Committee Membership

- Paul Joe (Chair)
- Jian Jie Wang of China (PWS, B08, TB)
- Peter Li HKO (PWS, AV, TB)
- Alan Seed AUS (Heu, Hy, Ens)
- Thomas Haiden AUT (Win, Sys, Cmplx, INCA CE)
- Marianne Koenig EUMETSAT (Sat, Lig, Dev)
- Steve Goodman USA (Sat, Ltg,)
- Jenny Sun (Mod, Obs,)
- Jim Wilson (Und, Thu, Sys)
- Tom Keenan (FCSTsys,)
- Augusto Pereira (Hyd, WSN12, Dev)

Introduction

One major workshop was held in Boulder, Colorado in October in collaboration with the Mesoscale Forecasting Research Working Group on NWP for Nowcasting. Much of the year was in planning mode for upcoming projects and completing previous projects. Membership remained stable.

Beijing 2008


A capacity training workshop, a requirement of a FDP, was deferred till a requirement arose.

SNOW-V10

The SNOW-V10 project completed in 2010 and a science workshop was conducted in Huntsville, Ontario in March 2010. Workshop presentations are available. A special issue of Pure and Applied Geophysics is planned. The deadline for submission was 15 March 2012. About 31 papers were planned for the special issue and over 20 papers have been submitted so far. Other papers have been and are planned to be submitted to BAMS and WAF. See Annex 1 for the list of papers.

NWP for Nowcasting

A workshop was led by Jenny Sun of WGNR and Dale Barker of MWFR. The purpose of the workshop was to identify and begin to bridge the gaps for the use of Numerical Weather. Over 40 participants were invited. Substantial gaps were identified. Participants indicated that future
workshops would address the gaps. Meetings every 3 years or so were suggested. An abstract was submitted by Jenny Sun to BAMS and an article is in preparation (see Annex 2).

**Meeting Highlights**

**Current State:**
- The skill level of prediction in the 2-6 hour time frame are insufficient to make good tactical decisions
- Model resolution of 250m are now available for severe weather applications and for predictions in the next few hours
- High resolution ensembles are in their infancy
- Blending is still the best to utilize NWP for nowcasting

**Gap - NWP**
- Most models do not focus on high impact weather
- Performance is far from satisfactory in first few hours for high intensity convection
- Too precipitation focused, other weather elements (visibility, lightning, etc) are important but application dependent
- Cloud microphysics is not well treated in most models
- Generating probabilistic nowcasts/forecasts are under investigation
- CSI score is a misleading verification statistic

**GAP – Nowcasting**
- Direct Use of Models: There is substantial room for growth in understanding current generation of models. Models are a moving target. “Should freeze model development for ten years in order to understand model errors.”
  - NWP has no skill below 100 km (domain size dependent)
  - Diurnal cycle is not well simulated
  - Growth and Dissipation is not well captured; hence blending does not generate better results than nowcasting
- Indirect Use of Models: Only a handful of NWP parameters are actually used in nowcasting.
- When and how to introduce probabilistic nowcasting is not clear

**Summary**
- Model deficiencies need to be handled before blending will be effective
- Radar reflectivity is extremely useful in the first few hours (dual-pol need investigation)
- More frequent model output is needed for nowcasting applications
- VDRAS is very promising for boundary analysis
- Extreme event skill scores need development

**WSN12**
WMO/WWRP Symposium on Nowcasting and Very Short Range Forecasting is being organized by Augusto Pereira in Rio de Janiero (http://www.wsn12.com) 6-10 August 2012. CAEM is considering participating in a significant way.

A 3 day nowcasting training course is planned for 13-16 August 2012.

**INCA-CE**
INCA-CE (Integrating Nowcasting with Crisis Management and Risk Prevention in a Transnational Framework) is a project lead by ZAMG (Yong Wang) of Austria. There is a European Commission project to deploy INCA in Central Europe. The group has submitted a draft proposal for consideration as a WWRP FDP project. A proposal is attached – Annex 3.
There are mutual goals and lessons can be shared.

