Summary of WMCs workshop

Beijing, China
26 – 29 March 2019

WEATHER CLIMATE WATER
TEMPS CLIMAT EAU

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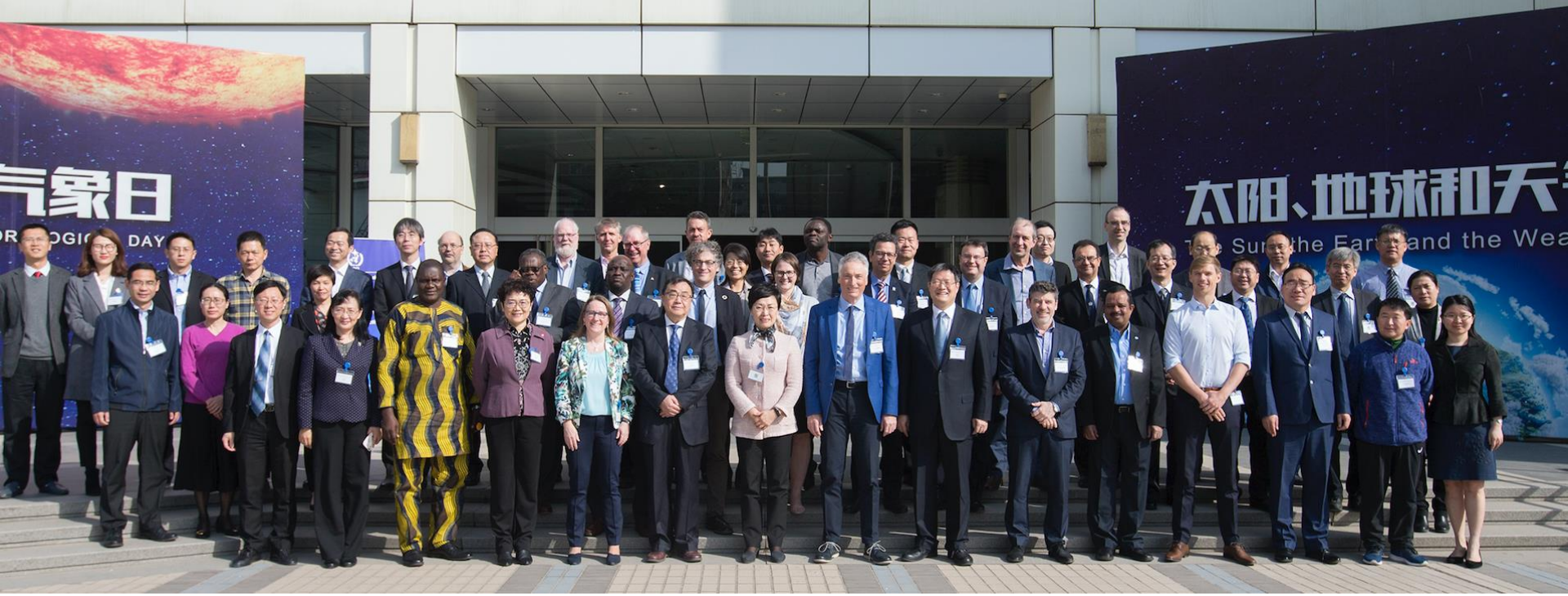
Organisation météorologique mondiale



IMPLEMENTATION PLAN OF SEAMLESS GLOBAL DATA PROCESSING AND FORECASTING SYSTEM

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Workshop contribution
Implementation Plan of Seamless GDPFS

- Areas for improvement in IP of Seamless GDPFS (Decision 40 (EC-70))
- Developed improved understanding of the opportunities for WIS2.0 to enable implementation
- Develop best practices based on models being used to support Members in particular LDCs/SIDS
- Pilot projects and plans (Decision 40 (EC-70))
- Coordination mechanisms
- Support to HA
- participant feedback and ”name game”

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Areas for improvement in IP of Seamless GDPFS

- Action: develop a framework for design of a Rolling Review for user Requirement (timeline, who?)
  - **WMO has a broad ecosystem dealing with stakeholder's interaction (GFCS, RCOF, PWS, Chy ….). How do we make it more effective and coordinate across ?**
    - **Paradigm shift: from just filling an excel feedback table to create dependencies with key final users**
    - **Sample relevant stakeholders and users and work with them for a certain period**
  - Defining users: targeted (NMHS); Final beneficiaries including Humanitarian Agencies
  - Reverse cascade
  - Lessons learned from RRR in WIGOS
  - Other sectors? (hydrology, cryosphere, oceanography, atmospheric composition etc)

