Nowcasting & Mesoscale Research Working Group (WG-NMR)

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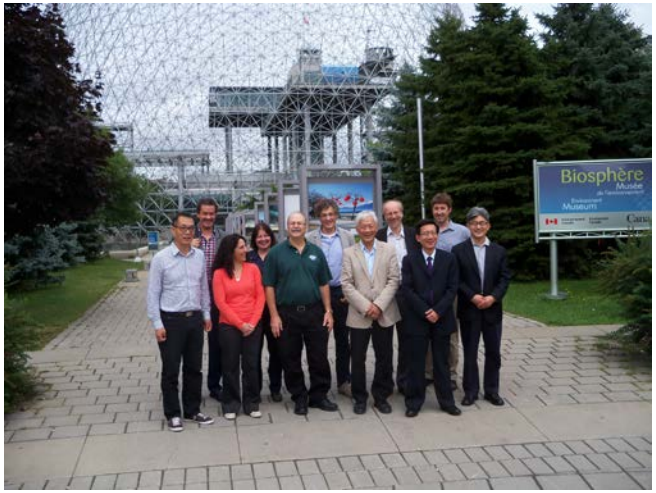
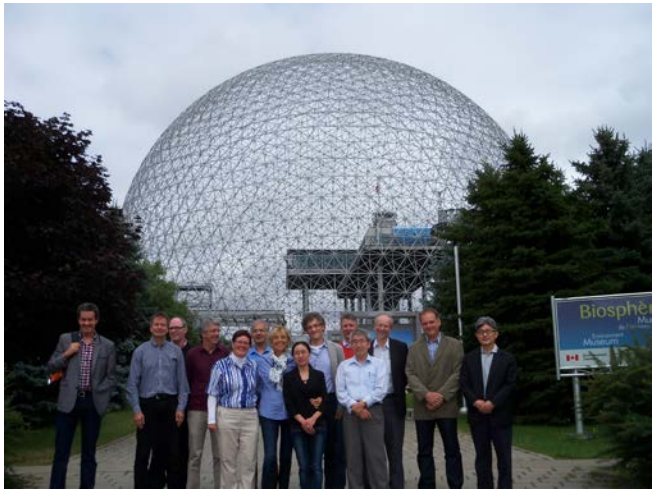
WG-NMR: the outcome of a merger



WG Nowcasting Research



WG Mesoscale Weather Forecasting Research

- Determined terms of reference, new co-chairs, membership changes
- Formulation of WG-NMR contributions to WWRP implementation plan 2016 – 2023
- July 30-31: first full WG-NMR meeting with new membership

Nowcasting & Mesoscale forecasting Research: Terms of Reference

Role: Advance and promote nowcasting and mesoscale science
Capacity building world-wide

Main goal: Improve the *accuracy*, *precision* and *use* of nowcasts and very short range weather forecasts, with a focus on achieving seamless forecasting and warnings of high impact weather

More specifically: bridge the gaps:

- Between observation-based nowcasting and short range NWP modelling
- Move down to the urban scale, across the "grey zones" for convection and turbulence
- From deterministic to probabilistic forecasting
- Integrate relevant earth system components in fine-scale models
- Between weather service and end user: develop new capabilities/products according to the needs of important user communities (aviation, emergency management, air quality, hydrology …)

Project	Main Science Focus
FROST14	Winter Nowcasting; complex terrain
TOMACS	Role of high density observations; urban
Grey Zone	Microphysics vs convection scheme
SCMREX	Precipitation physics of Monsoons
Polar Prediction Project	High Impact Polar Weather
UPDRAFT	Precipitation Physics of Land Fall Hurricanes
Lake Victoria	Nowcasting for DC; coupled models
Aviation RDP	Seamless
La Plata Basin/Relampago	Predictability
Korea 2018	Microphysics
HIWeather	TBD
GEOWOW	Ensembles
MesoVICT	Mesoscale Verification
SRNWP	Nowcasting, EPS and new observation types
Observation	New observation technologies

Examples of current actions: 1. LVB – HyNEWS
Lake Victoria Basin – Hydroclimate to Nowcasting Early Warning Systems

Lake Victoria: frequent severe thunderstorms occur around/over the lake, costing many lives. Two-pronged approach:

