GEWEX and GWSP

Overview and Prospect for Collaboration

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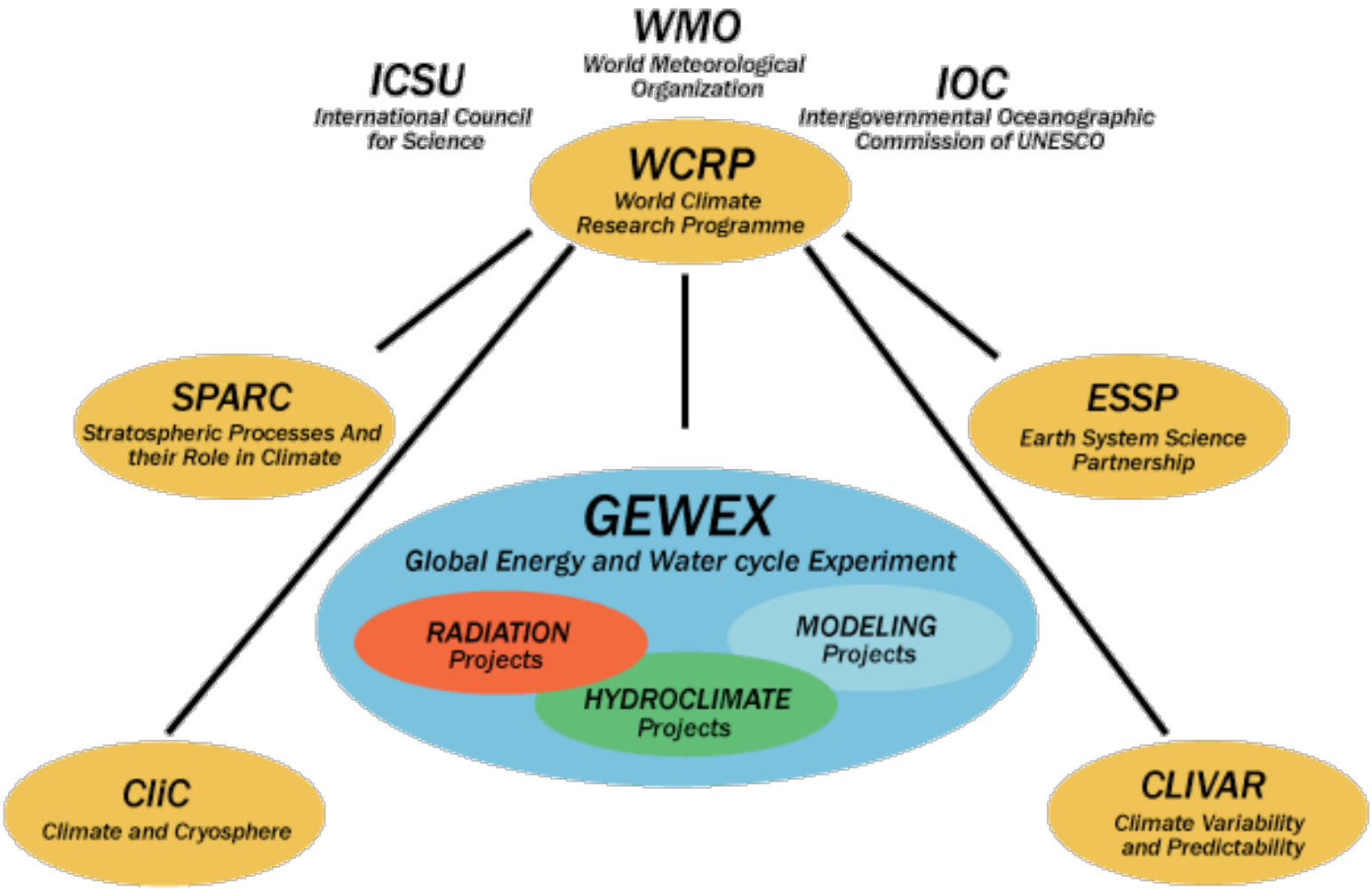
GEWEX Organization Within WCRP