Areas for improvement in IP of Seamless GDPFS

- Outline approaches to define the scope of S/GDPFS
  - Climate projections for community resilience? defined by RRuR, Copernicus experience, GFCS/CSIS roles etc.
  - "missing" pieces from other disciplines?
  - Vulnerabilities for impact-based forecasting? (flood risk a potential starting point)

Areas for improvement in IP of Seamless GDPFS: develop BMP for co-design

- Research to operations:
  - Lessons learned from existing approaches in WMC's
  - Approaches in other countries or organizations, not forgetting the challenges for LDC/SIDS
  - Gaps in RDP transition to FDP?
  - Approaches to reward technology/knowledge transfer
  - Strategy to attract universities to SWFDP
  - Consider an operational link with existing coordination mechanisms like WGNE → **to become yearly milestone for WMC meetings while Workshop every 2-4 years**

Areas for improvement in IP of Seamless GDPFS: develop BMP for co-design

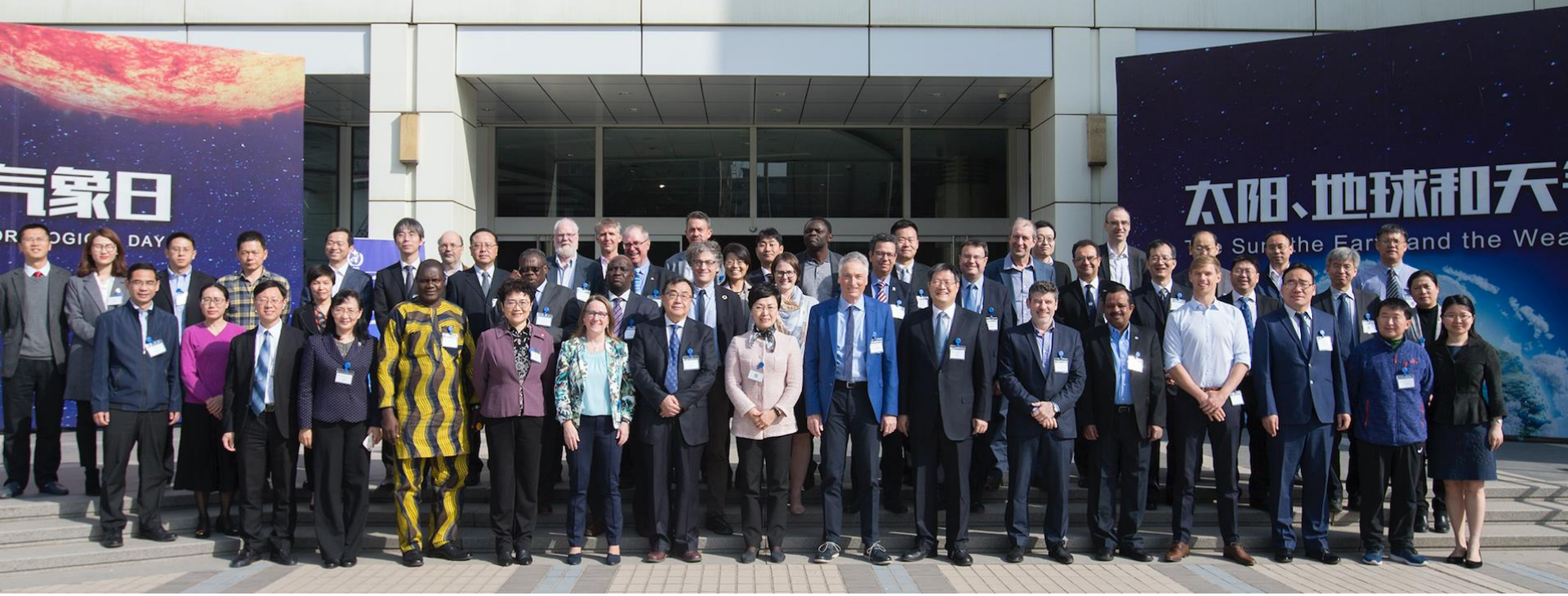
- Boundary between Research and S/GDPFS?
  - **Necessity to identify a concrete mechanism for this interaction continuing working and guaranteeing co-design (WGNE-WMCs)**
  - **Maintaining long-term objectives and implementation plans, complementing with short term tailored pilot projects (ex. AI, scientific visualization)**

