

# Meeting Minutes

## Nowcasting and Mesoscale Research Working Group

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Final

Dec 10-11, 2015  
WMO HQ, Geneva

### Attendees

Sarah Jones (Thursday only), Jeanette Onvlee, Paul Joe, Jian Jie Wang (Webex, Friday Morning), Paolo Ruti, Estelle de Coning, K.J. Park (Friday Only), Hui Yu (WEBEX, Friday Morning), Alexander Baklanov, Yong Wang, Kazuo Saito, Ping Wah Li, Veronique Ducrocq (SSC Liaison)

### Meeting Notes

1. Meeting documents are posted at [ftp://ftp.tor.ec.gc.ca/pub/NMRWG\\_Dec\\_2015](ftp://ftp.tor.ec.gc.ca/pub/NMRWG_Dec_2015) <replace when available on WMO web site>
2. The purpose of this “extra-ordinary” meeting was to focus on the merger of the two working groups and specifically on the Terms of Reference and the WWRP Implementation Plan.

Full review of previous actions items, and projects were deferred to the next WG meeting (31 July-1 August, 2016 at Hong Kong Observatory) which was planned to coincide with the WMO Symposium on Nowcasting and Very Short Range Forecasting, scheduled for 25-29 July 2016 in Hong Kong (<https://WSN16.hk>).

Some time-sensitive urgent projects were presented. In particular, the ICE-POP project needed NMRWG review for formal approval.

3. Veronique Ducrocq was appointed the SSC representative for NMRWG. She should be kept in the loop on significant activities and decisions.
4. The Agenda is attached as ANNEX A.
5. Agenda Items 4-6 were discussed together. CAS 16 decisions and their implications were discussed.

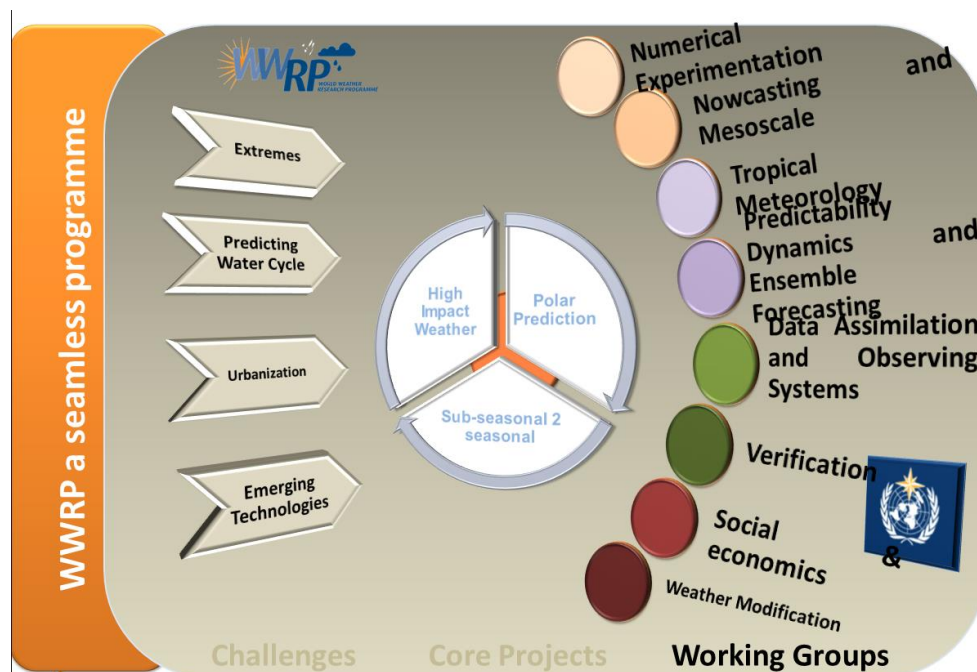
## Over-arching Theme:

- Seamless used to refer only to the Weather-Climate gap but, in this context, it is used within the weather context and includes the concept of consistency across temporal (minutes to months) and spatial scales (local to global); across hazards; from representation of scientific processes (technical; multiple tools – not just a single one) and to service provision (seamless to users and societal needs);

