RSMC Beijing report of Activities for 2014

Executive Summary

Primary activities at RSMC Beijing for 2014 consisted of communication test and a quarterly exercise conducted by WMO and IAEA. And as the chief leader, RSMC Beijing attended the ConvEx-2d, which is one day exercise based on a nuclear plant accident scenario. In addition, RSMC Beijing provided atmospheric backtracking products for the Provisional Technical Secretariat (PTS) of the Comprehensive Test Ban Treaty Organization (CTBTO). Also, some improvement of Environmental Emergency Response System (EERS) in RSMC Beijing and new products are developed in 2014.

1. Introduction

The National Meteorological Centre (NMC of China Meteorological Administration) is designated by the WMO as the Beijing Regional Specialized Meteorological Centre (RSMC) for the provision of atmospheric transport modelling in case of an environmental Emergency Response. The primary region of responsibility is WMO Regional Associations (RA) II. RSMC Beijing performs its functions jointly with RSMC Tokyo and RSMC Obninsk when requested by the IAEA or member states of WMO Regional Association II (RA-II). In addition to emergency response, RSMC Beijing contributes global reverse modelling support to the CTBTO's verification system and updated the new products upload method.

2. Operational Contact Information

National Meteorological Centre (NMC)
China Meteorological Administration
No.46, Zhongguancun Nandajie
Haidian District, Beijing
China, 100081

Business contact: Dr. Song Zhenxin
Tel   : 86 10 68400477
Fax   : 86 10 68407469
Email: songzx@cma.gov.cn

Operational contact (24 hours): Shift supervisor
Tel   : 86 10 68406344
Fax   : 86 10 62172909
Email : rsmc@cma.gov.cn

3. Responses and information on dissemination of products

i. Exercises (2014)

November 25 – RSMC Beijing participated in the ConvEx-2d exercise. The release site was Kozoloduy, Bulgaria and real-time meteorological field was considered. RSMC Beijing received IAEA faxed request for transport and dispersion modelling of radionuclide in support of the exercise. There has been good cooperation between us and other RSMCs.

According to the IEC planned exercises in 2014, RSMCs Beijing, Obninsk and Tokyo should take the ConvEx-1b exercise. However, this exercise was put off and finally cancelled.

ii. Dissemination of products

Transport model graphical products and joint statements are posted to secure joint web pages, and faxed to relevant RSMCs and NMHSs.

In addition to the other RSMCs, the following NMHSs are in our fax lists:

Bahrain
Bangladesh
Democratic People's republic of Korea
Hong Kong, China
India
Iran,Islamic Republic of
Iraq
Republic of Yemen
Kazakstan
Kyrgystan
Macao
Mongolia
Myanmar
Oman
Pakistan
Qatar
Republic of Korea
Saudi Arabia
Sri Lanka
Tajikistan
Thailand
Turkmenistan
United Arab Emirates
Uzbekistan

Viet Nam

The failure rate of fax transmission was high. During the exercises, only 14 out of 24 fax transmissions to NMHSs were successful, but which was worse than 16 out of 24 in last year. The successful fax transmissions were as following:
Democratic People's republic of Korea
HONGKONG
MACAO
The People's Republic of Korea
BANGLADESH
DARAB
KYRGYSTAN
TURKENISTAN
OMAN
MONGOLIA
IRAN
TURKNENISTAN
JAPAN
RUSSIA

iii. Response to requests by CTBTO-PTS

There were a total of 14 requests from the Provisional Technical Secretariat of the Comprehensive Test Ban Treaty Organization. The products were supplied to CTBTO within one day after the receiving of the requests.

4.   Routine operations

Quarterly Tests:

RSMC Beijing participated in quarterly tests conducted by IAEA. Table 1 contains summary information on these tests. The products of the tests were uploaded to RSMC common web pages and distributed to other NMHSs when requested.

Month	Source location	Initiated by	WMO Regional Associations
November	Kozloduy, Bulgaria	IAEA	I/VI[1]
November	GA Siwabessy, Indonesia	IAEA	V[2]

Table 1: RSMC quarterly tests for 2014

Notes:
1. ConvEx-2d. The RSMCs products were uploaded to RSMC common web pages and faxed to NMHSs in WMO RA II as requested.

2. The products were uploaded to RSMC common web pages.

Developed the new products:

Time of arrival (TOA) product has been developed. The new product can display the dispersion arrange at different time in an individual figure.

Capacity Building for Services system:

In collaboration with the Nuclear and Radiation Safety Center, Chinese Ministry of Environmental Protection, a new NPP accident source term evaluation system facing to China NPPs is developed.

The SOA of EER system has improved, which can ensure the CTBTO requirement complete automatically and correctly.

5. **Operational issues and challenges:**

- Different RSMCs take different atmospheric dispersion model, which will result in the big difference in the modeling of concentration and deposition. Whether can WMO and IAEA conduct the model inter-comparison project?
- ConvEx-1b in 2014 was scheduled at May 15; however, which was put off temporarily and finally was cancelled, which caused some inconvenience.

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

The operational Environmental Emergency Response (EER) system, in RSMC Beijing, is currently based on the Hybrid Single-Particle Lagrangian Integrated Trajectories (HYSPLIT4) Atmospheric Transport Model, developed at the NOAA Air Resources Laboratory. HYSPLIT4 is driven by meteorological input resulting from the operational numerical weather prediction system T639L60 global model and the GRAPES_MESO medium model. In 2014, for the regional EER system, the meteorological model is updated from WRF to GRAPES_MESO, the resolution is updated from 15km to 10km and the frequency of forecast was increased from 00/12UTC to 00/03/06/09/12/15/18/21UTC. The system is available for running on demand and produce forecast trajectories, concentrations (or exposures) and depositions for nuclear accident, volcanic ash, smoke and other episodes. In 2010, the HYSPLIT version was updated to HYSPLIT 4.9 version.

The HYSPTLIT4 is used for modeling atmospheric transport and dispersion of pollutants over medium/long-distance. The equations used in the calculation of pollutant transport and dispersion are a hybrid Lagrangian approaches. Advection and diffusion calculations are made in a Lagrangian framework using the meteorological girded 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 consideration of complex emissions from several sources. Dry deposition is treated with the deposition velocity concept. 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 blow a cloud layer. Radiological decay is also included when necessary.

7. **Plans for 2015:**

- RSMC Beijing will continue to fulfill its responsibilities as one of RSMCs in RA II to provide standard atmospheric products timely when requested.
- RSMC Beijing will participate in the national nuclear accident exercise "Ageis 2015" of China.
- RSMC Beijing will devote to further developing its capability for both nuclear and non-nuclear environmental emergency responses. The EER platform in operation will be updated to strengthen the reliability, and to enrich the diversity of its products.