RSMC Beijing report of Activities for 2011

Executive Summary

Primary activities at RSMC Beijing for 2011 consisted of the Environmental Emergency Response (EER) conducted by WMO and IAEA on Japan Fukushima Daiichi Nuclear Plant Accident and improvement to the response procedures, software. The Provisional Technical Secretariat (PTS) of the Comprehensive Test Ban Treaty Organization (CTBTO) made both operational and planned requests for backtracking modeling support by RSMC Beijing from March to December, 2011.

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 regions of responsibility are WMO Regional Associations (RA) II. RSMC Beijing performs its functions with RSMC Tokyo and RSMC Obninsk when requested by the IAEA or other member states of WMO Regional Association II (RA-II). In addition to emergency response, RSMC Beijing contributes global backtracking modelling supports to the CTBTO's verification system.

2. Operational Contact Information

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Operational contact (24 hours): Shift supervisor
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Fax : 86 10 62172909
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3. Responses and information on dissemination of products

i. Emergencies (2011)

From Mar. 14 to May 22 – RSMC Beijing participated in the EER on Fukushima Nuclear Plant Accident. The release site was Fukushima, Japan, and products including trajectories, concentrations, depositions and real-time weather situations were analyzed. RSMC Beijing received IAEA requests via fax and e-mail for dispersion modelling of radionuclides.

ii. Dissemination of products

Graphical products from the dispersion model and joint statements were posted to secure joint web pages, and sent to relevant RSMCs and NMHSs by fax.

The following RSMCs and NMHSs are in our checklist:

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

Viet Nam

There was a low success rate in the fax transmission. During these emergencies, only 7 out of 24 fax transmissions to NMHSs were successful as following:

Democratic People's Republic of Korea
Hong Kong, China
Macao, China
Republic of Korea
Saudi Arabia
Thailand
United Arab Emirates

iii. Response to requests by CTBTO-PTS

There were a total of 51 requests from the Provisional Technical Secretariat of the Comprehensive Test Ban Treaty Organization in 2011. The requests were emergencies, received from Mar. 19 to Dec. 22. The products were sent to CTBTO as quickly as possible, usually within a few hours.

4. Routine operations

Environmental Emergency Responses:

RSMC Beijing participated in Environmental Emergency Response (EER) conducted by IAEA on Japan Fukushima Daiichi Nuclear Plant Accident. Table 1 summarized these requests. The products and joint statements were sent to IAEA, RSMCs and NMHSs if requested, and were also put on the Joint Web Pages with RSMC Beijing and other RSMCs.

Date of Request (UTC)	Source location	Initiated by	WMO Regional Associations
3/11/2011(09:30)	Fukushima-Daiichi PP-Japan	IAEA	II
3/11/2011(16:00)	Fukushima-Daiichi PP-Japan	IAEA	II
3/12/2011(00:30)	Fukushima-Daiichi PP-Japan	IAEA	II
3/12/2011(15:50)	Fukushima-Daiichi PP-Japan	IAEA	II
3/13/2011(09:15)	Fukushima-Daiichi PP-Japan	IAEA	II
3/13/2011(15:00)	Fukushima-Daiichi PP-Japan	IAEA	II
3/14/2011(15:50)	Fukushima-Daiichi PP-Japan	IAEA	II
3/14/2011(18:15)	Fukushima-Daiichi PP-Japan	IAEA	II

