

High-Level Round Table for the Launch of the Open Consultative Platform

Summary of responses to pre-event questionnaire

The main concept of the OCP is to help articulate a common vision for the future of the weather enterprise in the coming decade and beyond with the expectation that the next decade will be the decade of digital transformation in almost every sphere of businesses and human activities. To help the Round Table discussion, participants were invited, through a small survey, to share initial thought on their vision for the next 10 years and related obstacles/barriers that need to be overcome. The survey also asked about expectations and suggestion on the future operation of the OCP.

Close to 40 responses to the surveys have been received. In summarizing these responses, five themes appeared as areas of common concern. Following the "Chatham House rule", a summary of the main views, without attribution to their originators, is presented below following the five main themes. The responses to questions 1 and 2 are summarized with some selected views presented, as in their original, in quotation marks; all responses to questions 3 and 4 are given in full, as material for further analysis.

Q1: Use your knowledge, imagination and sixth sense and try to envision how the weather/climate/water/environment information and services in 2030 will be different to today. Outline three major advancements you can foresee.

*"Forecasting is very difficult, especially about the future."
(probably, Neils Bohr)*

Theme 1: Data and ... more (shared) data

There is a strong consensus about the expected "exponential increase in the available observations including expansion of in-situ and remote sensing observations as well as observations from non-conventional platforms and sources (e.g. unmanned systems, crowd sourcing, etc.)". The technology-driven growth of data is expected to be non-linear (e.g., "sensor explosion", "data revolution", "unprecedented", "a flood of new observations") and is expected to come from various sectors, with much stronger presence of private sector, and from various sources including platforms on vehicles, buildings, bridges, etc. Personal devices and cameras will become widely used data sources and integration of conventional and non-conventional data will be mainstream.

The 2030 data landscape is highly automated, IoT and AI driven. Availability of lower cost observing equipment and systems, smaller and more affordable space-based Earth observation platforms, will help to improve the global data coverage and resolve today's

data gaps. The unprecedented increase of real time digital data with much finer resolution will accelerate the provision and the availability of highly accurate and localized user-oriented products ("narrow-casting").

The 2030 vision of a completely new data situation comes with a good consensus on the data sharing and access to data mechanisms in a combined public-private domain. Such mechanisms ensure that data and services are available to everybody as a public good globally and locally and accelerate progress by urging all countries to contribute with observations in return for access to risk reducing data streams and services in all societal sectors depending on weather, water, climate and the environment.

There is expectation that 'open data' will be embraced by the whole enterprise, guided by "new WMO data policies which set standards and guidelines needed to promote the open sharing and access to meteorological and other environmental data". At the same time, incentive-driven mechanisms will make "a wide array of data available through a common "data-mart" with associated metadata".

Having more and more data will require special effort to ensure "interoperability of formats, services, databases".

While the expectation for the exponential growth of data is non-disputed, the 2030 data landscape may be flawed by issues of uncertain data quality from some sources and related data integration issues.

Theme 2: Forecasting and ... forecasters

How the numerical modelling and forecasting will look like by 2030 is a key component of the 2030 vision. There is a solid consensus that the Earth System modelling will prevail – “a science supported and user driven seamless Earth system modelling capability is built on a global level, supported by interoperable observation systems for the provision of weather, water, climate, marine and environmental services. The Seamless Global Data Processing and Forecasting System forms the basis.” More specific views include that the evolution of the NWP models will be towards “global models which do not need parametrisations of deep convection, orographic gravity wave drag and ocean mesoscale eddies”, and “global convective permitting ensembles and deep learning”, and “predominance of probabilistic Earth monitoring and forecasting, with relevant user-oriented products”.

In support to the 2030 vision for a more resilient world, the expectation is that “most severe weather events will be accurately forecast through advanced Earth System Modelling and there will be concerted, science-based international action to address climate change”.

Big changes are envisaged in the future profile of “the forecaster”: “The role of forecasters would change significantly. The advisory role to various clients will become their main duty, rather than “forecasting,” which will be gradually replaced by AI”. In general, it is expected that “most weather forecasts will be direct NWP output” and that “weather forecast will be done automatically without human intervention and delivered directly to the user”. However, “there will be still the need of well-trained meteorologist”. Operational forecasters will use little to none of their time for model analysis in the way they have done it before; instead, forecasters will use model output to downscale, localize and tailor the forecasts in order to provide “specific, enhanced, and actionable information and services” that enable proper decisions. “Greater predictive capabilities through coupled models require less manual manipulation of forecast output, more attention on customer/user needs/communication.”

The overall expectation is for an improved accuracy of high-resolution forecasts at all ranges, from extremely local, to medium- and longer-range. There will be an “increase in business-to-business (B2B)” services” and services “will be more targeted and personalized, meeting the demands of the public and the industry”. The result will be a hugely positive impact for the society bringing new level of socio-economic benefits.