## Sub-Themes and Core Projects:

- There are sub-themes of (i) extremes, (ii) water cycle, (iii) urbanization and (iv) emerging technologies which form the basis of the implementation plan.
- Synergies and linkages must be developed across all WMO programs and projects to achieve this (for example, closer links and projects with GAW, GURME, WGNE, HiWeather and Polar Prediction Project). See Fig. 1
- The three legacy projects of Thorpex (High Impact Weather (HIW), Polar Prediction Project (PPP) and Seasonal-to-subseasonal forecasting (S2S) are all core projects. The Aviation RDP is considered very important and WWRP will be seeking approval to make this the fourth core project. The scope and goals of the project will expand and the timeline extended. A new project name was proposed – “Seamless Aviation” by VeroniqueD and seems very appropriate. The relations between core projects and working groups plus the existing Scientific Steering Committee of the AvRDP, and the ways to collaborate with them, are not yet clear and will surely evolve. Establishing effective liaisons with the core projects will be important to arrange.
- In HiWeather, ‘attribution’ is related to linking climate to future weather. High Impact weather is not necessarily Extreme weather (note the Extreme theme). It could be benign weather that has societal consequences – e.g. prolonged periods of dry weather could lead to droughts, or foggy weather over an airport could lead to air traffic disruption.
- Emerging Technologies:
  - Guidance is needed on observations/monitoring for nowcasting, this could be in the form of a white paper. Results for RDP’s and field campaigns should be considered and summarized.
  - What are the technologies, science, demonstrations required for “closing the gap” and the “trade offs”?
  - Are networks of dense conventional observations the way to go? And what is the role of “non-conventional” observations (e.g. cell phone, other crowd sourcing meteorological data.
  - Are the benefits of the “promise” realized?
  - There is an expectation that DAOS will play a role in this discussion, though they have been reluctant in the past due to their focus on better use of existing observing networks and not on emerging technologies. There are specific mesoscale issues that are not covered in global assimilation and inherently a different problem.
  - There was a discussion on assimilation of surface fluxes
  - Scalability should become an issue for concerted activity. WGNE is the most likely party to take the lead there, but as there are specific scalability challenges to be met on small scales, an active contribution from WG-NMR will be needed there.
  - Considerations for an Ensemble Observing system (considering the uncertainty in the observations; research required here). This will have an impact on “predictability” and linkages to the PDEF WG is required.

Action: There needs to be linkage between NMRWG and both DAOS and PDEF. A review of emerging technologies needs to be done and demonstration of new observing technologies in a field project (RDP) should be encouraged. The general availability of new observing technologies in research systems or networks could be assessed. A white paper on these issues would be appreciated (see TOMACS, ICE-POP, etc, FDP's, RDP's).



### Creation of Nowcasting and Mesoscale Research Working Group

- The Nowcasting Mesoscale Research WG was recognized as very important for the future of the weather services.
- There are substantial gaps and special attention is required to address the accuracy gap between observational based nowcasting and high resolution NWP. Progress is needed in both prediction techniques to close the gap for usable services. Multiple tools are envisaged.
- The purpose of the merger was to address this gap, a motto for the NMRWG could be “closing the gap”. The gap needs to be closed from both directions. Increased accuracy plus increased lead times are the metrics of success.
- The size of the group was clarified to be a maximum of 12 members.

### RDP/FDP

- Some clarification was needed on how RDP/FDP's were managed in general. Some FDP's seem to initiate other FDP's in sequence. These comments do not necessarily refer to the project by NMRWG but should be noted.
  - There needs to be clarity on the approval procedures, specifically on when a project begins and when it ends and when it renewed.
  - More attention is needed for the “post-processing” of actions: what procedures are needed to approve or migrate a project to enter a new or to an operational phase? The SSC is considering the process for handing over activities to the operational side of WMO. Some projects are too short to achieve the stated and approved goals. This is often related to national 3 year funding windows which result in on-going projects.

Discussion focused on how to ensure the analysis and results are articulated and part of the project.

- For initiating a project, the organizers should approach the WMO secretariat with a project proposal that includes a financial plan in order to assess the viability of the project but also to provide clarity on possible financial pressures on WMO budgets. This will allow effective planning of WWRP resources. The Secretariat requires proposals to be reviewed by appropriate WG's and who are asked to provide recommendations and comments on the proposal to the SSC for formal approval.
- Regional Associations should be involved/connected to the projects as there are greater benefits that can be achieved.
- In the past, projects could be brought to SSC, to the SSC chair without first review by a WG. The expert review and recommendation of the project by a WG is required.
- During the discussion, the role of FDP's and capacity building solely within WWRP was challenged. There are substantive expectations (rightly or wrongly) that FDP's and Capacity Building would result in rapid "research to operations" technology transfer. If this is true, then the operational parts of WMO should become involved in the initiation and leadership for FDP's and for Capacity Building workshops. However, technology transfer is always a challenge and there is substantial leeway in responsibilities.