Date of Request (UTC)	Source location	Initiated by	WMO Regional Associations
3/15/2011(03:00)	Fukushima-Daiichi PP-Japan	IAEA	II
3/15/2011(08:00)	Fukushima-Daiichi PP-Japan	IAEA	II
3/16/2011(09:58)	Fukushima-Daiichi PP-Japan	IAEA	II
3/17/2011(02:00)	Fukushima-Daiichi PP-Japan	IAEA	II
3/17/2011(11:00)	Fukushima-Daiichi PP-Japan	IAEA	II
3/17/2011(16:45)	Fukushima-Daiichi PP-Japan	IAEA	II
3/18/2011(08:30)	Fukushima-Daiichi PP-Japan	IAEA	II
3/20/2011(07:30)	Fukushima-Daiichi PP-Japan	IAEA	II
3/20/2011(09:00)	Fukushima-Daiichi PP-Japan	IAEA	II
3/20/2011(12:00)	Fukushima-Daiichi PP-Japan	IAEA	II
3/22/2011(15:00)	Fukushima-Daiichi PP-Japan	IAEA	II
3/23/2011(22:30)	Fukushima-Daiichi PP-Japan	IAEA	II
3/26/2012(17:00)	Fukushima-Daiichi PP-Japan	IAEA	II
4/2/2011(16:45)	Fukushima-Daiichi PP-Japan	IAEA	II
4/4/2011(07:14)	Fukushima-Daiichi PP-Japan	IAEA	II
4/6/2011(16:30)	Fukushima-Daiichi PP-Japan	IAEA	II
4/10/2011(03:30)	Fukushima-Daiichi PP-Japan	IAEA	II
4/11/2011(03:00)	Fukushima-Daiichi PP-Japan	IAEA	II
4/12/2011(01:50)	Fukushima-Daiichi PP-Japan	IAEA	II
4/13/2011(07:00)	Fukushima-Daiichi PP-Japan	IAEA	II
4/14/2011(01:30)	Fukushima-Daiichi PP-Japan	IAEA	II
4/15/2011(01:00)	Fukushima-Daiichi PP-Japan	IAEA	II
4/20/2011(04:00)	Fukushima-Daiichi PP-Japan	IAEA	II
04/25/2011(04:00)	Fukushima-Daiichi PP-Japan	IAEA	II
4/25/2011(10:30)	Fukushima-Daiichi PP-Japan	IAEA	II
4/27/2011(04:00)	Fukushima-Daiichi PP-Japan	IAEA	II
4/29/2011(04:00)	Fukushima-Daiichi PP-Japan	IAEA	II
5/2/2011(04:00)	Fukushima-Daiichi PP-Japan	IAEA	II
5/4/2011(04:00)	Fukushima-Daiichi PP-Japan	IAEA	II
5/6/2011(04:00)	Fukushima-Daiichi PP-Japan	IAEA	II

Date of Request (UTC)	Source location	Initiated by	WMO Regional Associations
5/9/2011(04:00)	Fukushima-Daiichi PP-Japan	IAEA	II
5/11/2011(04:00)	Fukushima-Daiichi PP-Japan	IAEA	II
5/13/2011(04:00)	Fukushima-Daiichi PP-Japan	IAEA	II
5/16/2011(05:00)	Fukushima-Daiichi PP-Japan	IAEA	II
5/18/2011(04:00)	Fukushima-Daiichi PP-Japan	IAEA	II
5/20/2011(04:00)	Fukushima-Daiichi PP-Japan	IAEA	II
5/23/2011(04:00)	Fukushima-Daiichi PP-Japan	IAEA	II

Table 1: RSMC Environmental Emergency Responses for 2011

5. Significant operational or technical changes:

- A new EER platform has been in operation in 2011. The new system can complete the IAEA and CTBTO requests automatically, from receiving the requests to spreading the products.
- HYSPLIT 4.9 has been entirely in operation in 2011, taking place of the old 4.8 version. The update can improve the abilities in backtracking calculations.
- T639, a new global meteorological data, has been able to be used in HYSPLIT. The resolution of new forecast and analysis fields is higher than that of the current T213.

6. Operational issues and challenges:

- Some NMHSs' contact information is out of date.
- Different time zones cause some inconvenience. Also, there are some barriers in communications due to differences in culture and language.

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

.The operational Environmental Emergency Response (EER) system in RSMC Beijing is 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 fields from the operational global numerical weather prediction model, T213L31 and T639L60, and the mesoscale model, WRF. The model is available to forecast and backtrack trajectories, concentrations (or exposures) and depositions for nuclides, volcanic ash, smoke and other pollutants. In 2010, the HYSPLIT 4.9 version was compiled and put into

operation. In 2011, HYSPLIT 4.9 has been completely taken place of HYSPLIT 4.8 in operation.

The HYSPTLIT4 can be used to calculate the dispersion over the mesoscale and synoptic scale. The equations used in the calculation of pollutant transport and dispersion can be either in Eulerian or 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 be simple trajectories from a single source to consideration of complex emissions from several sources. Dry deposition is treated with the deposition velocity concept. To indicate two different wet deposition processes, there are two parameters: 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 can be included when necessary.

8. Plans for 2012:

- The schedule of tests (quarterly and others) has been defined in collaboration with the IAEA.
- T639 meteorological fields will be take the place of T213.
- The new EERS platform is going to updated to strengthen the stability and develop new functions
- Improve the emergency response procedures, software.