimilation of surface observations seem to improve model performance.

H13-220
SMART CLIMATOLOGIES FOR PREPARATION AND PLANNING OF HAZARDOUS RELEASE EVENTS

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Under the sponsorship of the National Ground Intelligence Center, the National Center for Atmospheric Research (NCAR) has developed the Global Climatology Analysis Tool (GCAT) to generate “on demand” large databases of atmospheric parameters at high resolution, tailored to the specific transport and Dispersion needs of NGIC. The approach takes advantage of the zooming and relocation capabilities of the embedded domains that can be found in regional models like the community Weather Research and Forecast model (WRF). The WRF model is applied to dynamically downscale NNRP and ERA40 global analyses and to generate long records, up to 30 years, of hourly gridded data over 200km2 domains at 3km grid increment. To insure accuracy, observational data from the NCAR ADP historical database are used in combination with the Four-Dimensional Data Assimilation (FDDA) techniques to constantly nudge the model analysis toward observations. Artificial Intelligence techniques such as the Self Organizing Maps (SOMs) are used to automatically classify the large volume of high-resolution model data and extract weather regimes representative of the local climate. Dispersion calculations of with the Second order Closure Integrated PUFF (SCIPUFF) model for those climatological typical weather situations provide scenarios for protection and evacuation planning, and « what if » exercises.