Some considerations related to accessibility for the seamless GDPFS

- WMCs to publish data on GISCs by providing metadata
- NetCDF-CF to be included in the formats used for data exchange. Workshop WMO-CF and creation of ET on CF.
- Earth system observations in WIS/GTS. Cryosphere, ocean, hydrology already have systems to collect data from heterogeneous providers. Atmospheric composition more work to be done

Improved understanding of the opportunities for WIS2.0 to enable implementation

- Services using WEB APIs (interactive maps, data selection, operations on data, …) exposed through URLs.
- Use of web open standards to enable interoperability on web.
- Use of cloud to run processing closer to the data to avoid moving big data.
  - Remote processing of data residing in different clouds is a challenge and requires interoperability between clouds.
- New message queuing technologies in GTS are flexible way to exchange observations and products.



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Agenda II. Capacity development for NMHSs in LDCs/SIDS

- Suggested business models to support Members in particular LDCs/SIDS (Business model may be different from one country to another due to its unique economical and technical conditions)
  - Set up long-term strategic plan for each country (leverage of WMO Country Support Program)
    - Myanmar will be best practice (currently working with WB and WMO)
  - Develop implementation plan
  - Additional consideration
    - Provide sponsored staff for LDCs/SIDS at Global Centres (e.g. NOAA African Desk, USA)
    - Dispatch retired experts to the countries
    - Utilize WMCs coordination mechanism

Develop best practices based on models being used to support Members in particular LDCs/SIDS

Catalogue existing practices, develop best practices and identify gaps to leverage capacity

- Data, products and services
- Training and development
- Infrastructure
- Management practices
- Other ongoing support/advice
- Pilots/test-beds: RCOPS, SWFDP…

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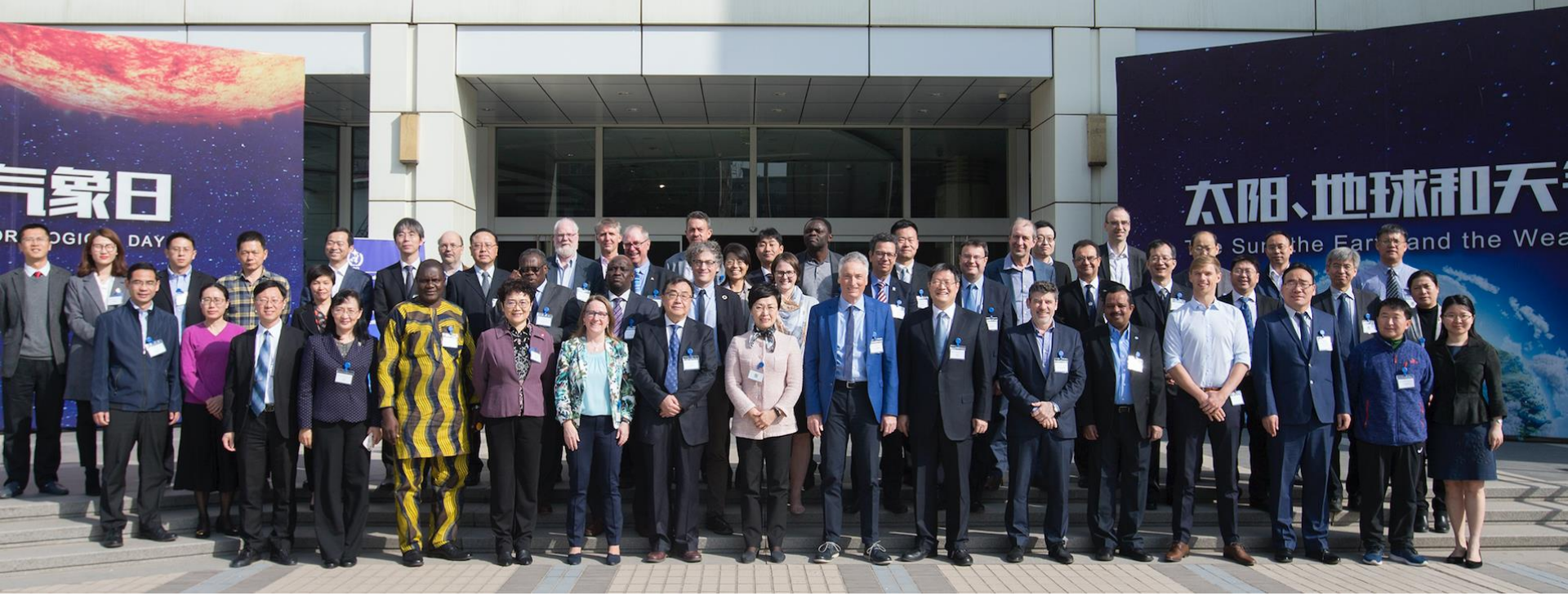