A summary of these expectations is: “Real time to decadal prediction of all key phenomena at microscale resolutions in space and time available to anyone, anytime, anywhere”.

Theme 3: Demand and Supply of Services ...

Weather/Climate/Water/Environment intelligence driving decision-making

There is no dispute in the 2030 vision that the “service delivery will be done jointly by public and private entities” and that there will be many more players as “environmental intelligence drives decision making”. Thus, a key element of the vision is that weather and climate information will be much better integrated in decision-making at all levels and will support complex systems and decisions “in accelerating global economy,

protection of life, property and poverty reduction". The optimistic views envisage also "endless capabilities to meet the ever-growing user requirements such as reliable services at localized scale".

A main element of the future vision is that the "multihazard and impact based forecasting will live up to its name". Weather and climate data will be regularly combined with non-environmental data using AI and machine learning to provide tailored information seamlessly to the end user, in more detail, specifying the impacts to them. The goal will be to deliver impact-based information "with a range of behaviour scenarios for the general public and businesses".

"Going beyond the forecast to "decision makers". Impact-based Decision Support Service (IDSS) as the predominant service model and AI or machine learning becoming part of our tool box."

Regarding the delivery to end-users, it is easy to predict that "information on weather/ climate/environment will be available on everybody's smart phone in a much more individualized form than today". The "radio and television weathercasts - the primary method of weather information to the public [now] - will still exist, but with fewer outlets and higher resolution narrowcasting rather than broadcasting". As an example, "technology will enable us to see what will happen in stunning detail; if flooding rain is predicted, we'll be able to use augmented reality/virtual reality (AR /VR), etc, to show the impact on every person's street".

A comprehensive vision on demand-supply of services in the future will require better engagement with the broader users communities. "The current trend towards Integrated Decision Support Systems will bring the power of more rapid and timely data and information to the end users (society). Those users are the decision makers in Disaster Prevention and Response, Aviation, Agriculture, Water Management, Insurance, Finance, Retail, and many other areas that rely on accurate and timely weather observations and forecast services. As we better understand how weather observations and forecasts impacts the decisions need to make, collectively we can better integrate that information into decision support tools that allow a greater benefit to society."

There will be a mixture of free available and "paid services" in the various business relationships between the providers and users. There will be a much better understanding of the added value of the services by "systematically connecting weather and climate information to sectorial information (vulnerability in the most general sense)". "Weather services will be more diversified and detailed to meet the specific needs and requirements from industries, and more new meteorological businesses will be widely born."

A possible risk exists that, in the increasingly complex service delivery landscape, the traditional meteorological service provider (e.g., NMHS) may lose the direct contact with the end user of meteorological and climatological information which should be avoided through new forms of cooperation between information providers of different sectors.

The big improvements in the service delivery capability will, in return, impact on weather and climate sensitive industries, reinforcing the demand for new services. An example from the insurance sector is that "the advancements in measurements and observations will drive a massive push to manage weather and climate risks via risk transfer to insurance, reinsurance and insurance-linked securities (ILS) markets. Climate risk

reporting will be mandatory for all sizeable organisations and active management of climate and weather risks will be commonplace”.

In conclusion, the expectation is that in 2030, “everybody will be informed of the weather which may impact their life in the individual situation, such as daily home life, tourism, health, etc., through the best media and in the best format for the situation.”

Theme 4: Capacity gap ... Alleviating inequality and advancing together

In 2030, “the capacity gap between the developed and developing world has decreased substantially and forecasts supporting the fundamental protection of life and property are available worldwide”. Weather information is integrated into civil decision making, globally, mitigating the impact of severe weather, climate and water events to the extent possible in each country. “The dependencies between, on the one hand, weather, water, oceans, climate and pollution, and on the other, the risks and value associated with food, health, energy and transport availability are obvious to everybody”.

Improved partnership and enhanced engagement of all sectors (Public, Private, academia, NGOs) in improving services through application of technologies and innovation for precise provision and use of information and services (weather, climate, water) for the benefit of various sectors of economy.

The improvements of data and service capacity in less developed countries is based on “more impactful and coordinated support of development partners to NMHS”.

Capacity improvements will not be automatic and are envisaged for “countries, which proactively embrace new thinking and business models, innovation, non-traditional ways of generating and delivering services, while others would struggle to make a transition to/adapt to the new landscape”. To support the proactive approach, it is expected that “due to increased impact of extreme weather the significance of weather prediction is better understood by the general public and governments”. Weather service “will become a key social infrastructure for the general public, like water, electricity, gas, transportation, or communication network”.

To allow the developing countries “advance together” with the developed world, NMHSs will still have a key role, therefore “bridging the gap between advanced and developing NMHSs need to happen through all forms of partnerships, shared interest and optimized implementation of the global/national meteorological value chain”.