GEWEX Radiation Panel

- Radiative processes and understanding
- Global Data sets on radiative and turbulent fluxes
- Global In-situ observational networks, development and standardization (BSRN, Soil Moisture)
- Development and improvement of radiative transfer codes
- Intercomparison studies and assessment
- http://www.gewex.org/projects-GRP.htm

GEWEX Hydroclimatology Panel (Formerly CEOP)

-Provide more visibility and effort for regional/basin studies and systems
-Globally distributed extensive regional data sets covering water and energy cycle observations (in situ and space borne and modeling data)
- Data management system / GEO Prototype for Water Cycle Observations
- Regional Climate Modeling and Process Descriptions (Monsoons, Extremes, etc)
- Hydrological Applications and Forecasting (Drought monitoring, Hydrological Ensemble Predictions…)
- Coupling with Global Modeling and Global Data sets (GRP and GMPP)
-http://www.gewex.org/projects-GHP.htm

Modeling and Prediction GLASS (Global Land/Atmosphere System Study) & GCSS/GABLS (GEWEX Cloud System Study/GEWEX Atmospheric Boundary Layer Study)

- Model Parameterization and development from land surface process to atmospheric processes
- Cloud process descriptions, parameterizations and model, data sets and tools, intercomparison studies
- Atmospheric Boundary layer studies, descriptions and intercomparison studies (diurnal cycle)
- Land surface feed back/coupling studies
-Strong cooperation with Numerical Prediction Centers and weather forecasting “through” WGNE
- http://www.gewex.org/projects-GMPP.htm

Some Key Issues for GEWEX

- The new GEWEX has adopted the mission of "land-atmosphere"

However GEWEX has also decided to be much more, in particular:

- GEWEX will continue to embrace the **global energy and water cycles**
- GEWEX also participates in activities supporting Earth system understanding and modeling and other integrating themes
  - **monsoons**
  - **extremes …**

Post 2013 Mission statement

To measure and predict global and regional energy and water variations, trends, and extremes (such as heat waves, floods and droughts), through improved observations and modeling of land, atmosphere and their interactions; thereby providing the scientific underpinnings of climate services.

Imperatives: Headlines

Datasets: **Foster development of climate data records of atmosphere, water, land, and energy-related quantities, including metadata and uncertainty estimates.**

Analysis: **Describe and analyze observed variations, trends and extremes (such as heat waves, floods and droughts) in water and energy-related quantities.**

Processes: **Develop approaches to improve process-level understanding of energy and water cycles in support of improved land and atmosphere models.**

Modeling: **Improve global and regional simulations and predictions of precipitation, clouds, and land hydrology, and thus the entire climate system, through accelerated development of models of the land and atmosphere.**

Applications: **Attribute causes of variability, trends and extremes, and determine the predictability of energy and water cycles on global and regional bases in collaboration with the wider WCRP community.**

Technology transfer: **Develop diagnostic tools and methods, new observations, models, data management, and other research products for multiple uses and transition to operational applications in partnership with climate and hydro-meteorological service providers.**

Capacity building: **Promote and foster capacity building through training of scientists and outreach to the user community.**

GWSP Scientific Framework

Theme 1 - Magnitudes and Mechanisms of Change

- A-1.1 Water Governance and the Global Water System
- A-1.2 Land Cover Changes and the Global Water System
- A-1.3 Climate Change and the Global Water System
- A-1.4 Water Diversions and the Global Water System
- A-1.5 Nutrient and Sediment Transport and the Global Water System

Theme 2 -Linkages and Feedbacks

A-2.1 Linkages at Different Spatial Scales in the Global Water System

A-2.2 Legacy of Human and Natural Interactions in the Global Water System

Theme 3 - Resilience and Adaptation

A-3.1 Water Requirements for Nature and Humans

A-3.2 The Nature of Adaptive Capacity of the Global Water System

A-3.3 Approaches to Enhancing Adaptive Capacity (the role of institutions, governance, industrial transformation)