**FROST-14**

FROST14 (Forecasting Research Olympic Science and Technology 2014) is a proposed blended RDP-FDP for Sochi 2014 on winter complex terrain nowcasting. Kick off meeting was held 1-4 March 2011 in Sochi. The next science meeting will be conducted in Moscow 16-18 March 2012. A first proposal was submitted by Dmitry Kiktev of Roshydromet at the 2011 JSC. System/countries participating include Russia institutions (Central Aerological Observatory, Typhoon, Institute of Radar and Applied Meteorology, Moscow State University), Austria (INCA/ZAMG), Finland (FMI and UH), Canada (EC), China (CMA), USA (NOAA), and ECMWF. Final approval was to be conducted upon submission of a revised proposal. This is yet to be formally approved. A new proposal is being drafted for JSC consideration (Annex 4)

For 2011-2012, Roshydromet conducted trial forecasts using the 7 km COSMO model. Environment Canada will provide 1 km and 250 m resolution NWP runs for selected cases. Issues are the adequacy of the observation network, model resolution and system integration.

**Lake Victoria**

This project continues to percolate as other meteorological activities are active. The SWFDP (CBS/GDFS) initiated last year and again this coming year. It was recommended to stay vigilant and be patient as thunderstorm nowcasting requirements are identified. A WGNR sub-group (Paul Joe, Marianne Koenig, Steve Goodman, Thomas Haiden, Jim Wilson, Jeanette Onvlee - MWFR chair and Alice Soares - CBS/GDFS) was created to brainstorm and formulate a rough plan. A local champion has been identified. John Mugnai of Kenya is seconded to the East African Community for SWFDP and similar projects. Manos Anagnostou of Uconn, U.S.A. has a radar project for agriculture applications in Ethiopia that can potentially be leveraged (see Annex 5).

**Discussion Points:**

- WWRP (WGNR, MWFR, SERA, Verification) charged with “basin dynamics understanding project” by Executive Council
- SWFDP is active
- UKMO running 4 km model
- Nocturnal convection over lake identified by lightning. Maybe lake breeze initiated.
- Lake breeze initiated convection over land NE of lake.
- Agriculture applications are priority. Leverage opportunity.
- Radars installation occurring in several countries. Potential leverage opportunities
- Severe weather warning programs are in their infancy. Gap and potential leverage opportunity.
- Mobile Weather Alert project is active.
- Satellite and lightning nowcasting system need development and validation.

**Rough Plan**

- RDP proposal to develop a satellite and lightning nowcasting system. Piggy back on work by EUMETSAT/Convection Working Group, SERVIR, RSA and others. This would be connected to the SWFDP and the UKMO and other MWFR modeling efforts.
• At the same time, conduct a field project to study the dynamics of Lake Victoria Basin. This would include temporary radar installations that would be needed to study the dynamics but also to validate the satellite-lightning and NWP nowcast system. This will also address the issue of the data quality and integrate use and interpretation of the extra Mobile Weather Alert data.
• Perhaps agriculture linkages could be explored in order to provide a “daily focus” on the use of radar and satellite hydrological product in order to promote frequent and daily use of radar and satellite products. This will overcome limited use of radar for severe weather leads to slow technology transfer.

An outline of the plan has been sketched out but a draft is yet to be started. It is recommended that this be completed and circulated for discussion. An expert team visit is recommended to promote and validate the plan.

**TOMACS**
TOMACS (Tokyo Metropolitan Area Convection Study) is a project lead by Dr. Maki of NIEDS. It is a multi-year project and the first field campaign was in 2011. Over 12 Doppler radars provide coverage over the project area, some providing innovative one minute volume scan coverage. The focus is on the use of high density observations over an urban environment and also includes a substantial societal resilient city component. Data will be released after two years and a proposal for a RDP is being prepared but not yet available.

**WENS**
The World Expo on Nowcasting Systems was conducted under the auspices of CBS/PWS. It focused on nowcast services. Hong Kong Observatory and Bureau of Meteorology were two of the nowcast participants. A final seminar and training workshop was conducted in November 2011. WGNR did not participate.

**India – Commonwealth Games**
India hosted the commonwealth games in 2011. Dr. Tyagi initially issued invitations to various WGNR members to consider participation in a FDP. Follow up emails were not returned. India worked with Hong Kong and Weather Decision Technologies to implement SWIRLS and WDSS-II. The focus was on Nowcasting for Mega-Cities – New Delhi in particular. Seminars and reports are available.

**Heuristic Nowcasting Workshop**
Alan Seed and Izstar Zawadzki have agreed to conduct the second Heuristic Nowcasting Workshop in Montreal in 2011 or 2012. Nothing to report.

**Forecast Systems**
The development of a Forecast Systems Workshop to advance the end to end holistic concept has been approved by Congress but has stalled. Project is dormant.

