World Weather Research Programme
Strategic plan 2016-2023

Estelle de Coning, Paolo Ruti, Julia Keller
World Weather Research Division
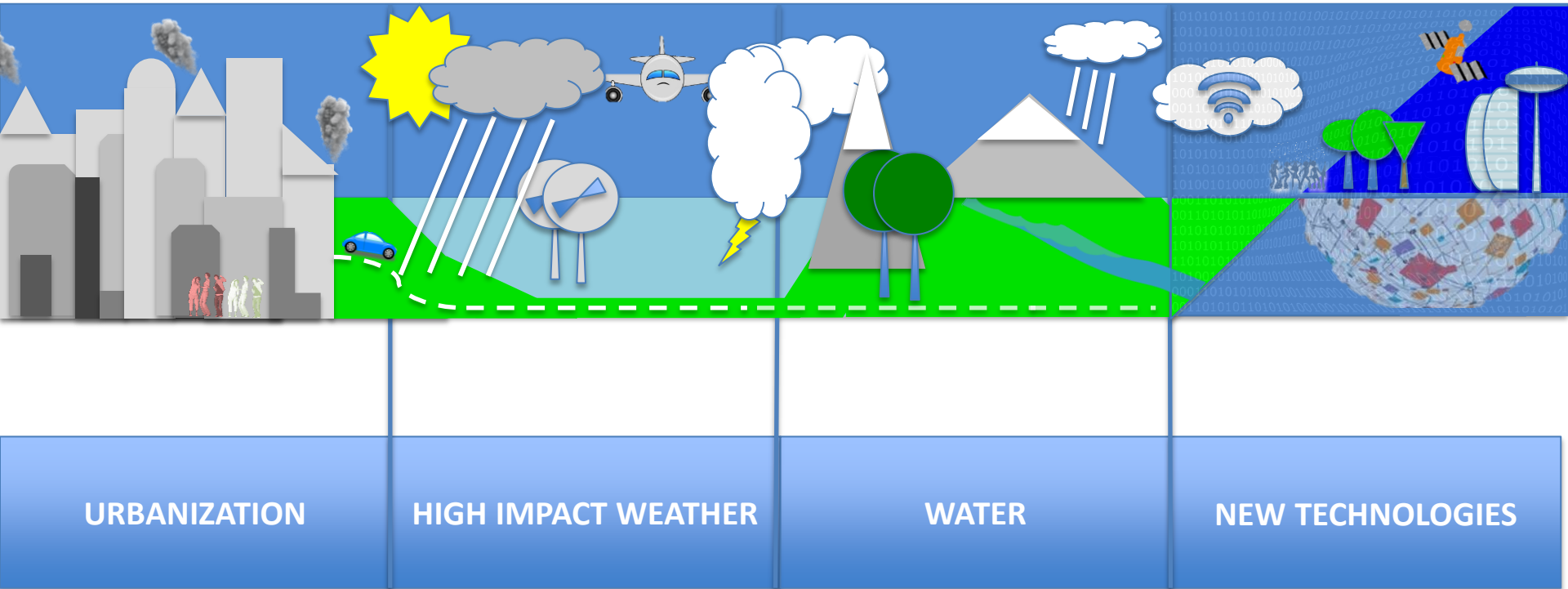Sarah Jones, Chair Scientific Steering Committee

WEATHER CLIMATE WATER
TEMPS CLIMAT EAU

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Overarching goals

- **Towards Environmental Prediction,** integrating modeling components (hydrology, sea-ice, ocean, atmospheric composition) to improve forecasting systems
  → **Ex. Polar Prediction Project**

- **Towards a seamless predictive capability**, developing a unified approach to advance environmental prediction from minutes to months and seasons, from global to local, for different users
  → **Ex. Sub-seasonal to Seasonal Prediction Project**