*Recommendation: It was recommended that Forecast Demonstration Project and Capacity Building workshops deeply involve or even lead by CBS due to the "operational" focus. It is recognized that the research to operations technology transfer process involves both WWRP and CBS. This should be worked out in the text of the WWRP Implementation Plan.*

## **Terms of Reference and Implementation Plan**

Two draft documents were circulated. They represent thoughts from about a year ago and they are not that different except for a discussion on decision-making and the forecast system. The second document was created after a brainstorm with WWRP. Many things have evolved since they were produced and were not extensively discussed in lieu of recent discussions at SSC and the drafting process of the Implementation Plan.

*Action: The Terms of Reference will be re-visited after the Implementation Plan is completed.*

## **SSC and the Implementation Plan**

The SSC is drafting some guidance and they are called "Action Areas". These are in early draft form and have not been extensively reviewed by the SSC and were presented as information, and, at this point, they should not be considered final. See Annex B. Neil Gordon is providing support.

The process for completing the Implementation Plan is that there will be a sequence of drafts produced that will bounce back and forth from SSC to the WG's. Responses will be required within a monthly time scale.

The NMRWG Implementation Plan was presented to the WG and substantially revised during the discussion. We appeared to be on track in our understanding of how to prepare the document. See DRAFT NMRWG Implementation Plan.

## **GAW Theme**

During the discussion of the GAW theme, major uncertainties in aerosol contribution particularly indirect for mesoscale issues was noted, models for volcanic ash prediction are not appropriate. Appropriate field campaigns need to be planned and aerosol observation requirements need to be developed. Links between volcanic ash nowcasting in GAW and the Aviation RDP are envisioned. Another related GURME initiative is related to “urban Africa” which may have a link to the Lake Victoria Project.

*Action: Assign to WG members for their contribution to all parts of the table including 2 year and 8 year plans.*

*Recommendation: It is evident that in order to deliver a “seamless prediction” system, collaboration with other groups (WMO and external) are needed. It is recommended that formal mechanisms are needed to encourage this and joint meetings, cross-appointments on committees, etc are needed but must be within reasonable budget and schedule constraints. In this discussion, holding the next NMRWG meeting with HiWeather was discussed but deferred to coincide with WSN16 in Hong Kong. It was also suggested to invite the GURME SAG to have a joint meeting with NMRWG at WSN16 in Hong Kong (it was later determined that this was not feasible).*

*Decision: Discussions, held offline, lead to the decision to send co-chairs to the HiWeather meeting in Exeter at the end of April 2016.*

## **RDP/FDP/Project**

Several projects were briefly presented.

**Study of Urban Rainfall and Fog/haze (SURF):** There are 90M people in the Jing-Jin-Jiang area (Beijing, Tianjin and Hebei). The goals of this project are to promote international experimental urban research in the Beijing area, to achieve an improved understanding of the underlying physical processes, and to utilize the social sciences to translate this into more effective warnings. The project includes: focus on precipitation (water cycle) and fog/haze, high resolution data assimilation in an urban area, strong observational campaign including visibility (PM2.5, PM10), submission with GURME to WWRP for a joint RDP/RDP is to be confirmed with a financial plan in place. From 2014 on, observations were and are being gathered. After quality control, these will be used in further studies in 2016 and 2017. A planning workshop for future years will be held in May 2016.

Follow-up: (i) The SURF team is encouraged to submit a project proposal to the secretariat. ii) Clarity and/or resolution of the is needed data policy is needed, this is particularly related to air quality data since it is gathered from a different organization.

### **Open Points:**

It was noted that the China Environmental Agency is working together with the World Bank on air quality monitoring. Is CMA is working together with them? Jian Jie Wang was assigned to investigate this. The SURF plans are quite ambitious and activities beyond the stated time frame of the project can be anticipated and the proposal should consider this issue, specifically, whether an extension or follow up project can be anticipated.

**SCMREX (South China Monsoon Rainfall Experiment):** the observing periods associated to this project have been ended, and many studies are ongoing, based on the data gathered. These include: process and parameterization studies, studies of advanced data assimilation methods and observation impact, and ensemble forecasting experiments. Many insights have been gained but more work is still needed; the organizers are considering a follow-up phase.