A-3.4 The Provision of Ecosystem Goods and Services by the Global Water System

To build GWSP-GEWEX links

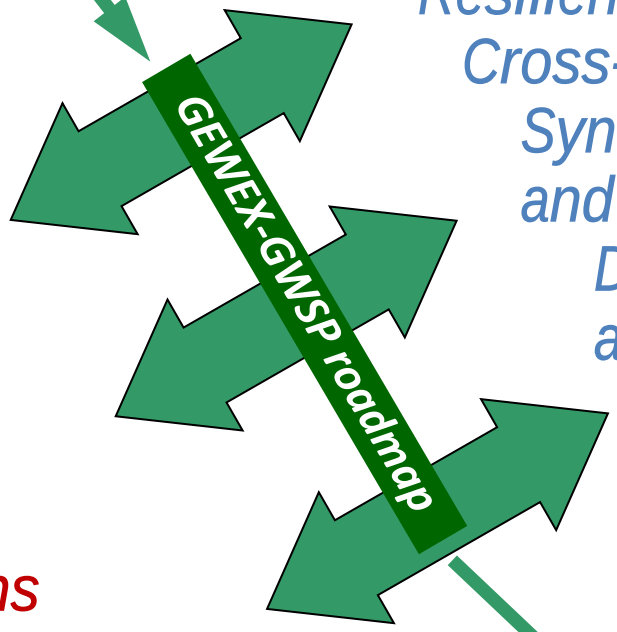
Need to identify activities within GEWEX and GWSP mostly exposed to cooperation

GWSP

Magnitudes and Mechanisms of Change
Linkages and Feedbacks
Resilience and Adaptation
Cross-Cutting Research Activities
Synthesis, Capacity Building and Education
Dialogue with Stakeholders and Policy Makers
Cooperation with Other Research Efforts

GEWEX

Datasets
Analysis
Processes
Modeling
Applications
Technology transfer
Capacity building



Need to identify well established and natural links

Short-term priorities

- GRP: **reprocessing of products, transition to operations** (e.g. through SCOPE-CM), production of a consistent multi-product dataset for water and energy studies; expanding GRP tools for broader use. Revisit water vapour product and continue to promote improvement in polar regions.
- GHP (Formerly CEOP): evolution of the regional hydroclimate projects, **enhance integration of in-situ and satellite data and more focus on regional studies** (monsoons, high elevation, extremes, semi-arid regions) **and hydrological applications**.
- GLASS and GCSS/GABLS: **atmosphere and land surface processes**; model diagnosis and development.
- **Cross-cutting activities**
  - "Monsoons in a changing climate"
  - Extremes and, in particular, drought and floods.

GRP develops **climate data records** of water and energy variables, complete with metadata and error bars.

Clouds - ISCCP
- Cloud Assessment

Radiation - SRB
- Surface reference observations - BSRN
- Radiation Assessment

Aerosols - GACP
- Aerosol Assessment

Precipitation - GPCP
- Sfc gauge obs (GPCC)

