

RSMC Washington report of activities for 2010

Executive Summary

RSMC Washington did not receive any requests for support for real events. Primary RSMC-related activities for 2010 consisted of Region 3, 4, and 5 monthly tests, conducted for scenarios over Canada, the United States, and Australia, four IAEA exercises with RSMC Washington and Montreal as Lead RSMCs for one exercise, incremental updates and improvements to the response procedures, software, and to the joint RSMC secure common web pages, which are used for communicating transport model products between RSMCs, and numerical modeling improvements.

1. Introduction

The National Oceanic and Atmospheric Administration's (NOAA) Air Resources Laboratory (ARL) together with NOAA's National Centers for Environmental Prediction (NCEP) are designated by the WMO as the Washington Regional Specialized Meteorological Centre (RSMC) with the specialization to provide atmospheric transport model products for environmental emergency response. The primary regions of responsibility are WMO Regional Associations (RA) III & IV, which encompass Canada, United-States, Mexico, Central and South America.

2. Operational Contact Information

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3. Routine operations

Monthly Test:

RSMCs Montréal, Washington, and Melbourne generally hold a joint exercise on the second Thursday of every month. In addition, RSMC Washington participated in four IAEA-initiated exercises during the year, one of which RSMC Montréal and RSMC Washington were designated as Lead RSMCs. Table 1 shows the breakdown of the details for the exercises in 2010.

Month	Source location
Jan 14	Douglas Point, ON, Canada
Feb 18	Jakarta, Indonesia (IAEA request)
Mar 11	Maralinga, Australia
Apr 8	Gentilly, QC, Canada
May 20	Darlington, ON, Canada (IAEA request)
Jun 10	South Texas, TX, USA
Jul 8	Lucas Heights, Australia
Aug 19	Dukovany, Czech Republic (IAEA request)
Sep 9	Whiteshell, MB, Canada
Oct 14	Leonora, Australia
Nov 18	Hamaoka, Japan (IAEA request)
Dec 9	Whiteshell, MB, Canada

Table 1: RSMC Washington monthly tests for 2010

Once the model products are posted to the common web pages, an email is sent in both Spanish and English to those NMHS contact points with valid email addresses in WMO RA III and IV, the IAEA and WMO. The email contains login information to retrieve the RSMC products from the common web pages.

Common web pages:

RSMC Washington (ARL) continues to maintain and update, as needed, the common web page code. RSMC Washington posts its results to the common web sites at RSMC Montreal, Melbourne, Obninsk. In addition, RSMCs Toulouse, Beijing, Tokyo, and Obninsk regularly post their results to the RSMC Washington common web page for IAEA exercises. The objective is for all RSMCs to post their products on all common web pages whenever possible.

4. Lessons learned from recent experiences and significant operational or technical changes:

- The RSMC Washington (NCEP) operational HYSPLIT set up script should contain all common radionuclide species.
- The NOAA NCEP Senior Duty Meteorologist suggested that source term information be provided occasionally in “regular” exercises as it is in the IAEA exercises.

5. Operational issues and challenges:

The WMO emergency response team for non-RSMC dispersion emergency response (e.g.: smoke, dust, toxic releases) is patterning its exercise framework on the radiological RSMC program. Experts from RSMC Washington have begun to collaborate with the non-nuclear developments and expect that additional responsibilities may be requested. The collaboration between both programs will need to be addressed to leverage each group’s resources where possible.

RSMC Washington continues to have difficulty with invalid email addresses for NMS contacts who receive email notices of updated model products. Guidance from WMO on how the proper procedure to remove bad email addresses from our system would be helpful.

6. Summary and status of the operational atmospheric transport and dispersion models

i. The HYbrid Single-Particle Lagrangian Integrated Trajectory Model (HYSPLIT)

RSMC Washington's operational atmospheric transport and dispersion model is HYSPLIT (HYbrid Single-Particle Lagrangian Integrated Trajectories) model, developed at the NOAA Air Resources Laboratory. HYSPLIT is driven by meteorological forecast data from the operational Global Forecast System (GFS) model (T574, 22 km) and the North American Meso (NAM) Non-hydrostatic Multi-scale Model on a 12 km grid (NMM). The system is available for running on demand and can produce forecast trajectories, concentrations (or exposures) and depositions for nuclear accidents, volcanic eruptions, smoke episodes and other related atmospheric pollutant releases.

HYSPLIT can be used for modeling atmospheric transport and dispersion of pollutants over a broad range of distances; from local to global scales. The equations used in the calculation of pollutant transport and dispersion are a hybrid between Eulerian and Lagrangian approaches. Advection and diffusion calculations are made in a Lagrangian framework using the gridded meteorological analysis and forecast fields. Air concentrations are calculated on a fixed three dimensional grid by integrating all particle masses over a pre-set averaging period. Routine calculations may consist of simple trajectories from a single source to complex emissions from several sources. Dry deposition is treated with a deposition velocity. Wet deposition is divided into two processes: a scavenging ratio for pollutants located within a cloud layer and a scavenging coefficient for pollutant removal in rain below a cloud layer. Radiological decay is also included when necessary.

7. Plans for 2011:

- The schedule of routine monthly tests for all of 2011 has been set up in collaboration with RSMCs Montréal and Melbourne.
- Four exercises in 2011 will be initiated by IAEA with the November exercise being designated "Lead" for RSMCs Washington and Montréal.
- Implement multi-processor version of HYSPLIT for improved run-time.
- Continue to make small modifications to the common web page code as needed based on problems encountered during exercises and provide the changes to all RSMCs.
- Upgrade the operational NCEP HYSPLIT to the current version 4.9 in late 2011 along with required changes according to the revision of the GDPFS manual (WMO No.485).
- Test and add finer temporal resolution output in support of NWS aviation requirements.
- Upgrade, test and implement HYSPLIT driven by the National Environmental Modeling System (NEMS) NMMB model on a 12 km North American grid.
- Test the NEMS-NMMB on demand and varying location 1.3 km Homeland security/Fire weather nest.

- Test, and upgrade HYSPLIT driven by the GFS global model upgraded high resolution grids (T878 (~15 km) resolution) when available

References

WMO, 2010: Documentation on RSMC Support for Environmental Emergency Response. *WMO-TD/No.778*. Available online at <http://www.wmo.int/pages/prog/www/DPS/WMOTDNO778/Annex4.html>