The impact of an enhanced global capacity on the national capacity of developing country will be a decisive factor in bridging the capacity gap. Operational/business models with cascade value chain in which there will be “more regional/collective approach/ownership” of the parts of the chain will help utilizing national/local resources better.

Significant improvement in the provision of essential services will come from “the advancement of Information and Communication Technology (ICT) and other science and technology, including meteorology, so that every country, regardless of developed or developing, will have a practical framework and capacity to ensure that the disaster prevention authorities as well as the people receive, understand and utilize weather

warnings and related data/information to take appropriate measures to protect life and properties from weather/climate/water related disasters”.

Theme 5: Roles, responsibilities, partnerships for common actions

Strong consensus exists on the need for “structured global partnership with clear roles, responsibilities and contributions”. This includes “enhanced engagement of all sectors (public, private, academia, NGOs) in improving services”.

At national level, there will be changes in the role of the public and private sector entities in the service delivery; in some countries, private sector will have a major role. The expectation is that, regardless of the relative share of each sector, respective roles will be better defined through relevant national framework.

In summary, “clearly defined and mutually agreed upon roles for the public, private, and academic sectors are established which focus on obtaining the goals of enhancing awareness of hazardous and impactful weather, mitigate the negative impacts of weather on economies and global citizens, and enhancing safety and preparedness. It is important to note and understand that one model that has worked well in one country may not exactly apply to other parts of the world”.

The 2030 vision puts strong emphasis on enhanced mutually-beneficial partnerships between the sectors and stakeholders across the enterprise. “Partnerships can take many forms and can involve two or more participating partners, that utilize the strengths of each partner to achieve a set of defined goals, in a manner that is mutually beneficial to all involved. Good Partnerships will have very strong collaboration, with multiple levels of checks and balances to help ensure all partners are contributing and receiving what is necessary to sustain the Partnership”.

The evolving role of the WMO has a prominent place in the 2030 vision. “WMO - as the only technical, global, environmental organization – rises to a global leading role in fostering science hand in hand with technological and cultural enablement to maximize current and emerging capabilities to the benefit for all Members”.

“The structure of the WMO has evolved to an organization based on public-private partnerships which is wholly inclusive of all members of the GWE. WMO membership not only consists of member states, but also member organizations largely from the private and academic sectors”.

“WMO has managed to keep the big-data revolution in a combined public-private domain in such a way that the opportunities and services are available to everybody as a public good globally, and has in this way avoided that “the winner takes it all” and has on the contrary accelerated progress by urging all countries to contribute with observations and user experience in return for access to the risk reducing data streams and services in all societal sectors depending on weather, water, climate and the environment.”

WMO role in setting policies and standards, and the need for WMO, by 2030, to accelerate the creation and improve these policy and standards.

“Representative diversity, especially of gender, in the delivery of w/c/w/e information and services and in the governance and working bodies of WMO”.

Special views:

In 2030 climate change is even more urgent today with social instability on the rise in poorer parts of the world. Geoengineering is pushed for by global companies with the support of countries with weak governance structures. WMO should prepare for this situation by supporting research of geoengineering options and uncertainties, and should pursue vigorously the development of a "Global Law of the Atmosphere" that can provide a responsible, global platform for geoengineering discussions.

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Q2: Which problems or barriers that exist today need to be resolved by working together in order to achieve the vision you outlined above?

"The job of a leader is to spot barriers that hinder information sharing and collaboration and tear them down..."(after Morten T. Hansen)

Theme 1: Data and ... more (shared) data

A number of issues exist related to the current availability and exchange of data, and related international/national policies. There is a strong consensus about the need to make more data available: "Improved observations globally are desperately needed, particularly in the observation-sparse areas of the globe". A major problem is the persistence of data-void areas in some developing countries: "Data gaps have to be filled systematically by sharing know how and funding in an appropriate way". There is a strong concern regarding potential deterioration or disruption: "Global exchange of numerous high-quality earth-system observations is needed; need to guarantee that there is no erosion of the global observing system, and the new players in the field of earth observations are complementing the system without major disruption".

"Free and open exchange of data need to be maintained" is a repetitive view of the surveyed experts. And ... "A free data policy that has a built in prohibition of "the winner to take it all"".

There is a strong call for a comprehensive approach to data policies and data sharing practices: "Data rights and exchange rules need to be resolved globally with WMO leadership"; "The GTS and rules associated with data sharing (resolution 40, etc) need to be updated"; "More open government data and a level playing field for private sector to enable a thriving weather value chain"; "Global, homogeneous data policy is required enabling unrestricted access to relevant data by all".

Existing national data policies sometime are seen as barriers that need to be resolved "Government's restrictions or regulations against the open data policy". One response states the "lack of willingness to share data" as the major barrier. "Everything else is minor in comparison".

