

RSMC Melbourne report of activities for 2014

Executive Summary

Primary activities for 2014 were the monthly tests conducted for scenarios over Canada, the United States and Australia and the IAEA quarterly tests for scenarios over Slovakia (Feb), (May test cancelled), USA (Aug) and Indonesia (Nov, as Lead Centre), plus an IAEA Convex 1d test over Bulgaria. The Provisional Technical Secretariat (PTS) of the Comprehensive Test Ban Treaty Organization (CTBTO) made 12 requests for inverse modelling support throughout the year.

1. Introduction

The Bureau National Operations Centre (BNOC) (previously known as the National Meteorological and Oceanographic Centre until late 2013) of the Australian Bureau of Meteorology is designated by the WMO as the Melbourne Regional Specialized Meteorological Centre (RSMC) with the specialization to provide atmospheric transport model products for environmental emergency response. The region of responsibility is WMO Regional Association (RA) V, which includes the countries: Australia, Brunei Darussalam, Fiji, Indonesia, Malaysia, New Zealand, Papua New Guinea, Philippines and Singapore. RSMCs Washington and Montréal also respond jointly in support of RSMC Melbourne in case of an event in WMO RA-V until a second RSMC can be designated for this region. In addition to emergency response, RSMC Melbourne contributes global inverse modelling support to the CTBTO's verification system.

2. Operational Contact Information

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3. Responses and information on dissemination of products

i. Dissemination of products

Transport model graphical products and joint statements are posted to secure joint web pages, and faxed to relevant RSMCs and NMHSs. For examples of the graphical products, see Annex 4 of **WMO, 2014**.

In addition to the other RSMCs, the following RA-V member countries' NMHSs are in our email and fax lists:

Brunei Darussalam
 Fiji
 Indonesia
 Malaysia
 New Zealand
 Papua New Guinea
 Philippines
 Singapore

ii. Response to requests by CTBTO-PTS

A total of 12 requests for support were received from the Provisional Technical Secretariat of the Comprehensive Test Ban Treaty Organization between 23 January and 10 December 2014. In all cases, the products were supplied to CTBTO within the allowed time limit.

4. Routine operations

Monthly Test:

RSMCs Melbourne, Montréal and Washington generally hold a joint exercise on the second Thursday of every month. In addition, RSMC Melbourne participated in four IAEA-initiated exercises during the year, one in which RSMC Melbourne was lead with support from RSMC Montréal and RSMC Washington. The table below shows the list of tests held in 2014.

Once the model products are posted to the common web pages, an email is sent in English to the relevant RSMCs, the NMHS contact points in WMO RA-V, the IAEA and WMO. The email contains login information to retrieve the RSMC products from the common web pages.

| Month | Source location | Initiated by | RSMC providing joint statement |
|-----------|---|---------------|----------------------------------|
| January | Davis-Besse, Ohio, USA | Washington | Montréal |
| February | Kecеровce, Slovakia | IAEA | Exeter & Toulouse |
| March | Darlington, Ontario, Canada | Montreal | Washington |
| April | Lucas Heights, NSW, Australia | Melbourne | Melbourne |
| May | <i>(Exercise cancelled)</i> | <i>(IAEA)</i> | <i>(Beijing, Obninsk, Tokyo)</i> |
| June | Fort Calhoun Nuclear Power Plant, Nebraska, USA | Washington | Montréal |
| July | Point Lepreau, New Brunswick, Canada | Washington | Montréal |
| August | Fermi 2 NPP, USA | IAEA | Montréal & Washington |
| September | Lucas Heights, NSW, Australia | Melbourne | Melbourne |
| October | Palo Verde, Arizona, USA | Washington | Montréal |
| November | GA Siwabessy, Indonesia | IAEA | Melbourne |
| December | Point Lepreau, New Brunswick, Canada | Washington | Montréal |

Table 1: RSMC monthly tests for 2014

5. Lessons learned and significant operational or technical changes:

- The routine monthly RSMC tests continue to be invaluable for identifying and rectifying any problems in our scripts or in the uploading of data to the various ftp sites, as well as helping our operational staff maintain familiarity with the procedures for responding to requests for support. The participation of other RSMCs in these exercises is welcomed and encouraged.
- 2014 saw the progressive upgrade of all the Australian "ACCESS" Numerical Weather Prediction models which provide meteorological input to our HYSPLIT (v4.9) atmospheric transport model. The resolutions of these models are now: 40km (N320) for the global ACCESS-G model; 12km (0.11°) for the regional ACCESS-R model; and 4km (0.036°) for the high-resolution ACCESS-C models (6 separate city-based domains). All models now use 70 vertical levels. The regional and city-based models are now updated 4 times daily and the global model is updated twice daily.

6. Operational issues and challenges:

- Results from several monthly tests have shown significant differences in the plumes compared to other RSMC results. One in particular transported a few particles thousands of kilometers eastwards. Examination of the particle path revealed a large upward motion in a short time period, excessive vertical motion in the NWP model data is one possible cause. The matter is being investigated.
- Occasional problems were encountered with ftp uploads to some joint RSMC ftp servers. Improved error checking using the "lftp" transfer protocol has now been incorporated in our upload scripts to fix these problems.
- RSMC Melbourne's ftp server experienced problems in October due to internal networking changes

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

RSMC Melbourne's operational Environmental Emergency Response (EER) system is currently based on version 4.9 (*revision 506*) of the Hybrid Single-Particle Lagrangian Integrated Trajectories (HYSPLIT) model, developed by Roland Draxler at the NOAA Air Resources Laboratory. HYSPLIT is driven by meteorological input from the various operational numerical weather prediction systems run in the Bureau of Meteorology. The system is available for running on demand and produces forecast trajectories, concentrations (or exposures) and depositions for nuclear accident, volcanic ash, smoke and other episodes. For most initial responses to requests for nuclear EER products the input to HYSPLIT is provided by the N320L70 (approximately 40km horizontal resolution) global ACCESS-G system.

8. Plans for 2015:

- An upgrade of the ACCESS NWP systems, increasing the resolution of the global ACCESS-G system from N320L70 (approximately 40km horizontal resolution) to N512L70 (approximately 25km horizontal resolution) and also increasing the horizontal resolution of the city-based ACCESS-C system from 0.036° (approximately 4km horizontal resolution) to 0.0135° (approximately 1.5km horizontal resolution), is planned for late-2015.
- HYSPLIT will be updated to the latest revision available from NOAA's svn repository
- RSMC Melbourne will continue to respond to requests, including the quarterly IAEA test as well as ad-hoc requests from IAEA and CTBTO.
- The schedule of routine monthly tests for 2015 has been set up in collaboration with RSMCs Montréal and Washington. Each RSMC will select the simulated accident location and write the joint statement on a rotating basis. Quarterly tests are also scheduled with the IAEA.

References

WMO, 2014: Documentation on RSMC Support for Environmental Emergency Response.

WMO-TD/No.778. Available online at <http://www.wmo.int/pages/prog/www/DPFSERA/td778.html>