

Group 1

System

What do we know about user groups and their needs, models, data and interface that could be integrated in earth System ?

- Modelling Earth System. - Other users in Earth system necessary - Global Air quality and hydrology need to be included
- Climate prediction and issue dealing with longer term prediction important – consider inclusion
- Atmospheric composition also important to include
- Users groups/clients how do we define them?
- Definition of users is also important
 - o Is it the role of GDPFS to identify the users' needs?
 - o The man in the street is not the primary users of the GDPFS
 - o GFCS is also the users of GDPFS.
- o Short term climate prediction such S2S providing information
 - o Boundary of GDPFS and WWRP what is it?
 - o Climate change interest is also affecting decision maker
- o How do we define Seamless?
 - o In China it is up to 3 months. China, local decision makers are the main users needing information several weeks in advance up to a few month.
 - o For air pollution, looking at 3 months ahead
- o **Need to define the end of Seamless**
- o **What are the key gaps in modelling... data gap is in the sharing of non-traditional observation (snow depth measures etc) – a lot of gaps for example on convection permitting forecast- moving to probability forecast**
- o **Integration of system is the contribution of various models**
- o **Limit the scope of GDPFS to technical aspect, not going into people aspect**

System

What issues related to coordination and interoperability need to be addressed? What (pre-existed systems) can be leveraged

- **Data compatibility issue in copernicus has been a long process (many data-provider) came up a standard data set to allow different information to be processed together... needed to work with data providers to get there: **contractual arrangement****
- **Needs to learn from Copernicus**
- **Role of the private sector increasing – need to think interoperability with private sector**

System

What are low hanging fruits to advance the S/GDPFS system?

- WGNE is the interesting place where research, operation and climate folks work together and needs to be linked to GDPFS – strengthen the role of WGNE
- Should find a way to link Re-analysis and reforecast to GDPFS
- Integration of AQ and Hydrology in GDPFS are low hanging fruit
- Cascading the information down to
- **Multi-model seasonal forecast is low hanging fruit.**
- Copernicus- near real term data from Copernicus available
- Re-analysis would help policy setting
- **SWFDP is available to cascading information down---need to be strengthened**
- **Portal for catalogue of latest development and availability of data? (accessibility)---WMO should offer this system to highlight the contribution of GDPFS centres. Across WMCs and particularly in AQ**
- **ents;**

System

What are low hanging fruits to advance the S/GDPFS system?

- AQ model - Aerosol interaction is a major issue – pilot on traditional weather forecast and air quality.
- Gap on flash flood warning
- Very high resolution on fetch prediction is also long hanging fruit
- Need pilot projects in different regions.
- Processing available data is also a low level hanging
- Wx fcstg important for flood forecasting –
- **Exploit the information on TiGGE – proposed website linked to TIGGE**
- **What scale the high resolution information need to be retained in terms of users requirement**

Accessibility

How S/GDPFS could take full advantage of WIS 2.0?

- How S/GDPFS could take full advantage of WIS 2.0?
 - Accessibility (users accessing data) and interoperability (users to process the data in the cloud)
 - Data providers need to use format standards
 - WMO developed a series of standards for data/information which are followed by the centres. Now with the new technology there is need for new set of standards.
 - **Forge the integration of current WMO format with other formats being introduced with new technology (API)**
 - **Copernicus tools/systems can be integrated in WIS 2.0**
 - **From WIS data policy for exchange with private sector.**
- **How to change the users habit to use the clouds. Need use case to demonstrate the feasibility**
- **NEED info on data needs -**
- **Need for high quality data...will this be made free of charge. How are the latency of the data for use by clients?**
- **Hydrology: need information from GDPFS**
- **Case study for API – API allow you to select the part of data you want and to process. Another option is to process in the clouds**
- **SWFDP cascading implies Regional centres can play the role packaging the data. Could be the back end of the GDPFS - South Africa is an example. Deon to check with Colleagues in South Africa.**

Accessibility

What are the alternative systems/Networks for accessibility to ensure key Information is received by Members in emergency case?

- Prepopulated products
- Building web interface –
- Pilot project to demonstrate the use of WIS 2.0
- Product of WIS 2.0 discoverable on service providers (google)
- Quality of data - who is responsible when we have a multitude of sources?
- On Quality of data, the data provider to provide extra information (metata data)
- Back-up system of WIS is to use the GISC which keeps the data for 24h and which are linked.

Suggestion to hold the workshop regularly to discuss these issues.

SWFDP feedback back to regional and global centres

Innovation and Research

What are the priorities Innovation and research themes for the S/GDPFS; how do these needs be coordinated internationally

- Keep in mind current projects in WMO: HIW, YOPP, S2S, Polar and other work such as WGNE, RORPEX, TIGGE – building on existing work and identify gaps
- Pilot project on transfer of research to operations
- Moving to unified models is a trend now -
- Coordination to facilitate the development in one centre can be used in another centre.
- **WMCs to be able to share their information for improvement of services – Collaboration among WMCs is very important**
- **Platform in WGNE needs to be strengthen**
- Need to consider how open source code can be added in the process moving forward
- Cooperation between centres is important
- **Convective ens. prediction system important for the short range forecast**
- **Using the platform like this for RSMC and WMCs to discuss what they need from each other to advance**
- **Demonstration project, like SWFDP, is a good place where research and operation can be brought together**
- **Need to tap into resources in GEWEX**

Innovation and Research

What are the priorities Innovation and research themes for the S/GDPFS; how do these needs be coordinated internationally

- Water resources assessment and forecasting and climate projects
- Hydrological extremes (flood) should be considered in the pilot project, especially in LDCs
- A lot research needed around pcpn forecast implying more work in clouds physics to support water management
- Strong research emphasis should be put on water and AQ
- Global data processing research is a good one to do as pilot project
- **Atmospheric composition – Copernicus identify the need for research to EU. Focus is on DB using the sentinel satellite. Already working in integrating data from that satellite to assimilate atmospheric composition in their model. Research to transfer atmospheric composition in the model is important and very useful. Need from policy makers and other to define whether xtrm events can be attributed to climate change or not.**
- **Centres to get together as a group and to develop research priorities for the attention of funding agencies such as EU**
- Issue discussed on the proliferation of centre – need WMO to request centre seeking designation to share the result of their NWP of comparison with other centre to understand performance
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Innovation and Research

How do we establish and implement principles of co-design between operations and research?

- Research and operations should tighten the loop between them (ECMWF example)
- ECMWF – research team work under the schedule of the operation.
- USA – co-design is part of the research and operation teams.
- Uniform standards between research and operation; data structure, S/W etc... is essential for WMO/GDPFS to establish
- **Operation driven research - answering to operation needs – Targeted research**
- Research to understand operation requirements
- More cooperation and less competition
- Report of Economic forum implies more work in getting improved warning

Innovation and Research

How do we establish and implement principles of co-design between operations and research?

- Verification of forecasts and feedback – more feedback needed
- R2O some barriers to overcome...hard to get research data in a format to be used by operations – S/W very complex to use in the operation
- Strengthening the feedback loop in SWFDP
- *Svr wx, WMC to send people to Oklahoma/Seasonal scale pilot project*
 - *Training to use the information and apply*