**UPDRAFT:** A kickoff meeting for this new project has been conducted recently. Focus is on understanding the physical processes of land falling tropical cyclones (e.g. precipitation intensity, fine scale winds, not just track forecasts), applying and developing high-resolution NWP to improve the forecasting of these aspects, and a better monitoring and verification of these spatially detailed forecasts.

**INCA-CE:** 16 countries (claim: #1 nowcasting implemented system), consolidation of expertise, Intellectual and Data Policies are still an issue, just finished a ensemble nowcasting project and a 5 year seamless forecasting project has been awarded (0-3 day focus).

**ICE-POP:** KJ Park presented the project plan. It was discussed at recent SSC and SSC requires WG recommendation before approval. The plan was presented in 2014 and the request by SSC was to increase the international participation and to provide a time line/schedule for the project. The international kick-off meeting was held in Oct 2015. Material available prior to the meeting indicated three general weather concerns – precipitation (location and intensity, phase), visibility (150 days per year) and wind (complex terrain, sea breeze). The projects address many of the “closing the gap” issues, in particular, (i) field campaign with ground base and aircraft observations for advance ice microphysics (seeking advice on use of aircraft), (ii) NWP for Nowcasting approach, (iii) high resolution data assimilation including assimilation of radar data, satellite snow observations and application of 4D-VAR with advanced linearized physics (ice phase), (iv) emerging technologies (extensive use of new observation technologies, e.g. Doppler lidar, dual-polarization, multi-frequency radar, (v) coupled modeling.

*Action: The proposal was well received. A detailed review of the science plan is being prepared by NMRWG (Paul Joe) for SSC approval.*

*Recommendation: There is sufficient information and detail to recommend approval by SSC upon receiving the NMRWG recommendation report early in 2016.*

**WSN16:** Dates are 25-29 July 2016 and will be held at the Chinese University of Hong Kong (CUHK). The web site <http://wsn16.hk>. Apart from other nowcast and mesoscale NWP topics, a special theme on Aviation Research Demonstration Project (AvRDP) will be included. An AvRDP Training Workshop will be organized on 20-22 July 2016 before the Symposium. There will be an Aviation RDP Science Meeting (tentative dates of 20-21 July 2016; location will be CUHK or HKO). NMRWG meeting will be conducted on 31 July-1 August 2016 at the Hong Kong Observatory (Kowloon). Deadline for abstracts is currently 31 Jan 2016 but will be extended to mid-March. Discussion of joint meeting with GURME SAG was discussed but rejected due to budgetary, schedule and availability constraints after the meeting.

Discussion on possibility of support for students and for developing countries was noted. There are potential funding sources from GFCS trust fund (e.g. Canadian contribution is targeting South East Asia and South America) and from Training trust fund.

*Action: Need to publicize this meeting much more. List will be generated (Paul Joe) of contacts to publicize meeting (BAMS, AGU, EGU, NMRWG members, EUMETSAT, ERAD, AMS Radar, Mesoscale groups etc). Action for All.*

*Action: Palo Ruti to discuss support of students and developing countries with Geoff Wilson. Note that some countries require substantial lead time to get organizational, travel and visa approvals.*

**Aviation RDP:** Project has a phased start. HKO completed the 1<sup>st</sup> IOP to collect observational data, nowcast and mesoscale NWP data as well as Air Traffic Management (ATM) data to cover “the summer

convective regime”. CDG will begin this winter. YFB has installed equipment (Ka Band radar, lidar, ceilometer, radiometer) and has started to collect data. Project website <https://avrdp.hko.gov.hk> has been created. Data server was also set up for data exchange. A VCP Nowcasting Training Workshop has been conducted to transfer radar-based nowcasting technology to some Project participants including SAWS and Shanghai Meteorological Bureau. Preliminary results to be presented during WSN16. The development of the Aviation Training Workshop in connection with AvRDP (see WSN16 above) is in progress. A team involving JWGFVR to discuss about the verification component has started. Collaboration with other relevant WGs as well as CAeM and CBS were being sought.