Turbulent Fluxes
- SeaFlux
- LandFLux

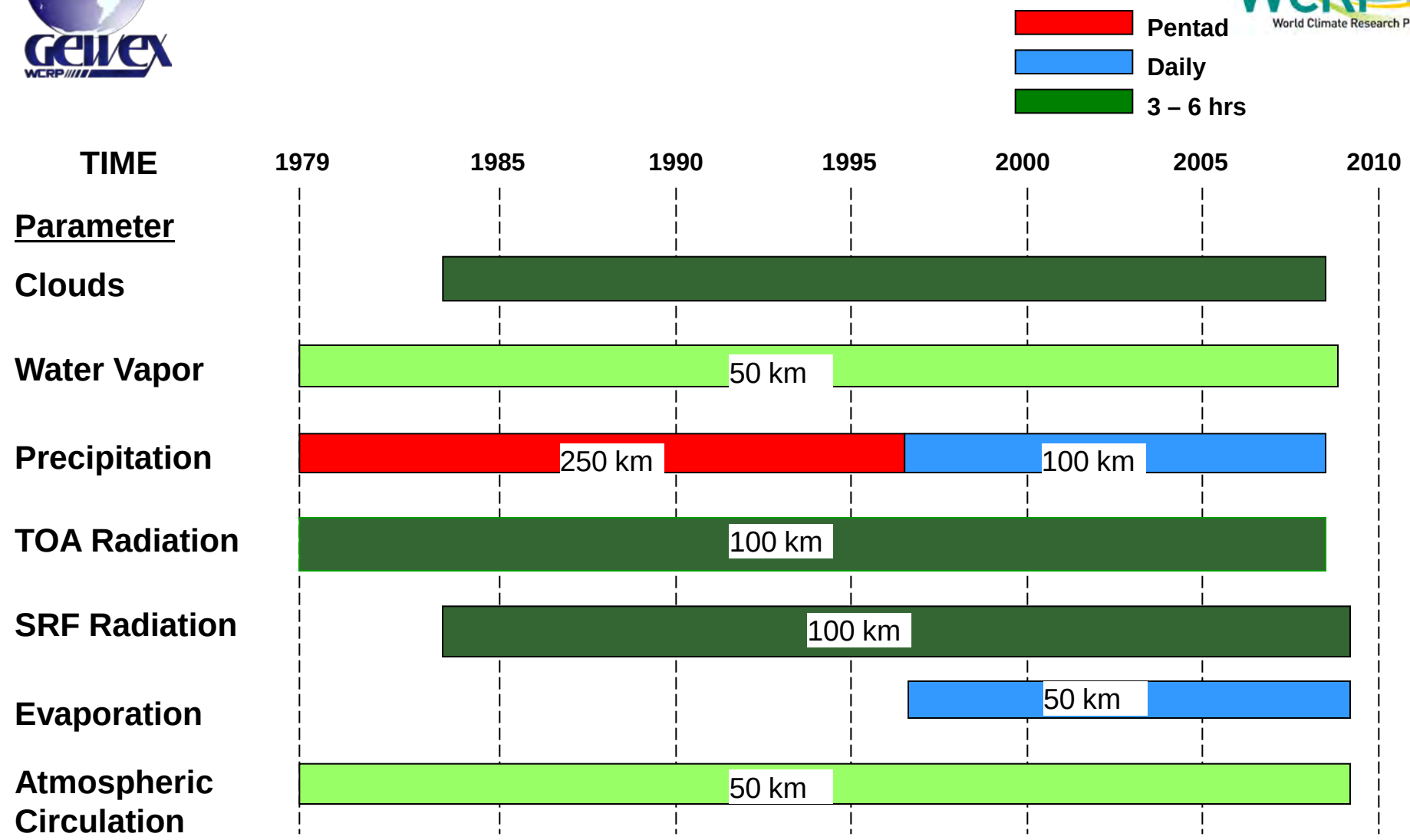
Soil Moisture

Potential of cooperation →

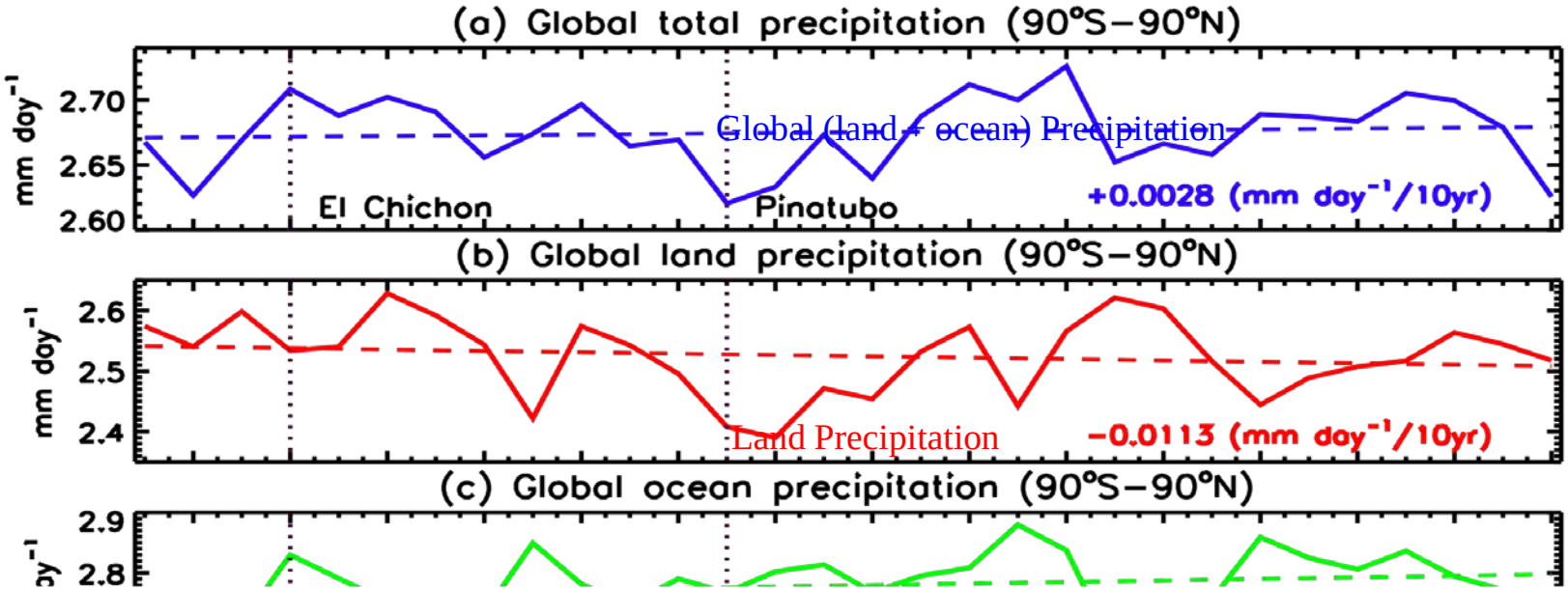
- ❑ Synergy with GWSP data sets
- ❑ Using GWSP vision of stakeholder requirements to improve GEWEX data sets

A GRP product is endorsed by GEWEX/GRP to conform to a high standard of production and documentation. It consists of a blend of available satellite and in-situ observations and is periodically compared and assessed against other products in an open and transparent fashion. It is openly available to everyone without restrictions.

Available Global Datasets



Monitoring Global Precipitation with the Global Precipitation Climatology Project (GPCP)