- SWFDP: set up cascade process for the operational production of local warnings with available tools
- WWRP/WG-NMR: improve understanding and tools
  - Field campaign (funding sought), for process studies and development/validation of coupled atmosphere-lake modeling
  - Development of nowcast/VSR forecast warning system based on available (global) observations
  - Nowcasting training with SWFDP for NMHS around Lake Victoria
- Cooperation with WCRP: seamless from seasonal to nowcasting time scales

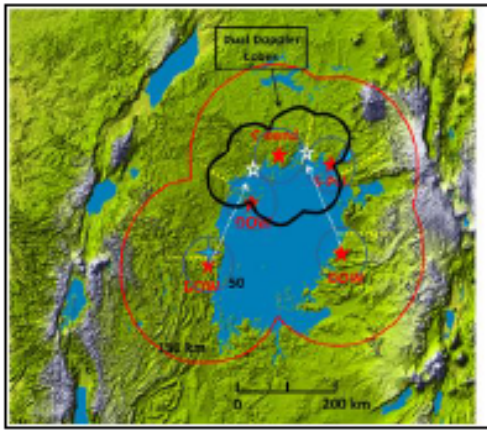
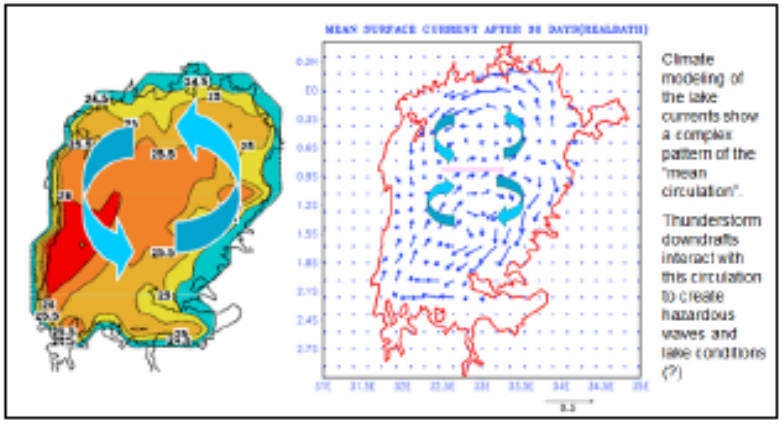


Figure 2. Example positioning of Deployment Pool instruments plus a non-Deployment Pool C-band radar. The red stars indicate possible positions of the radars for Broad Scale Operations. The outermost curves outlines areas within 150 km of a radar. The white arrows and white stars indicate possible repositioning of two mobile radars for High Resolution Operations. The black curves outline the area that would have ≥ 20 deg dual Doppler coverage. The blue star six pointed star is the integrated Sounding System, blue 4 pointed star is a radiosonde and the dashed yellow lines are lines of surface stations



Climate modeling of the lake currents show a complex pattern of the "mean circulation".

Thunderstorm downdrafts interact with this circulation to create hazardous waves and lake conditions (?)

2. Aviation RDP

- Improved meteorological support required for aviation, for safety and economic benefits:
  - Trajectory Based Operations
  - Decision-making for ATM
  - Airport capacity management and ground operations
- Actions to achieve this already ongoing in US/Europe (NextGen, SESAR); AvRDP intended to build similar capacity world-wide
- A new WWRP programme:
  - Originally proposed by WG-Nowcasting as RDP, now accepted as programme at same level as HIW, PPP, S2S
  - Kick-off meeting June 2015
  - Special Session in WSN16 and 2d Steering Committee meeting, July 2016

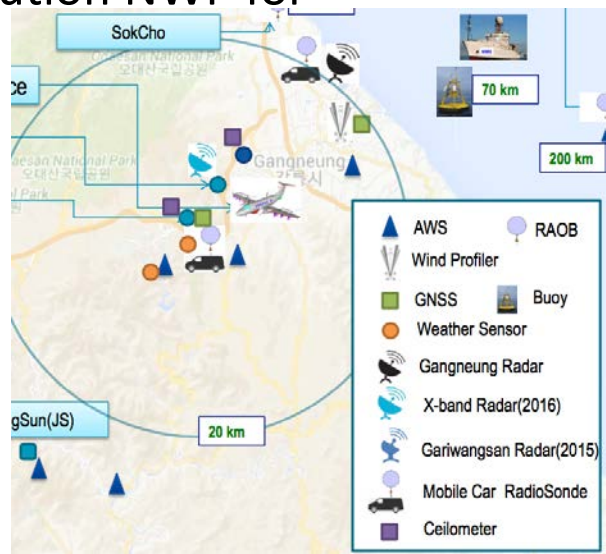
3. ICE-POP
International Collaboration Experiment for Pyeongchang 2018 Olympics & Paralympics