The utilization of the emerging new data sources needs a strong quality assurance accord: "There is a need to assure the quality of the diverse range of observations now available, including those from non-conventional platforms and sources (e.g. unmanned systems, crowd sourcing, etc.)"; "Better standards for calibration and classification of measurements".

The core basic infrastructure for data needs to be sustained and developed further, which depends on sustainable public investments. At the same time, "business models which would incentivize data provision should be developed".

At least one response highlights the need for "step change in observing and understanding oceans and cryosphere".

The data exchange and providing easy access to data require fast uptake of advanced ICT solutions. "Finding a means to share all weather observations freely in the modelling, forecasting and service delivery communities" is seen as a key task for collaborative cross-sector work.

Theme 2: Forecasting and ... forecasters

To progress more rapidly, there is a need to raise the ambition, for instance: "Treat the developing weather and climate models with the same ambition as we put into the Large Hadron Collider". Connected with this ambition: "Focused, aggressive investment in numerical weather prediction is needed", as well as "fundamental investment in basic science and science collaboration".

"Focusing on global modelling by many" stakeholders is seen as an inefficiency of the current enterprise; it could be overcome by the understanding that "true value" for many providers "could come from focusing exclusively on downscaling and service delivery".

Another constraint is the "reluctance of embracing probabilistic information" and another ambition may be to "give up on the concept of deterministic prediction completely".

In preparing for the evolving role of weather forecasters, adequate changes are needed in the education and training programmes "so that they become weather consultants".

A negative trend and characteristics of the current situation is in "the many sources of weather forecast and warning information which do not always provide a consistent and coherent message". Related to this, many respondents highlight the need for quality assurance and standards to spread over the forecasts and products available from various providers through different media.

To accelerate the improvements in data processing and forecasting, "there is a need to partner with IT scientists and major companies to ensure that the best technology for an efficient extraction of data information is utilized". This includes super-computing and super-storage, fast and open Internet.

Theme 3: Demand and Supply of Services ...

Weather/Climate/Water/Environment intelligence driving decision-making

There is a general feeling of "underappreciation of the benefits of weather, water and climate predictions" and services among the governments. In this regard, "communication about severe weather and climate change still needs to improve". "More work is needed together with social sciences to develop the right language".

"Lack of regional or sub-regional understanding of the extent of private sector involvement along each point in the value chain" is an impeding factor.

The continuing effort on impact-based services needs "more systematic collection / management of "impact" data, and more scientific work in the field of applied meteorology, in order to help decision making process of all kinds".

"In order to adequately serve all those affected by climate change and the more extreme weather conditions we are experiencing, we need to have easy and cost efficient access to weather data" to design products and services for "risk mitigations strategies for all those affected".

To advance the services and service delivery in all areas, there should be a "profound shift in the relationship between science and society - the transaction of trusted science into action". "We need to reinvigorate a global Grand Challenge to advance all forecasts especially at the local level."

Some general risks in the digitally connected world are seen also as a risk to our community, e.g., how to deal with the “Emergence of fake news in our field”.

Theme 4: Capacity gap ... Alleviating inequality and advancing together

A major obstacle in moving ahead as a global community is the “Lack of capacity in developing and specifically least developed countries to cope with emerging technological changes and lack of legislation and policies to guide partnership and engagement of all sectors. Inadequate resources (e.g. skills and infrastructure) necessary for enhanced service delivery. Shortage of skilled human resources and deterioration of infrastructure” need to be addressed urgently”.

“Capacity of all countries should be enhanced not only in the area of meteorological monitoring and prediction and related Information and Communication Technology (ICT), but of broader areas including legislation, strategic collaboration with disaster authorities and other relevant bodies, public awareness activities”.

“A seamless and sustained link exists between capacity-building, community-based implementation and the role of the natural environment in sustaining livelihoods, economies, and our values.”

The current landscape contains large gaps between the developed and less developed nations, both in observations and in services. This situation needs to be resolved in order to achieve the vision. A number of potential actions and needs have been outlined in the survey:

Development financing: “In development financing, the current way of financing simply reinforces a traditional capital-based infrastructure approach. More policy incentive type investment/results-based approaches are needed. Leveraging private financing would also be explored as well”. “Lack of long-term and coordinated grant funding to support bridging capacity gap in developing countries”. “Structure of international financing for capacity building activities needs to be looked at and addressed”. “Donor funding for capacity development in developing world needs to be reformed significantly. Funding mechanisms and structure needs to be changed”. “Coordination and prioritization of investments need to be established within the UN family of organizations”.

Sustainable business models: “There is a lack of sustainable business models for service delivery in developing countries [NMHSs]; this must be overcome or the service model must be changed (e.g. changing roles from pure service delivery to an oversight or governance role, where appropriate)”.

“An Understanding of Sustainability: It is important for all stakeholders to realize that sustainability is something that must be planned from the very beginning and designed into any organizational system being developed”.

