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| WORLD METEOROLOGICAL ORGANIZATIONCOMMISSION FOR BASIC SYSTEMSOPAG on DPFSEXPERT TEAM ON EMERGENCY RESPONSE ACTIVITIES (ET-ERA) VIENNA, AUSTRIA, 1-5 OCTOBER 2018 |  | DPFS/ET-ERA/Doc. 4.2(5)(XX.IX.2018)\_\_\_\_\_\_\_Agenda item : 4.2ENGLISH ONLY |

**Status of operational implementation / activities of RSMC Beijing**

*(Submitted by Zhenxin Song, RSMC Beijing)*

##### Summary and purpose of document

This document is to report on the operational status and on the activities regarding ERA at RSMC Beijing after the ET-ERA meeting in Buenos Aires (2015).

##### Action Proposed

The meeting is invited to The meeting is invited to review the summary for their information..

**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 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.

**2. Operational Contact Information**

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**3. Current Status of Forecasting System**

From 2015 to 2017, the model product driving the large-scale nuclear and hazardous chemicals environmental emergency response system of RSMC Beijing is mainly based on the global numerical prediction model T639L60 of the CMA. The horizontal resolution of T639 is about 30 km and 60 levels in vertical. T639L60 provides weather forcing fields at 00 and 12 UTC per day for atmospheric transport models.

Since 2018, the GRAPES\_GFS model independently developed by CMA has replaced T639 for driving HYSPLIT. GRAPES\_GFS adopts 4DVAR technique, the horizontal resolution is 25 km and 60 layers in vertical, the forecast period is 240 hours. HYSPLIT 4.9 atmospheric diffusion model is still used, but the version is upgraded to the newer 854 version, which adds the simulation function of long-term modeling TCM.

**4. Review of actions from previous meeting (Buenos Aires, Argentina, 2015)**

**4.1** Nuclear EERS activities

In the past three years, RSMC Beijing participated international obligations of nuclear EERS and completed the requested exercises from IAEA and CTBTO successfully. From November 16, 2015 to September 1, 2018, RSMC Beijing has completed 10 IAEA requests, including the three of RA II and six of other regional areas (providing the atmospheric transport model (ATM) products on joint website) (Table 1 and Table 2). Meanwhile, RSMC Beijing has completed 13 CTBTO exercises for providing the back-calculation to tracing the nuclear emissions. The summary of IAEA and CTBTO exercises are illustrated in Table 1.

In the past three years, the North Korea has conducted three nuclear tests. In order to evaluate the potential effects, RSMC Beijing start up the EERS procedures and provided the EERS services that are shown in Table 3.

Table 1 Summary of IAEA and CTBTO exercises

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 2015(11.16-12.31) | 2016 | 2017 | 2018(~09.01) |
| IAEA | 1 | 4 | 3 | 2 |
| CTBTO | 0 | 4 | 3 | 6 |

Table 2 The summary of IAEA exercises participated by RSMC Beijing

|  |  |  |  |
| --- | --- | --- | --- |
| Month/Year | Source location | Initial by Exercise | WMO Regional Associations |
| November, 2015 | 43.521oN, 76.408oW | IAEA | RA III and RA IV |
| February, 2016 | Koeberg, South Africa | IAEA | RA I and RA VI |
| May, 2016 | Japan, Shika | IAEA | RA II |
| August, 2016 | Mexico, Laguna Verde | IAEA | RA III and RA IV |
| November, 2016 | Opal-Lucasghts, Australia | IAEA | RA V  |
| June, 2017(three requests) | PARKS NPP, Hungary (36hours)  | IAEA | all |
| February, 2018 | 6.16oN, 106.82oW Indonisia | IAEA | RA V |
| May, 2018 | Hongyanhe NPP, China | IAEA | RA II |

Table 3 The summary of North Korea Third, Fourth and Fifth nuclear tests

|  |  |  |
| --- | --- | --- |
| Test | Date | No. Reports  |
| Forth | 2016.01.06 | 2 |
| Fifth | 2016.09.09 | 17 |
| Sixth | 2017.09.03 | 8 |

RSMC Beijing participated the IAEA ConEx-3 exercise held on June 21-22, 2017. and successfully completed three requests issued by IAEA/WMO and carried out the testing of new TOA products. In the whole exercise, RSMC Beijing has been good communication with China's National Nuclear Emergency Department and provided 5 five special reports for National Nuclear Emergency Office. In addition to providing IAEA standard products, RSMC Beijing also provides two kinds of TOA products, namely Instantaneous and Integrated TOA products .

**4.2 Non-nuclear EERS activities**

The meso-scale meteorological field of Hazardous Chemicals EERS of RSMC Beijing is provided by GRAPES\_MESO. The resolution of the meteorological model is 10 km, and the forecast time is 84 hours. It covers China and its surrounding areas . Additionally, GRAPES\_MESO can also provide the 3 km numerical weather products in the eastern region of China. The atmospheric dispersion model is the same as the global scale model and adopts the upgraded HYSPLIT4.9 atmospheric dispersion model.

In the past three years, RSMC Beijing participated Chinese non-nuclear EERS activities. From November 16, 2015 to September 1, 2018, RSMC Beijing has completed three non-nuclear EER requests, namely G20-Hangzhou, BRICs-Xiamen and SOC-Qingdao .

Table 4 The summary of non-nuclear EERS activities from 2016 to 2018

|  |  |  |  |
| --- | --- | --- | --- |
|  | 2016 | 2017 | 2018(~09.01) |
| No. | 1 | 1 | 1 |
| Activities | G20, Hangzhou | BRICs Conference,Xiamen | SOC submmit,Qingdao |

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**5. Mirrored Web-Site at RSMC Beijing**

The original joint web server is replaced due to the server failure . In order to prevent the joint web server vulnerability, the operational system of joint web server was upgraded and FTP security was strengthened. Also the blank picture of joint website are produced. 84hours after the end of the IAEA exercise, the original products will be replaced by the blank pictures.

**6. Lessons learned from recent experiences**

It is hoped that the mode of product distribution can be improved and upgraded. In the past three years, the fax transmission of RSMC Beijing ATM products has a high failure rate and takes a lot of time, and it is hoped that they will be sent directly over the Internet and via e-mail in the future.

It is hoped that IAEA and WMO establish a unified platform for collecting and distributing products, similar to CTBTO. At present, there are 8 different joint webpages in 8 RSMCs; each atmospheric diffusion forecast product needs to upload 8 different servers simultaneously, which will take more time to upload products and make the exercise procedure more complicated..

**7. R & D activities**

In order to simulation the atmospheric pollutants transport with higher resolution, a case study was carried out using EPA CALPUFF.

The ensemble atmospheric transport modeling is mainly based on T639 numerical ensemble forecasting system and GRAPES\_MESO ensemble forecasting system. And the relative ensemble ATM products are produced. The ensemble members are 15. The horizontal resolution of T639 global ensemble forecast is 30 km, and that of GRAPES\_MESO regional ensemble forecast is 15 km. The other perturbation methods of ensemble ATM are based on HYSPLIT model, by using the different turbulent calculation methods, the displacement disturbance of particle et al. The ensemble members are about 20 and 27, respectively.

**8. Plans for 2018**

RSMC Beijing will continue to develop the high resolution atmospheric dispersion forecast capability and strength the visualization of atmospheric dispersion products.

Develop a new EERs operational system.

Utilize GRAPES\_GFS to IAEA and CTBTO exercise and carry out the evaluation of atmospheric dispersion forecast under GRAPES\_GFS.