- Improve the understanding of air-sea interactions and mountain effects on winter weather
  - Supported by dense, sophisticated observing network
- Improve nowcasting/VSR forecasting of “difficult” weather elements (visibility, precipitation type, …) in complex terrain
- Focus on better representation of snow, hydrometeor microphysics, boundary layer processes
- Demonstrate the value of nowcasting and high resolution NWP for winter weather in complex terrain

Just starting:

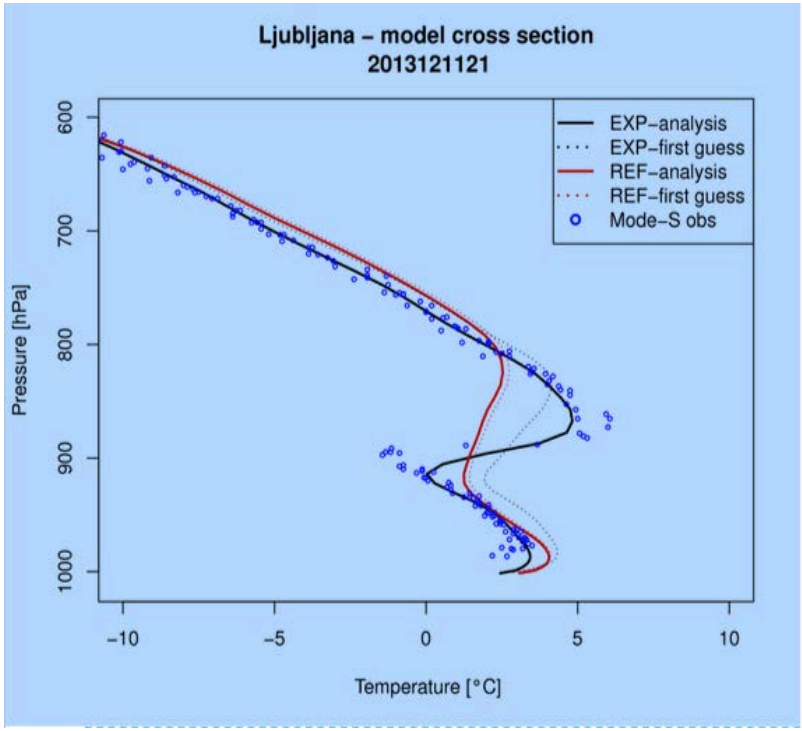
– Kick-off meeting Oct 2015

– Modeling teams from Asia, Europe & North America



New task: research on emerging observing technologies

- Assess new high resolution observations and their potential for high resolution NWP
  - MODE-S data included in new EUMETNET Aviation observations program



Benedikt Strajnar, ARSO

New task: research on emerging observing technologies

- Assess new high resolution observations and their impact in high resolution NWP
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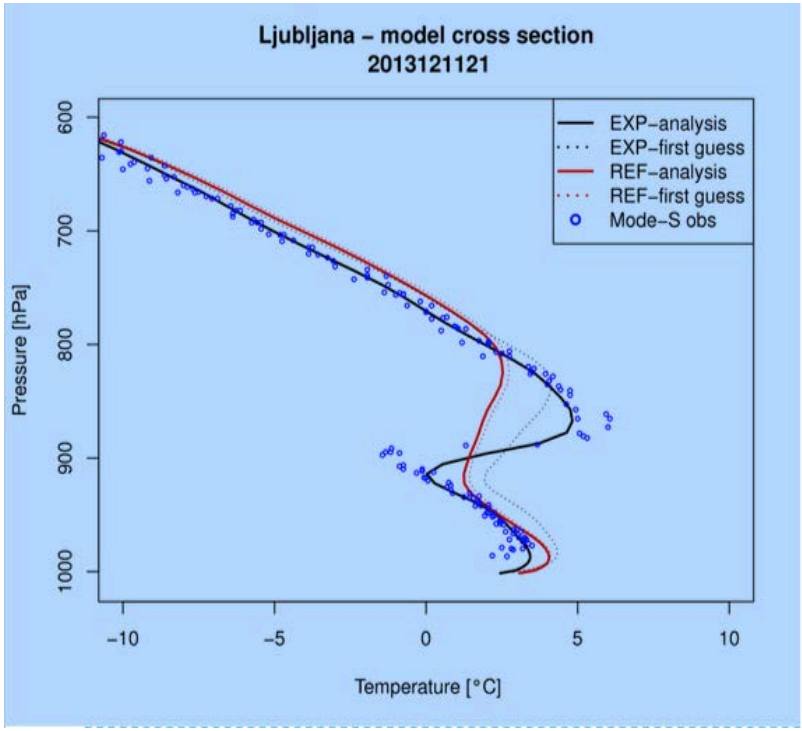
- Profiling of thermodynamical properties in lower troposphere for fine-scale NWP
  - Scanning lidars