“Loss of application of indigenous knowledge due to selective globalisation i.e. dominance of knowledge/value of other regions/countries; disproportional access to resources and technology”.

The development of capacity along the value chain includes the capacity of decision-makers. “Governments at different levels are not that aware of the risks of meteorological disasters. Their capabilities in disaster prevention need to be improved”.

"Lack of coordination on implementation across the scales of governance with unclear division of tasks and responsibilities of actors, especially under conflicting timescales of interventions, and response."

Theme 5: Roles, responsibilities, partnerships for common actions

A dominant barrier description in the responses is "lack of trust" between public and private sector. "Misunderstanding and a lack of trust still exists between the public, private and academic sectors of the global weather enterprise. This needs to be alleviated in order to achieve anyone's vision for 2030. We need to seek to understand each other and where we can best contribute to the common goals and vision". Neither sector can do everything on its own and each part of the enterprise need to provide their best expertise – "the whole is greater than the sum of its parts".

A good description of the situation is the "Us vs Them" culture: A culture that views the Public sector and Private sector as being on opposite sides of all issues, is our single largest barrier we face and which retards our forward progress".

In addition, "there is a general fear of the recent trend toward public sector use of private sector capabilities for services of many types; Data services, Computing services, IT services, Forecast services, etc. However, it is important for public sector to realize that the private sector is not intending to replace high quality services already provided by any NMHS".

To resolve the "lack of trust issue", "High-level dialogue at appropriate fora is needed to facilitate a policy shift. Discussion there should be aiming at maximizing the countries' benefits, not the benefit of any particular sector or entity".

At this stage, the lack of "clear, well-defined, and mutually agreed upon roles and responsibilities of public, private and academic sectors" is seen as an obstacle for better synergy and cooperation. There is a strong need to identify "means and/or structures through which NMHSs and private weather service providers can work in a complementary fashion to provide a range of forecast services to the the public authorities and entities, to commercial users, and to general public through broadcasters/websites/social media, etc."

There is an important role foreseen for WMO in resolving the existing issues and barriers. "Integrating the private sector (and academia) fully into WMO work so that regulations, standards, guidelines, competency frameworks, etc. are developed in coordination with private sector experts"; "Full integration of the private sector into the WMO and facilitation of a "level playing field" for all sectors to enable a thriving weather value chain still needs attention". Work on "principles, pathways, processes and business models whereby all parties contributing to global w/c/w/e information and services commit to collaborating, especially to ensure the free and unrestricted exchange of data essential to global NWP and cascading seamless services".

All above issues and barriers should be seen in a broader political context whereas "The current political evolution in a number of countries supporting a narrow national approach, rather than a collective global one need to be addressed. Decisions based on short term socio-economic return. Need for much stronger cross disciplinary and cross border cooperation". At international level, "countries should reach a consensus and

strengthen cooperation in climate change response and the protection of ecological environment”.

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Q3: What are your expectation for the Open Consultative Platform and how do you envisage your engagement in it?

- Broadcasters, as part of the private sector of the weather enterprise, are dependent on the free flow of weather data in order to reliably deliver high-quality weather information to the public. It would be helpful to have a weather enterprise that helps this become possible in all countries around the world.
- Support of basic concepts of data policy developed by WMO like Res. 40 of Cg. 12, recognition of the global meteorological infrastructure coordinated by WMO
- As a private sector operational forecaster, I don't foresee the Open Consultative Platform impacting my daily activities at work in the short term. As our roles change, and especially if TV news disappears, I think I might transition to a role where I use the Platform on a regular basis to share information with colleagues in the Emergency Management community and other stakeholders as I help them make decisions.
- Positive.
- No idea!
- The Open Consultative Platform provides an enormous opportunity to align the interests of all players in the weather value chain. Equipment manufacturers, National Weather Services, Private Weather Services, Different Sectors of the economy and Society at large. This will contribute to the engagement.
- Following much talk at various fora over the past 18 months or so, it is time to decide on more concrete measures to better engage the private sector and academia with the work of WMO and the NMHSs.
- We have to understand better how OCP will work and what role is expected from partners.
- Optimism: I am optimistic that the OCP will further encourage open and honest dialogue between all sectors of the Weather, Water, and Climate community. It is only through this continual discourse that we can make progress towards improved benefits to society. However, I am a little disappointed that nowhere did the survey ask for what is the vision for the future. The survey merely asked what problems exist and what does the future look like. Neither of these questions can be resolved if you do not create a common vision that all three sectors believe in. It would be my hope that the OCP would create a true strategic process beginning with a SWOT (Strengths, Weaknesses, Opportunities and Threats) Analysis. From this we would create a vision that all would agree and adhere to when we open true discussions on the future and how to remove the barriers. While I realize that we cannot create a perfect roadmap to resolve all the issues we face, if we do not have a common understanding of the vision, we can never make progress on problems we believe are important to resolve.
- As the discussion at OCP has implication to the hydromet business of 10-20 years later, I really hope OCP would successfully engage younger generations/young leaders in this domain who will be in the central stage in 10-20 years.
- The importance of weather, climate and water for the future of the planet and mankind increases day by day, a global cross-sectoral effort is needed and welcomed. Our company, as a leader in weather observation technologies contributes actively to this ecosystem.
- It will be interesting to whether the various components of the meteorological community can work in harmony to enhance wellbeing and economic development. I will be particularly interested in ways in which meteorological societies can more effectively support the weather enterprise.