PILOT PROJECTS

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Pilot Projects/Test beds/low-hanging fruit

- Take stock of existing and proposed ideas
- Criteria and Mechanisms to identify how proposals will be developed and when a proposal has a sufficient level of maturity to be considered, such as:
  - **Considering as criteria to prioritize pilot projects: to facilitate the development of an effective coordination among WMCs, RSMCs and SWFPD; to be sustainable beyond its end**
  - Addressing priority needs of NMHS and end-users
  - Testing elements and measuring outcomes of a Seamless GDPFS

A1. Indication of three high priority pilot projects and plans for those proposal that have a sufficient level of maturity - 1 (Decision 40 (EC-70))

- Aerosol-cloud/radiation interaction – integration of traditional weather forecast and AQ models
  - ✓ Develop Integrated Air Quality Prediction and Forecast Systems in Africa (Project 7 in IP)
- Project to demonstrate the use of WIS 2.0
- Project on predicting of hydrological extremes (flood), especially in LDCs
  - ✓ Linking to the CHAMP project with GLOFAS and the Copernicus Climate Change Service (Sectoral Information System: Water) to develop experimental hydrological products (project in IP)
- Project on coordination and inter-operability: Lake Victoria used as an example
- Weather model in the cloud - provide information for a specific LDC region, benchmark for LDC

A1. Indication of three high priority pilot projects and plans for those proposal that have a sufficient level of maturity - 2 (Decision 40 (EC-70))

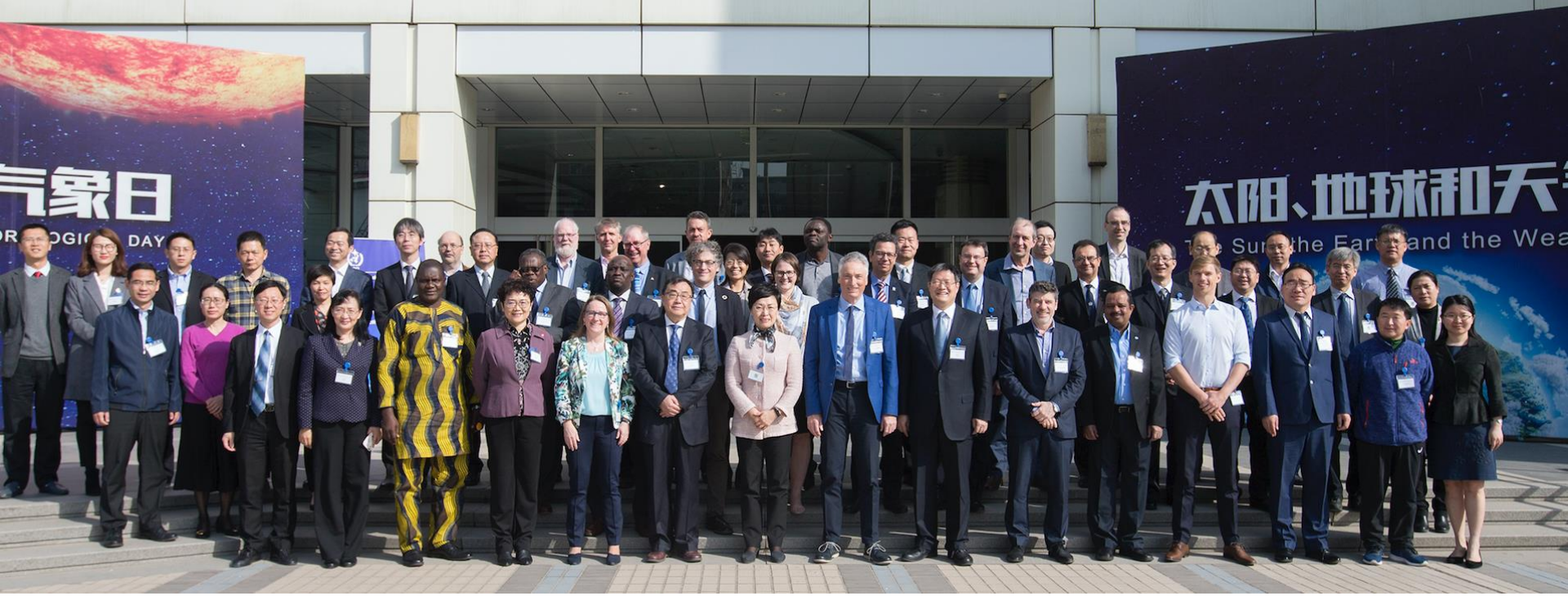
- Seamlessly distill the data along the time scales, developing full chain products (Hydrology test, HydroSOS ex)
- DRR virtual laboratory for forensic analysis using virtual environment with accessibility tools
- Project on AI
  - ✓ Parametrization and calibration
  - ✓ Downscaling for specific sectors (energy, hydrology)
  - ✓ Post-processing methodologies
- Project on transfer of research to operations
- Project on seasonal scale prediction