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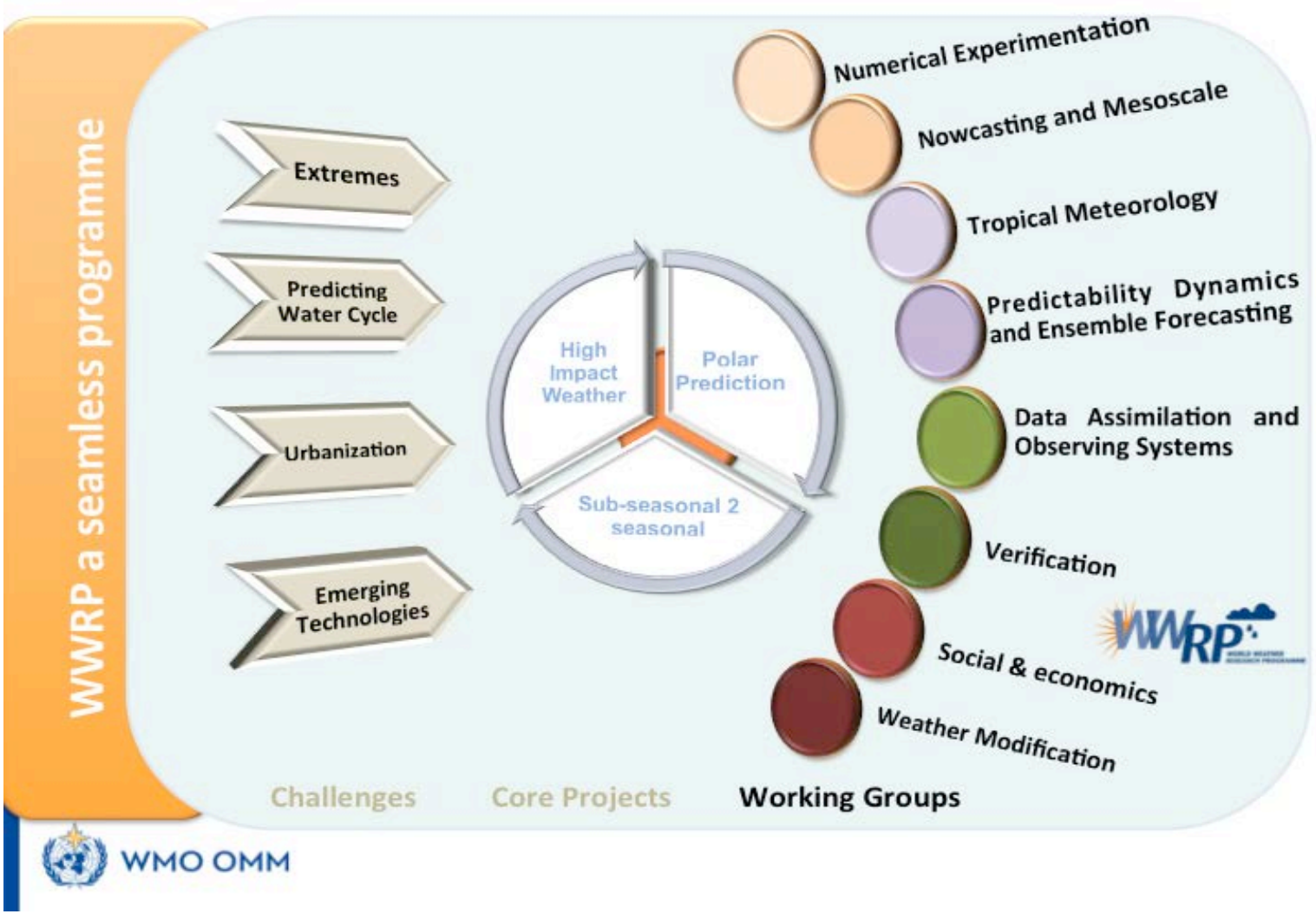
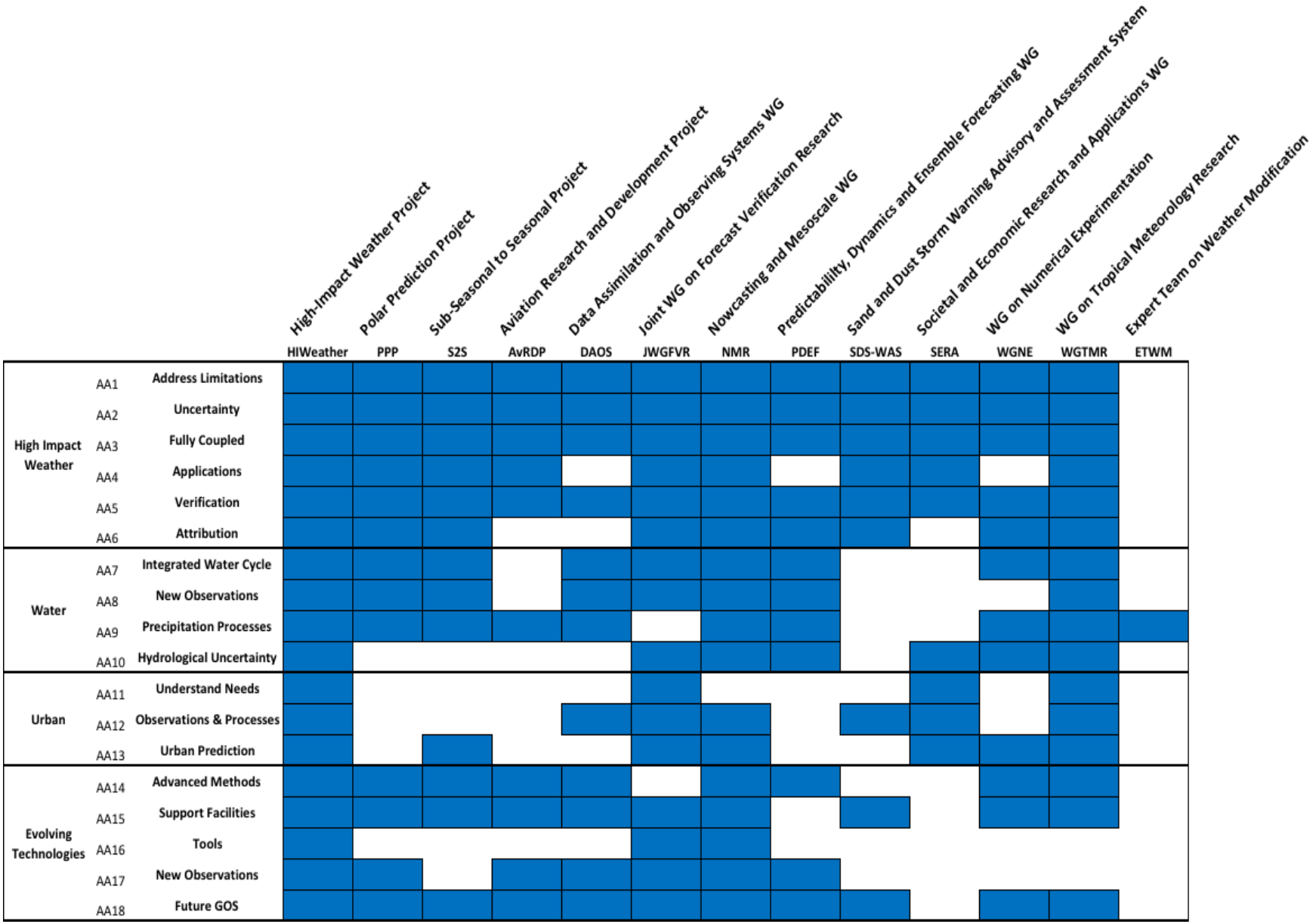
- Assess potential of crowd-sourced data, e.g. from
  - Road observations by cars
  - Cell phones: Pressure, Temperature, Humidity, Wind and signal strength

Key WWRP priorities for the period 2016-2023



WWRP action areas



Questions?

THANK YOU