- I expect a lively discussion between various actors in the field of weather, to pin down the major challenges for the future which WMO is expected to help.
- Our company plans to be an active partner and thought leader in the Open Consultative Platform, bringing to the table our experience working in partnership with public, private, and academic sectors during our 57+ years in business. Our expectations for the OCP is to have it serve as a productive forum to open up new ways for the Global Weather Enterprise to make connections, build trust between all the players, and assist in furthering the understanding of the benefits each part of the Global Weather Enterprise brings to the discussions. If the OCP is successful in these aforementioned areas, we foresee this group playing a key role in shaping the future of the weather enterprise in the coming decade and beyond.
- Establishment of genuine collaboration and dialogue, and clear pathways to partnership and engagement across all of the parties involved in the global w/c/w/e community, on ensuring that high integrity, high impact and highly accessible w/c/w/e information and services are available to every member of society
- I am expecting to see and listen different opinions for analysis and progress for further activity. I hope I will have dual (or other) discussions with different participants
- That's a great question. How is this different than to the GWE? How will the Private Sector be represented? How is it going to function going forward?
- I am not sure I can fully answer this question, as I need to know a little more about the OCP and the associated vision.
- A practical and concrete path forward, and I am engaged to make this work.
- Further the dialogue between various actors: public sector, private sector, civil society ...
- Open a consultative and informal forum to put proposals in the table that could be accepted by all NMHS.
- I am hopeful that this platform will continue the ideas started under the Global Weather Enterprise Forum linking the three sectors and accelerating improvements in the developing world at a speed that is sometimes not possible in a large organization, such as the WMO. Ideally, it would act much like the World Economic Forum on a smaller-scale selecting critical topics for the future and bringing nations closer together. Will do anything needed to help.
- Be part of a growing body of concerned citizens for the modernization of the sector.
- I have been involved in the GWE Forum for more than 1 year. This unique experience helped a lot fostering dialog between academic, public and private sectors. GWEF experience is valuable and can be shared before starting OCP full scale. One can have big expectations for the OCP, and be realistic at the same time: everything takes time, all the more that public organizations are involved. Important thing is to help all parties involved understand that they are working for shared interest and mutual benefits, for the sake of people. Outcome of OCP may be in the form of new (successful) practices one can adhere to, not necessarily new rules. This can happen in the field of new business models, data exchange, service delivery, etc. I am ready to be engaged in the OCP if my presence makes sense, but will always keep priority on steering my boat, trying to set the GWE and then the OCP principles to operation! Practice will validate theory always!
- In order for each country to enjoy the benefits of public-private partnership and also taking into account different national policies, social systems, etc., some kind of scheme for government-private collaboration should be established at the national level. However, considering that meteorological business can easily cross the borders, and that international data exchange and collaboration is essential for the services of NMHSs, we need to have a forum to exchange the views and information between NMHSs and between

NMHSs and the private and academic sectors collectively. Open Consultative Platform should provide such broad forum for dialog. This will also provide good opportunities to identify the requirements for capacity building, particularly in the area of legislative framework and the strategic collaboration with other disaster related institutes.