*Action: Project is very important and WWRP will proceed to promote it to “core project” status. This will expand the scope and time lines. The governance and management structure should be reviewed.*

*Action: Additional promotion of WSN16 is needed. WMO Secretariate and all NMRWG members are requested to promote the symposium. The abstract deadline is extended to accommodate this action.*

**TOMACS:** Final meeting will be conducted 4-5 Feb 2016 in Tokyo. Lessons learned were: (i) in unstable conditions, the results were highly sensitive to the details of the microphysics scheme; (ii) urban surface conditions and their representation were critical; (iii) the intercomparison of different data assimilation algorithms is providing very interesting results. Assimilation of doppler lidar with 4D-Var (in particular, wind direction shift of ten’s of degrees) was critical to thunderstorm intensity prediction; (iv) shear lines were detected by the dense AWS network and significantly influenced thunderstorm development. Care should be taken however, to develop separate structure functions for AWS in urban areas and for AWS in rural territories; (v) the ability of the model to capture the sea breeze adequately was critical for achieving an accurate description of convective evolution, as well as (vi) capturing the urban heat island.

ANNEX A

WORLD METEOROLOGICAL ORGANIZATION  
COMMISSION FOR ATMOSPHERIC SCIENCES (CAS)

CAS/WWRP/NRWG/DOC1.0

Weather Research Programme (WWRP)

(19 November 2015)

**Nowcasting and Mesoscale Research Working Group  
(NMR WG)**

WMO, Geneva, Switzerland (10-11 December 2015)

Item: 1.0

**AGENDA**

**Nowcasting and Mesoscale Research Working Group (NMR WG)  
Kick-Off Meeting**

Version date: 20151201

V6

(as adjusted during the meeting)

**Date/Time:** Thursday to Friday, 10-11 December, 2015.

**Start Time:** 1pm Thursday 10 Dec 2015

**End Time:** 5 pm Friday 11 Dec 2015

**Location:** Salle C2, WMO, 7bis, avenue de la Paix, Geneva, Switzerland

**Relevant Documents:**

1. TOR (2 versions, already sent)
2. WWRP Implementation Plan (initial version, emerging technology revision, already sent)
3. ICE-POP Science Plan of 26 Nov 2015

**AGENDA:**



**Thursday Dec 10 2015**

		Item	Lead
<b>Session Chair: Jeanette Onvlee</b>			
1	13.00-13.05	Introduction	Co-chairs
2	13.05-13.15	Opening Remarks	Sarah Jones, Paolo Rutj, Alexander Baklanov
3	13:15-13:20	Agenda Adoption/Approval	Co-chairs
4	13.20-13:40	SSC Update Relevant for NMRWG	Sarah Jones, WWRP Secretariat
5	13:40-14:15	Review of CAS 16 - decisions, implications and impacts on mandate and implementation	WWRP Secretariat, co-chairs lead discussion
6	14:15-14:45	Seamless, multi-hazard concept and focus	WWRP Secretariat, co-chairs lead discussion
	14:45-15:15	Health Break	
7	15:15-16:00	Terms of Reference	
8	16:00-16:15	Implementation Plans	Paul Joe
8a	16:15-1730	IP – Emerging Technologies	Estelle de Coning
END OF DAY 1 Group Dinner TBD			

**Friday Dec 11 2015**

<b>Session Chair: Paul Joe</b>			
8b	8:30-9:15	IP – HiWeather	Paul Joe
8c	9:15-10:00	IP – Water Cycle	Jeanette Onvlee
10a	10:00-10:30	<ul style="list-style-type: none"> <li>• SCSMEX</li> <li>• UPDRAFT</li> <li>• SURF</li> </ul>	Hui YU (WEBEX) Jian Jie Wang
	10:30-10:45	Health Break	
8d	10:45-11:30	IP – Urban	Paul Joe
8e	11:30-11:45	IP - GAW	Jeanette Onvlee
9	11.45-12:30	ICE-POP	K.J. Park
	12:30-13:30	LUNCH	
<b>Session Chair: Estelle de Coning</b>			
	14:20-14:45	Health Break	
10b	14.45-16.45	WWRP Projects (Time Permitting) <ul style="list-style-type: none"> <li>• Aviation Training Workshop, WSN16</li> <li>• NMRWG Meeting</li> <li>• Aviation RDP (30 min)</li> <li>• Lake Victoria Project (not presented, defer to July)</li> <li>• TOMACS (30 min)</li> <li>• INCA-CE (30 min)</li> </ul>	Peter Li  Estelle de Coning  Kazuo Saito Yong Wang

		<ul style="list-style-type: none"><li>• RELAMPAGO (not presented, defer to July)</li><li>• HiWeather Preparation (to be discussed via email)</li></ul>	Estelle de Coning Jeanette/Paul
		END OF MEETING	