FLIGHT PLANNING PRODUCTS FOR INTEX-B, ANALYSIS, AND AURA VALIDATION

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Summary:
We plan to participate as part of the INTEX-B Flight Planning Team, conduct analysis of observed data, and perform post-mission modeling of transport features and chemistry during INTEX-A and –B. We will provide an array of trajectory- and satellite-based flight products on a daily basis during the Spring 2006 INTEX-B field experiment that will contribute to the planning of research flights. The products are similar to those we have provided for a number of previous campaigns such as SONEX, ACCENT, PEM Tropics-B, TRACE-P, and INTEX-A. We will make several improvements to the existing forecast tools plus add new products. The existing flight planning tools include convective influence maps, lightning influence forecasts, an OMI-based aerosol exposure estimate, and a stratospheric influence (PV) reverse domain-fill calculation. New products will include a CO exposure calculation based on AIRS CO observations. Trajectory products will link the MILAGRO/Mexico City domain to the DC-8 flight region. In addition we will supply near-real-time OMI tropospheric NO_2 column data to the flight planning team. We will interpret these products in the field, as well as ozonesonde profiles which will be communicated to the INTEX-B deployment sites by Collaborator Thompson. Our main analysis tasks will include interpretation of DC-8 O_3, NO_x, and NO_y data from INTEX-A in relation to observed convection and lightning, as well as use of the University of Maryland Chemical Transport Model (UMD-CTM) for simulations of both the INTEX-A and –B periods. Major modeling tasks will include an estimate of North American ozone export during INTEX-A, which will be compared with estimates from other summers being computed under our UMD IDS project. We will also estimate CO import to North America from Asia in INTEX-B and determine the role played by deep convection in this transport process. We will also evaluate the convection and lightning parameterizations in the GEOS/UMD-CTM system using tracer simulations, convective influence products, observed lightning data, and satellite imagery. After evaluating our INTEX-B model output fields with aircraft data, the fields will be useful in comparisons with Aura retrievals. INTEX-B model output fields will be compared with INTEX-B aircraft and Aura satellite measurements. This comparison will enable an understanding of the dynamical and chemical processes, and contribute to the satellite validation process.