- **Towards impacts forecasting,** building community resilience in the face of increasing vulnerability to extreme weather events, through a better understanding of communication and decision-making processes
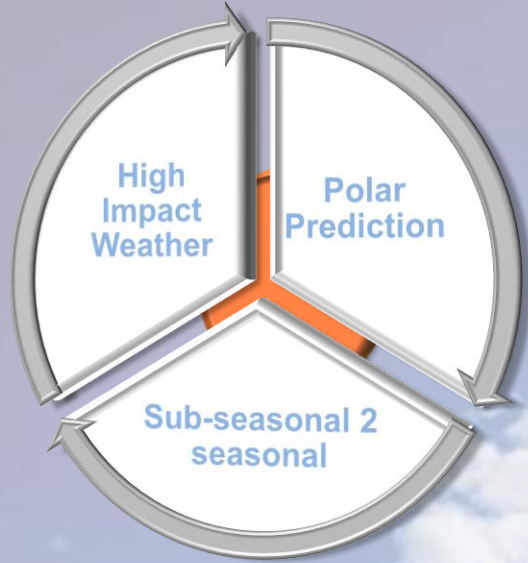 → **Ex. High-Impact Weather Project**

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WWRP Societal Challenges

| URBANIZATION | HIGH IMPACT WEATHER | WATER | NEW TECHNOLOGIES |

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Extremes

Predicting Water Cycle

Urbanization

Emerging Technologies

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High Impact Weather

Polar Prediction

Sub-seasonal 2 seasonal

Numerical Experimentation

Nowcasting and Mesoscale

Tropical Meteorology

Predictability Dynamics and Ensemble Forecasting

Data Assimilation and Observing Systems

Verification

Social & economics

Weather Modification

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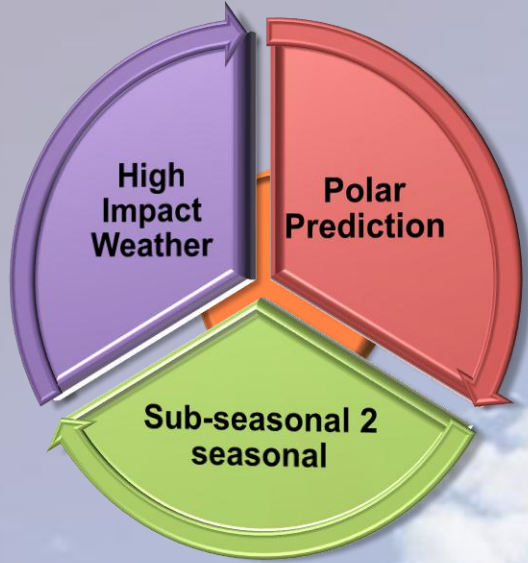**Challenges**   **Core Projects**   **Working Groups**

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Challenges

- Extremes
- Predicting Water Cycle
- Urbanization
- Emerging Technologies

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Core Projects

- High Impact Weather
- Polar Prediction
- Sub-seasonal 2 seasonal

Working Groups

- Numerical Experimentation
- Nowcasting and Mesoscale
- Tropical Meteorology
- Predictability Dynamics and Ensemble Forecasting
- Data Assimilation and Observing Systems
- Verification
- Social & economics
- Weather Modification

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Challenges

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1. WWRP implementation plan 2016-2023
Urbanization

- Key research issues:

  - Development of **model capabilities** that consider unique urban aspects (such as architecture etc.) and make **<u>use of high-density (crowd sourced) data which are available in cities (phones, cars etc);</u>**

  - An interdisciplinary integrated **urban services approach** that considers societal challenges, service requirements, crowd behaviour, messaging and trusted **sources of information.**

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2. WWRP implementation plan 2016-2023
High Impact weather

- Key research issues are:
  - Seamless approach to **understand and model extreme events**, which also **makes use of <u>new and non-traditional observations</u>** and considers aspects of global change;
  - Refined understanding of the **socio-economic implications** and decision processes taking into account vulnerabilities and risks;
  - Integrated approaches to extend predictions from physical impacts to **effects on social and economic systems**, considering stakeholders´ needs.