**RIO 16 and Regional Training Center – Nowcasting**
No activity in this area as yet. Project is dormant.

**South-East Asia (Vietnam)**
This project will piggy back on the SWFDP lead by Chen and Honda. The SWFDP is behind schedule due to capacity issues in Vietnam. Also, the nowcasting local champion is taking education leave in Australia for two years. Project is dormant.
Annexes

1. SNOW-V10 List of papers for special issue
2. NWP for Nowcasting Meeting Report Abstract
3. INCA-CE Plan (separate document)
4. FROST14 Plan (separate document)
5. UCONN USAID Ethiopia Project email
Annex 1 Partial List of SNOW-V10 Papers for Pure and Applied Geophysics


14) *Lim, S, D. Moisseev and V. Chandrasekar, 2012: Classification and quantification of snow. Submitted to Pure and Applied Geophysics


Use of NWP for Nowcasting

Juanzhen Sun, Jeanette Onvlee, Paul Joe, Peter Lee, and Dale Barker

In this proposed BAMS article, we will review recent progress on the use of NWP for nowcasting applications and describe challenges that face the NWP and nowcasting communities to tackle the important problem of 0-6 hour forecasting of severe weather. This review article stems from a recent WMO workshop that was held in Boulder, CO on 24-26 October, 2011. In this workshop, practitioners, users and developers of high resolution models, data assimilation and nowcasting systems gathered to articulate and define the requirements for NWP in nowcasting applications, identify existing gaps between the nowcasting and mesoscale NWP communities, and to explore ways to advance the nowcasting of high impact weather through improved data assimilation, high-resolution modelling, and blending of NWP and observation-based nowcasting. The key themes and outcomes from this workshop will be summarized in the proposed article. We expect the length of the article will be less than 4500 words and the number of figures will not exceed 10.

Factors making this article timely, important, or interesting for a general BAMS readership are summarized below:

- The interest and practice in the direct or indirect use of NWP for 0-6 hour forecasting of high impact weather have increased greatly in the last decade. We believe now it is the time to review the progress and discuss the future directions and challenges.
- The topic is important because it links both nowcasting and mesoscale NWP communities to tackle the challenging forecasting problem of severe weather that has a large societal and economical impact.
- Improving the forecasting of high impact weather is an interesting topic to meteorologists as well as general public. The use of NWP for nowcasting the high impact weather is in particular an interesting topic to meteorologists because it is a new direction for mesoscale NWP as well as for nowcasting.
Annex 5 Email from Agnastou to WGNR regardind Ethiopia Project

Joe and Steve

The University of Connecticut is leading a consortium proposal to USAID to establish a Center for Water Resources and Development in Africa. We would like to include WMO NOWCAST and Severe Weather Forecast groups as affiliated partners of the proposed center.

The goal of the center is to conduct basic research and implement new technologies that will help USAID to more effectively address water related development challenges throughout Africa. Predicting the water cycle variability is critical to addressing water development projects in Africa. The University of Connecticut has been conducting a highly successful capacity building project for USAID in Ethiopian water resources over the past three years (http://news.engr.uconn.edu/uconn-helps-inaugurate-ethiopian-institute-for-water-resources.php) and is well prepared to lead this new initiative.

The center will be comprised of consortium and affiliated partners from universities, governmental and non-governmental organizations, international organizations and the private sector working together to develop, incubate and implement solutions to water related challenges in Africa. The center will organize and facilitate targeted activities to promote networking amongst the partners and provide research and development support to spur partnership innovation. Currently, confirmed consortium partners include Tufts University, Georgia Tech, IBM, Oklahoma University and Millennium Water Alliance leading the themes of Water Governance, Water Management, Sanitation and health. UCONN will lead the hydroinformatics and regional climate modeling, and will manage the project. The role WMO NOWCAST and Severe Weather Forecast groups in this Center will be to work with the modeling and water management group providing precipitation and land surface forecasts of droughts and floods across Africa for use in the Center’s water allocation and management activities. As affiliated partners scientists from these groups can receive moderate funding for this activity, but, most importantly they will be fully engaged in this USAID coordinated effort to improve human security in Africa.

Please let me know whether you would be interested and able to include WMO NOWCAST and Severe Forecasting Groups as affiliated partners of this USAID Center. We will be requesting letters of collaboration from all affiliated partners in the next week. Please let me know if you have any questions or if I can provide additional information.

Best,
Manos