- We, as a private weather information service company, would like to create new values of meteorological information with/through Public, Private and Academic Partnerships all over the world. The critical factors to achieve those goals are: recognizing and legally defining the roles and responsibilities of each sector; and establishing the collaborative environment among three sectors with mutual respect and trust. Within the Open Consultative Platform, we would like to enhance this movement by promoting and sharing the real success stories of PPP.
- A clear realization of the critical global need for all of us to work together to serve society with the best solution to deal with the primary global risks. I would like to promote trust, understanding of global realities and provide some practical directions to bridge some blockages in the critical path for success.
- Avenue for sharing ideas that may lead to appropriate action to enable Members embrace new ways of partnership and collaboration that are effective in addressing the existing global challenges.
- The Platform can establish a common vision for 2030 and the main requirements to reach it.
- Initiate a consultative platform for long term planning through engagement of diverse groups including grassroots. My role will be on the importance of a integrative approach to weather/climate information and services.
- Open-minded discussions, listening to each other and readiness for action.
- Open, constructive and respectful dialogue, where everyone has a chance to speak.
- I hope this platform can assist communication among experts, consultation and promotion of meteorological science.
- Facilitate the contribution of water/hydrology perspectives + scientific community. Articulate with existing initiatives and organized expertise such as IAHS.
- Expectations: setting achievable, measurable common goals. My engagement: I would like to contribute to achieving the goals in any way I can.
- A high-level mechanism such as the Open Consultative Platform will be useful but unless we couple that with more regular dialogue we are only solving part of the equation so it needs to be coupled with integrated efforts. Not all countries are in the same place with respect to involvement with the private sector as well as national laws and policies. The discussions should be contextual by Regional Associations. Perhaps we need to invite academia and the private sector to our technical commission working structures, not as just observers but to work together to solve the challenges identified by Members. The solutions Members develop, such as WIS and WIGOS, are largely government focused efforts, but governments are increasingly moving toward public-private models (i.e. major infrastructure projects). Therefore we need an analysis of the status or current level of involvement of the private and academic sectors vis-a-vis the public sector, region by region and along each part of the value chain.
- Guidance and practical pathways for securing and sustaining collaborative networks across research, observations, services and decision-making at each level (local, national, regional, international). Share my experience (successes and failures) in attempting to develop such science-policy partnerships and to learn about new approaches.

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In this field you may wish to put additional ideas about the Next Generation of Weather and Climate Intelligence

- Weather broadcasting will change just as broadcasting itself changes. With the number of platforms to deliver forecasts increasing, it is advisable for us to develop new and more effective communication methods to help the public make their decisions for daily life. Among the advances will be the ability to deliver higher-quality and more precise forecasts for specific locations.
- Meteorological and climatological information will be widely used in combination with very different kinds of other information, intelligence will increase, its visibility decrease.
- There are some basic recognitions to be made: The global weather community has created one of the best functioning international cooperation structures worldwide, with the WMO as a catalysing body. The principle of the natural monopoly applies to a functioning basic weather infrastructure as much as to a road or school system. We must ensure a functioning and unbiased base infrastructure of weather measurements and alarms, operated by national (or public) services . On the basis of a functioning base infrastructure , we must create an open and level playing field for the development of a thriving private sector and new technology, which is essential for a better service to multiple sectors of the economy. This private sector will also need some more standards and regulations, to make the services more comparable and useful for downstream customers. The example of open-data markets, such as the USA, provides evidence of the enormous value such a development brings to all stakeholders, including society at large. The advent of new technologies (remote sensing, mobile communication, micro-sensor revolution and big data management, i.a.) bring additional opportunities to more rapidly bridge the infrastructure gap existing in some regions , and leapfrog development steps into a more productive weather value chain with a better cost/benefit ratio than previous technology. Given the global impact and scale of the phenomena, it is imperative that we as community apply the principles of economic and social development to the evolution of the Global Weather Enterprise, and there is a big opportunity to do that in a structured, rapid and very effective way.
- All of the challenges facing the Global Weather Enterprise in finding better means to work together in harmony are set against a background of rapid climate change, which will bring increased threats to civil society and indeed perhaps to the very concept of nation states. There needs to be a shared recognition of the immense moral and ethical imperatives for those of us in the meteorological community to work together in a collaborative manner to keep society fully informed of the growing risks, both in terms of day-to-day weather and the changing climate.
- Weather Decision Support: Again, I would like to express my view that the Next Generation of Weather, Water, and Climate "Intelligence" will be in the form of Integrated Decision Support Systems. This will bring the power of more rapid and timely data and information to the end users we all support. Our perfect Observations and Forecasts are of little value, if the users cannot understand them and make rational and effective decisions leading to a reduction in negative impacts of severe weather events on the lives of society. We also will not be able to show the growth or positive impacts to GDP. The decision makers in all areas of our economies rely on accurate and timely observations and forecast services, in order to achieve the economic stability and growth necessary for the global community. Collectively we all need to collaborate to make that happen.
- Diversity of players, data sources, service providers and delivery channels is a fact and we must harness them all for the global good. At the same time, we must not lose sight of the responsibility of governments for the operation of a sustainable value chain, from data to the service outcomes, that ensures the safety and well-being of their citizens. While we work together to innovate and improve at all the steps along the value chain, the integrity

and sustainability of the value chain is paramount, and new initiatives and business models should keep sight of the whole and not just the parts.

