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OPAG ON DPFS MEETING OF EMERGENCY
RESPONSE ACTIVITIES COORDINATION GROUP

Agenda Item 10

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**THE USE OF A COMMON EXPERIMENTAL DATA BASE AND METEOROLOGY TO
ESTABLISH PERFORMANCE STANDARDS FOR ATMOSPHERIC ENVIRONMENTAL
EMERGENCY RESPONSE MODELS**

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Summary

- A data base of long-range tracer experimental data, meteorology, and statistical analysis procedures has been established in a common non-proprietary format for public distribution
- The data base is designed to be used for the verification and development of long-range atmospheric transport models for environmental emergency response

Recommendation

- It is proposed that the existing RSMCs participate in the initial data base demonstration with the intent that ATM "verification" eventually becomes part of the procedures in the establishment of RSMCs for transport model products.

References

CAS, 1999, Report from the Ad Hoc Group of Experts (R.R. Draxler, G.D. Hess, R. Maryon, G. Graziani, W. Klug, F. Gifford), on the Long-range Transport and Dispersion Model Verification Data Base, submitted to the CAS Expert Panel, March 1999, Zurich, CAS Working Group on Environmental Pollution and Atmospheric Chemistry.

1. Background

The twelfth meeting of the World Meteorological Organization's (WMO) Commission for Atmospheric Sciences (CAS XII - 23 February to 4 March 1998 in Skopje) emphasized the importance of the coordinating role of WMO in emergency response activities. The Commission noted the increasing use of Atmospheric Transport Models (ATMs) to address the long-range transport of pollutants. In particular, there has been consistent emphasis on nuclear reactor accidents since the Chernobyl accident. The European Tracer Experiment (ETEX) symposium evaluated 47 different ATMs. The recent ratification of the Comprehensive Test Ban Treaty (CTBT) may require the development of a whole new class of ATMs. Most of the ATMs are linked to operational meteorological forecast models. These meteorological models are routinely evaluated and tested and compared against common performance standards.

Although similar standards exist for ATMs, the verification data are not as easily obtained and are usually limited to single case studies or controlled field experiments that are not conducted on a routine basis.

The Commission decided that there was a need to create a database of all known field experiments and the corresponding meteorological data in a common format that could then be used for model verification and development. The USA and Australia agreed to assemble a small expert group to consider the tasks required to address this issue and report their results to the CAS Working Group on Environmental Pollution and Atmospheric Chemistry. Based upon this report, the US funded a small pilot study, using data from US sponsored experiments, to test the concept. The results of this pilot study, the Data Archive of Tracer Experiments and Meteorology (DATEM) are now available for evaluation.

2. DATEM Overview

This pilot study assembled the data from five long-range dispersion experiments, representing transport distances of 100's to 1000's of kilometers over a variety of different seasons. The archive contains a collection of more than 19,000 air concentration samples, 29 months of meteorological fields from the NCAR/NCEP reanalysis project, and statistical analysis programs based upon the ATMES-II evaluation of ETEX. All the emissions and sampling data are in space delimited text files, easily read by Fortran programs or imported into any spreadsheet. Meteorological data fields are encoded in an unpacked binary format, one record per variable per time period. The statistical programs are provided as PC executables and Fortran source code for compilation on other platforms. The entire data archive is on 3 CDs, with the first CD containing all the experimental data, software, and meteorological data from 3 experiments. The other 2 CDs contain meteorological data from the remaining two experiments. The CDs can be ordered on-line through the DATEM web site (<http://www.arl.noaa.gov/datem>), or the individual data files can be downloaded directly through FTP. Users of the archive are encouraged to share any additional analysis software they may develop or perhaps even provide additional experimental data in the DATEM format.

3. Recommendations

The RSMCs are invited to participate in a model evaluation exercise using a mutually agreed upon experiment(s) available in the DATEM archive. Results would be published and also included in WMO-TD/No. 778, Documentation on RSMC Support for Environmental Emergency Response.