Workshop of World Meteorological Centres

Beijing, China, 26-29 March 2019

Questionnaire for World Meteorological Centres

(as of 27 February 2019)

Note: The following seven questions will be used to orient participants' discussion on:

- *Agenda III. WMCs in the context of WMO Constituent Bodies Reform*, and
- *Agenda IV. Overall coordination mechanism between WMCs and WMCs/RSMCs to support Members*.

Your answers will be distributed to all participants in advance.

I would deeply appreciate if you could send your feedback **before or on 15 March** 2019

Name of World Meteorological Centres: WMC（Beijing）

Agenda III

1. What areas your WMC wants to improve in near future and in the long-term by considering the functionality described in WMO-No. 49

Note: World Meteorological Centre (WMC). A centre of the GDPFS that has the primary purpose of issuing meteorological analyses and prognoses, including probabilistic information and long-range forecasts on a global scale. (WMO-NO. 49, Technical Regulations, Basic Documents No. 2, Volume I – General Meteorological Standards and Recommended Practices)

As a WMC, we would like to improve capabilities to support the key functions of operational weather forecast and service nowadays in WMO's NMHS members, such as severe weather monitoring and warning, NWP guidance, NWP application techniques, and the operational skill training etc.

(1) For near future, we will commit to advance operational GRAPES (Global/Regional Assimilation and PrEdiction System) deterministic and ensemble systems, especially the improvements of the global model skill on medium-range weather prediction, and the regional model skill on heavy rainfall and typhoon intensity forecasts. Also to develop the global reanalysis is one of our main goals. These provide continuously the reliable and usable NWP guidance and reanalysis products as the foundation of operational weather forecasts, and of customized meteorological products to serve end users including WMO's NMHS.

In the long term, the underway development of a new global/regional atmospheric model with high accuracy and scalability using multi moment constrained finite-volume (MCV)

technique on quasi-uniform grids will be continued, aiming to meet the seamless approach for numerical system generating prediction products from minutes to months.

(2) To develop functional post processing system with diverse techniques towards “smart” goal, and to generate bias corrected, variable/element broadened, and impact based products, meeting the increased demands of forecasters and end users from other sectors, for optimized and maximized usage of NWP (especially the EPS) prediction, for seamless meteorological and hydrological operations.

(3) To enhance FY satellite production not only for model data assimilation but also for tropical cyclone and severe weather monitoring, and to promote High-Speed Meteorological Data Exchange globally.

(4) To broaden the scope of operational skill training activities, such as, international forecaster desk from typhoon forecast expanding to other desks like severe weather and QPF; establishing meteorological services consultation starting from the region by on-line weather discussion and by ad hoc requested customized products.

2. What could be additional roles of your WMC to support the WMO Constituent Body Reform and Strategic Plan of WMO, especially Strategic Objectives 2.3

Note: Strategic Objective 2.3: Enable access and use of numerical analysis and prediction products at all temporal and spatial scales from the WMO seamless Global Data Processing and Forecast System

(1) Developments in cloud to facilitate access to and use of massive data.

(2) Demonstration the seamless support for agrometeorological, hydrological, and environmental services by development of downstream or component-coupled model systems and generation of relevant products.

(3) Enhanced role in operation skill training, which will benefit developing and least developed members in their operation capacity building.

Agenda IV

3. Please provide the name of organizations that you are currently working with/worked/will work, identifying the nature of the work and your role and responsibilities.

Note: organizations can be UN agencies, NGOs, Regional entities such as RIMES and other GDPFS Centres

(1) CMA and the WMO has signed the letter of intent focused on promoting regional meteorological cooperation and build "belt and road neighborhoods", also with the

area along the surrounding countries set up a satellite emergency response mechanism to provide high-resolution ad hoc satellite data support.

(2) Cooperate with EUMETSAT and NESDIS/NOAA in support satellite data sharing globally.

(3) Involvement in WMO's SWFD projects in south-east Asia, central Asia and Bangladesh to provide customized NWP products.

(4) As a core member of the ESCAP/WMO typhoon committee, provide regular and cross-member operational technical training each year, particularly for junior operational forecasters.

(5) Bilateral cooperation with many other WMCs (e.g. ECMWF, NOAA, UKMO, DWD and EC etc) in NWP development and application of NWP products.

(6) Support WMO the establishment of a mechanism for providing meteorological, hydrological and climate information products and services to the United Nations and other humanitarian agencies, and is willing to provide personnel, technical and systematic supports.

4. In relation with question 1, what are the most difficult challenges you met and how you did overcome it, if you did.

In relation with question 1, the most difficult challenges are in two aspects:

(1) Relevant to the development of thorough seamless numerical prediction system. To address these difficulties, international exchange was strengthened and Scientific Steering Committee (SSC) was set up. Also, the forecasters and model developers has been working together analyzing and verifying model performances for severe weathers to make help on NWP improvement.

(2) Relevant to impact-based forecasting and risk-based warnings. To access and sharing indispensable information (e.g. vulnerability and exposure data) in an operational manner from different sectors of society is a bottleneck, which results from complex causes (data policies, development status on owner sectors of those data (collection/process/management etc.).

5. Is there a good example of coordination mechanism between your WMC and other centres you want to share. Tell us why it is a good example of coordination mechanism.

We have established bilateral win-win cooperation with many other WMCs (ECMWF, NOAA, UKMO, DWD, and EC ect.) by formal cooperation agreements. The bilateral cooperation covers mainly the fields on FY satellite data assimilation, model physics, ensemble forecast application, and model verification through exchange expertise, knowledge, experience and short/long term visiting work.

In addition, it has established a real-time exchange mechanism with Tokyo typhoon forecast center.

It is hoped that through this workshop, a multilateral operational coordination and technical exchange mechanism will be formed between the world meteorological centers.

6. As a WMC, do you have specific request to make to SIDS and LDCs to help improve your system?

Note: For instance, Ghana utilized cloud resources with Reading University for forecasting drought. They provided their observations which were assimilated in UKMO Land Surface Model to enhance quality of drought forecast.

Except regular operational real-time data exchange, extended OBS data (e.g. precipitation in higher resolution, flooding and surge data) in real-time and/or in history can benefit on verification and improvement of global NWP of WMCs that will result in better support to the services for SIDS and LDCs, meanwhile WMCs could generate customized impact-based products for SIDS and LDCS.

7. LDCs and SIDS are interested in not only chart-type products but also NWP output. To help them to develop applications (post-processing), how do you see your WMC addressing these needs?

The CMA has adopted the CMACAST system, which is equipped with a specialized integrated weather information analysis and processing system (MICAPS) to support the use of numerical prediction in the LDCs and SIDS in central Asia, South Asia, Southeast Asia and Africa.

At the same time, we are developing a highly interactive CMACLOUD intelligent numerical prediction product application platform, which enables users to obtain gridded, customized NWP products and services.

In countries where conditions permit, such as Bangladesh, the CMA has assisted in building the NWP system in the region based on CMA GRAPES-MESO. In addition, the CMA can help LDCs and SIDS to develop their numerical prediction application (post-processing) systems.