- As NMS representative I understand that very changeable weather and climate in composition with technical/technological progress at the same time low government budget and willingness and possibility of private sector to be on frontline of MET service, all of this factors are not positive for future NMSs. But we need to be proactive and flexible.
- We need to acknowledge the key success factors that brought us where we are (e.g. The Weather Machine as described in Time Magazine), and find the strategic decisions that we need to make now in order for that global enterprise to continue to grow... This is saving life, and key to the future of Mankind.
- The value of weather services needs to be clearly established and paid for by users.
- The requirement for sound and clearly communicated policy relevant science to inform wise choices related how best to deal with the climate challenge. Individually customized environmental intelligence across all time scales for all levels of society and business. Strengthened Global and Regional Partnership so that critical mass issues and the growing gap of service the populations of developed and developing countries can be address. I global pact and commitment between all countries to contribute and work together to serve society. Special attention on urban dwellers, the oceans and water. Changing roles and disappearing jobs and realignment of training programs and creating exciting career opportunities for the brightest young minds.
- Involvement of global enterprise in the next Generation of Weather and Climate intelligence should consider mutual benefits among partners for various sectors in Member states. Improved observation networks at national levels, improved global cooperation in data exchange, improved data processing systems, improved communication systems are of paramount importance. Furthermore, the next Generation of Weather and Climate intelligence should consider fully automation of operations and service delivery. There should be a full participation of public, private and academia sectors in support of enhanced observation networks for data availability and sharing. Improved availability and access to weather, climate, water and environmental information and services at all levels through available and emerging communication options such as mobile devices need to be considered. Finally, there is a great need to come up with proper arrangement for transfer of technology so as to ensure no Member will be left behind while addressing the available and emerging global challenges. Weather and Climate do not respect political boundaries hence a need for the next Generation of weather and climate Intelligence to ensure all Members are involved in enhancing services so as to have safe world for all.
- The next generation of Weather and Climate Intelligence is based on a value cycle/chain which is characterized by a backend system developed and supported by research, by interoperable, metadata-governed observation systems, data assimilation, operational Earth system model forecasting and ensemble predictions including verification. Post processing models and specific observations are developed and put into operation for the general public as well as for specialized applications in energy production and distribution, traffic (road, rail, air, ships), agriculture and other ecosystem services, air pollution and health impact, visibility, water availability and quality, high impact weather, offshore activities, coastal activities (storm surges and waves), the military, tourism. Other sectors can also be mentioned. This is enabled by the trend toward coupled Earth system modelling to provide prediction and analysis products at all time and space scales and to all sectors and applications that require such information. The availability of computing power is contributing to the improved accuracy at all time-scales and forecast lead-time of numerical predictions, and allowing the generation of ensemble systems that enable a probabilistic approach.

- Refined weather forecast and climate prediction. Reduced uncertainty to allow for more focused short and long term action by policy makers.
- Based on the trust which was built up in the Global Weather Enterprise Forum new forms of collaboration between the public, private sector, academia and developing agencies could be built if each partner has a positive vision of how to approach the others and profit from the advantages of cooperation.
- The next generation of weather and climate intelligence will make full use of advanced technologies including cloud computing, big data, Internet of Things and mobile Internet to provide intelligent, targeted, and interactive meteorological services that can deliver benefits to and be shared by everyone. We need to provide users with accurate meteorological services by improving the supporting system, meeting the growing demand of the public for individualized and customized services.
- 1) Offer interest, value, and agenda setting to draw efforts and inputs of scientists to common objectives / counterbalancing actual trends of competition, money-driven research, bibliometrics, salami-slicing of knowledge development. 2) Reinforce hydroclimate/hydrometeorological articulation. 3) Rely on academic expertise and new didactic approaches towards capacity development.
- First need to add "water" to the Next Generation of Weather, Water and Climate Intelligence. As extreme weather becomes more common and damaging due to a confluence of physical and socioeconomic factors, citizens and decision-makers are turning to the National Meteorological and Hydrological Services to provide weather, water, and climate observations, forecasts and warnings to protect life and property and enhance the national economy. This would be done through a seamless suite of products and services from short term to weeks 3 and 4 to Sub-seasonal to Seasonal including specific weather, water, climate forecasts especially for extreme events. In the new Strategic Plan for the U.S. National Weather Service, we've recognized much has changed. Technology advancements are accelerating, leading to a more connected world with greater expectations for timely and actionable information. Technology is also driving advances in observations. Machine learning, big data analytics, the internet of things, and miniaturization are all contributing to a giant leap forward in how scientists observe the atmosphere. Furthermore, the Weather, Water, and Climate Enterprise continues to grow and is now engaged in all areas of the forecast value chain, from observations to decision support. We see the need to more rapidly and holistically evolve the agency to realize the vision of a Weather-Ready Nation. This change will require a shift from individual performance to a more collaborative operational model, whereby the collective wisdom and operations of the broader international enterprise are brought to bear on significant weather, water, and climate challenges. It will require the application of new science, tools, and technologies to process and communicate critical forecasts, warnings, and hazards. We will need to use nimble and effective approaches to keep workforce skills current and ensure that we can meet future customer needs.
- Question: What constitutes "intelligence"? How well are we using existing intelligence? and, When and how do intelligence and foresight become action, and for whose benefit?