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3. WWRP implementation plan 2016-2023
Water Cycle

- Key research issues are:
  - Seamless approach to **understand and model the water cycle** and its processes, including the correct precipitation processes;
  - Improved **consideration of socio-economic needs and benefits**, and decision processes related to the water cycle, enabling refined **communication procedures** and services;
  - **Development and optimal application of modelling and data assimilation techniques.**

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4. WWRP implementation plan 2016-2023
New/Emerging technologies

- Key issues**:**
  - Exploitation <u>of **new methodologies and sources** for</u> observations, to complement existing capabilities, <u>assess</u> data **quality** and **<u>relative contributions of observing systems;</u>**
  - Exploitation of **modelling and <u>data assimilation capabilities and methodologies</u>**, optimum usage of computing power and communications bandwidth;
  - Adaptation to evolving **communication technologies**, while continuing service to traditional means of obtaining information, which may become important in the event of disasters.

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WWRP implementation plan 2016-2023

Intro + Societal Challenges

Action Areas

First Booklet

Programmatic Goals

Activities

Next two year details

Second Booklet

Term of References

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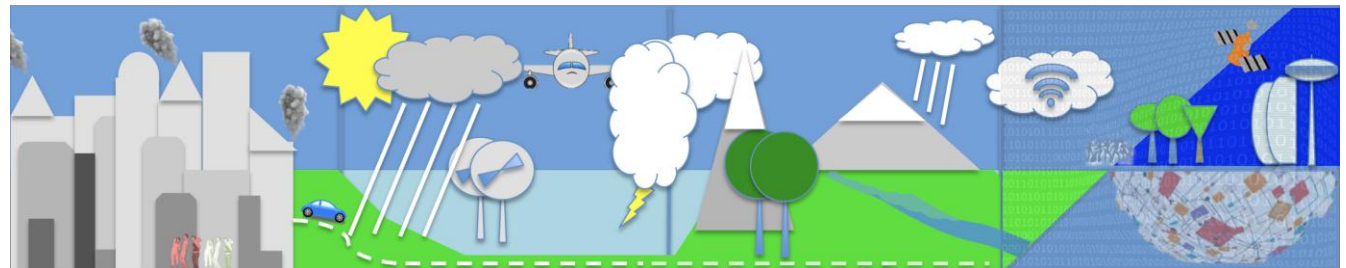WWRP
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WWRP implementation plan 2016-2023

For each Societal Challenge there are a number of Action Areas, and for each of those a number of overall WWRP programmatic goals, which are contributed to by activities involving one or more of WWRP's projects and **working groups**.

Action Areas

- -

Programmatic Goals

- -

Activities

- -

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WWRP implementation plan 2016-2023

Group			HIWeather	PPP	S2S	AvRDP	DAOS	WGFVR	NMR	PDEF	SDS-WAS	SERA	WGNE	WGTMR	ETWM
High Impact Weather	A1	Address Limitations													
	A2	Uncertainty													
	A3	Fully Coupled													
	A4	Applications													
	A5	Verification													
	A6	Attribution													
Water	A7	Integrated Water Cycle													
	A8	New Observations													
	A9	Precipitation													
	A10	Hydrological Uncertainty													
Urban	A11	Understand Needs													
	A12	Observations & Processes													
	A13	Urban Prediction													
Evolving Technologies	A14	Advanced Methods													
	A15	Support Facilities													
	A16	Tools													
	A17	New Observations													
	A18	Future GOS													

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For consideration in DA plans for the future

1. How can <u>new/emerging data sources</u> be used for DA (especially in data sparse regions)?

2. How can field campaigns/RDP/FDP be used to <u>highlight</u> the work of DA community (East Africa, Nawdex, etc)?

3. Are closer links needed with Nowcasting and Mesoscale Research WG to address shorter time scales and higher resolution?

4. What can DA community do which is to the benefit of all WMO members (aside from good science)?

5. DA <u>guidelines</u> for developed and developing countries?

6. <u>Concrete actions</u> from this workshop to apply DA in basic and complex systems?