A1. Indication of three high priority pilot projects and plans for those proposal that have a sufficient level of maturity - 3 (Decision 40 (EC-70))

- Planned Asian Typhoon activity
- Link to SWIFT with potential for pilot project linking to training outcomes
- Link of humidity and dust to meningitis
- Developing and strengthening regional partnerships Project 8 in IP)
  - ✓ Pilot projects would empower neighboring countries to work together on specific areas of mutual interest. Partnerships could be built around the new RSMC's for nowcasting in Tokyo and Hong Kong, and the existing SWFDP to co-design activities, develop products of mutual benefit and work together on verification. Such projects can draw on experience from existing activities such as the SWFDPs and Regional Climate Outlook Forums.

A.1 Priorities for the implementation (low hanging fruit)

- Way to link Re-analysis and reforecast to GDPFS
- Integration of AQ and Hydrology in GDPFS
- Cascading the information down to Multi-model seasonal forecast
- Copernicus- near real term data from Copernicus available
- Strengthening SWFDP in the context of cascading information down
- Very high resolution on fetch prediction
- Processing available data



OVERALL COORDINATION MECHANISM BETWEEN WMCS AND WMCS/RSMCS TO SUPPORT MEMBERS

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Agenda IV. Overall coordination mechanism between WMCs and WMCs/RSMCs to support Members

- There was strong agreement that a coordination mechanism between WMC's, and with RSMC's.
  - Notwithstanding WMO Reform, a mechanism will be developed.
  - Coordination opportunities already with existing mechanisms, like SWFDP and WGNE

- Identification of future roles of WMCs and the best practices to implement the roles
  - Future roles will evolve as the user requirements process begins and as the coordination mechanisms become more formal

Agenda IV. Overall coordination mechanism between WMCs and WMCs/RSMCs to support Members

- Skeleton of coordination mechanism (Decision 40 (EC-70)).)
  - **Efficient coordination mechanism (i.e., facilitators + e-platform, chairmanship among WMC ..)**
  - **Clarity on RMSCs/(SWFDP, hydrology, marine) having a global perspective, are they regional or global?**
  - **More coordination role of RMSCs/SWFDP from RA towards a model with WMC interacting with 6 RAs**
  - **Research-System: strengthen partnership with WGNE**

- Identification of future roles of WMCs and the best practices to implement the roles (from Agenda III related to CBR)
  - Seamless services mean having more coordination across weather (RMSC) and climate (RCC) → also here RA could have a strong role

AOB: WMCs mechanism to support Humanitarian Activities

- Potential roles of WMCs to respond to requests for Humanitarian activities
  - Many of the principles within the S/GDPFS will go a long way to better meet the needs of the HA
  - Determining User needs
  - Data accessibility and consistency
  - Seamless approach in time and disciplines
  - Cascade & coordinated approach WMC-RSMC-NMHS
  - Impact-based and probablistic products and user verification

Participant feedback

- Overall assessment of WMC Workshop
- Share any highlights
- Identify any gaps
- New Name ?

Call for Name

- (WI)CES- (WMO Integrated) Community Earth System
- GAPS - Global Analysis and Prediction System
- GDPS – Global Data Processing System
- GFA - Global Forecast Adaptation
- WIEPS – WMO Innovative Earth Prediction System
- WIMS – WMO Integrated Modeling System
- GDPFS v2.0
- GDPFSS – Global Data Processing and Forecasting System & Service

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thank you
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- Engaged participation
- CMA a wonderful host

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