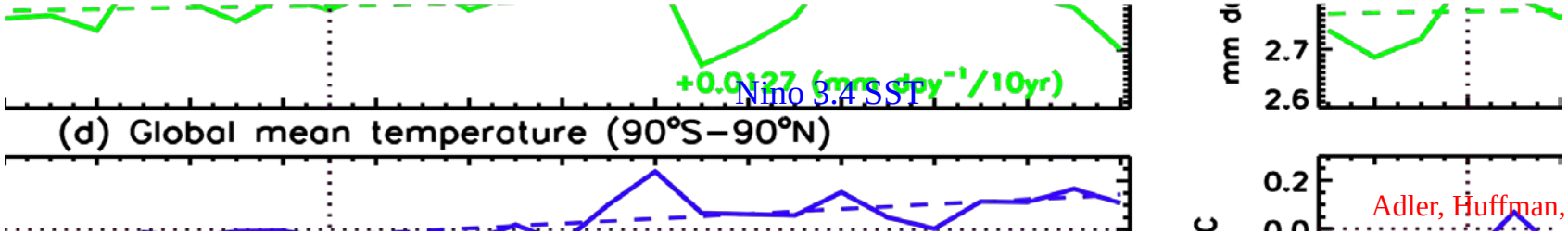


Global (land + ocean) Precipitation

Land Precipitation

Ocean Precipitation

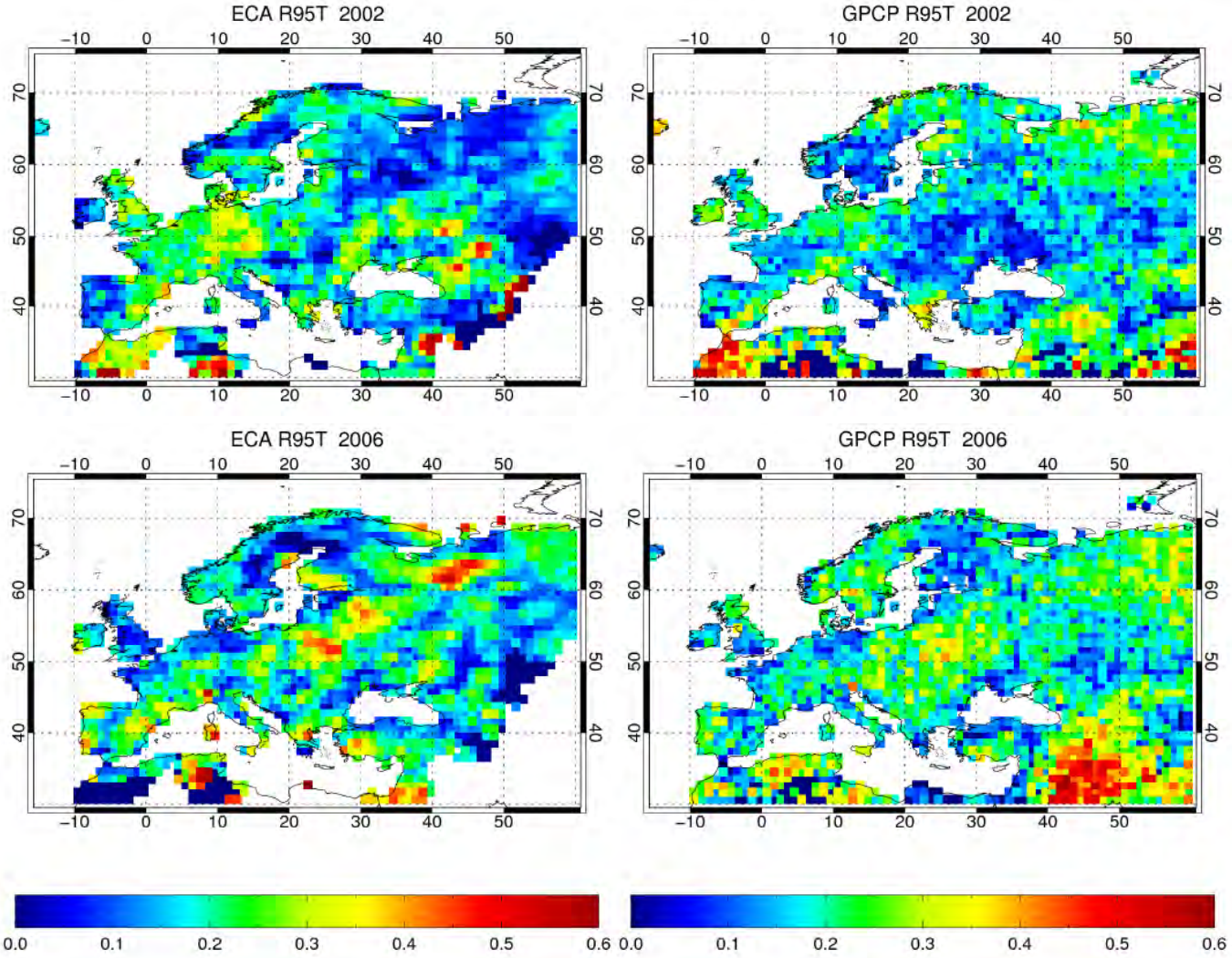
Surface Temperature



Nino 3.4 SST

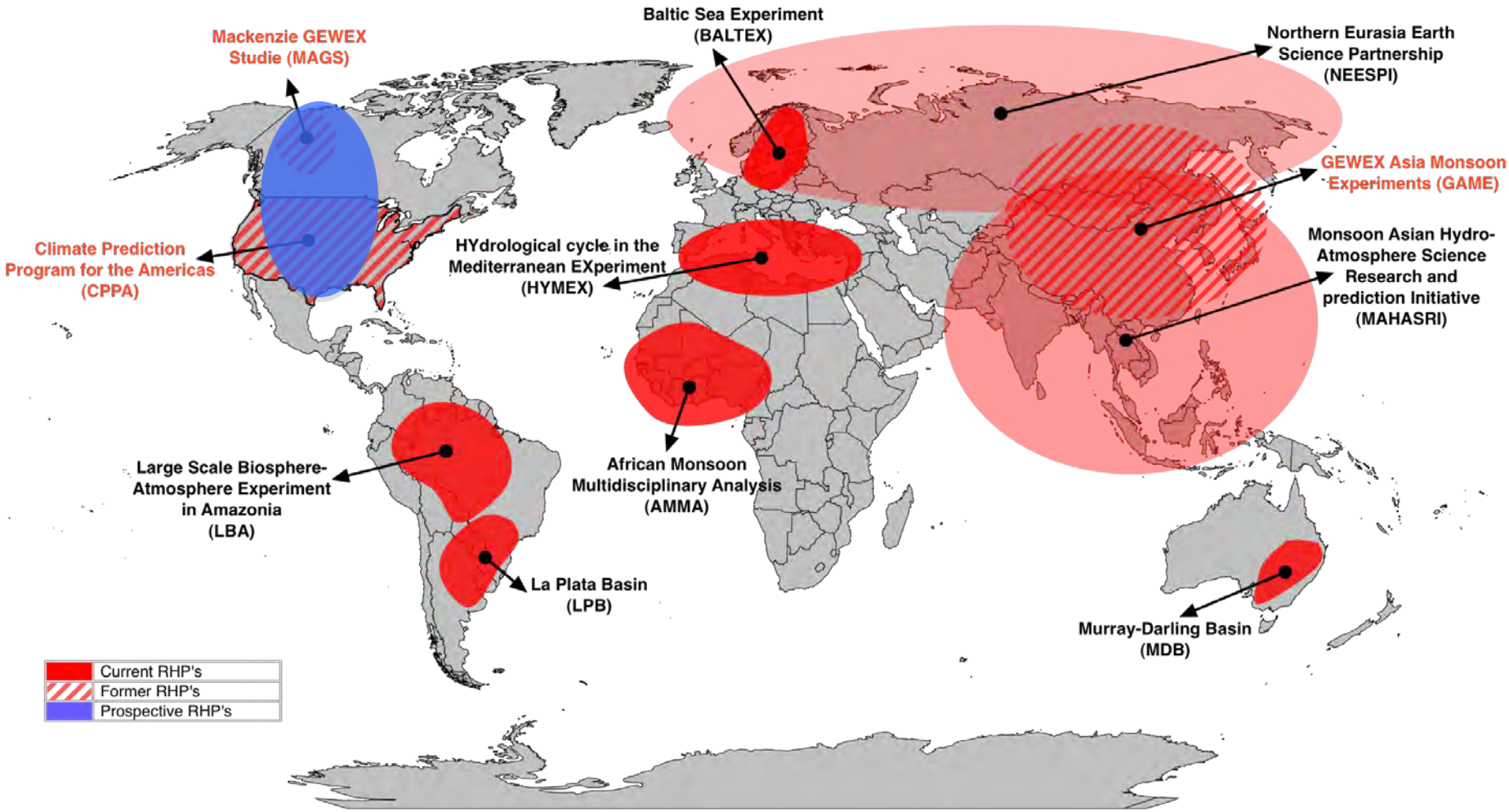
Adler, Huffman, Gu

Looking on the abilities of satellite products to capture regional extremes: still far away from realistic estimates



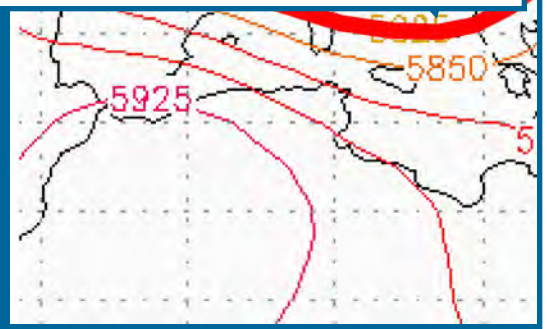
Lockhoff et al. 2010

GEWEX REGIONAL HYDROCLIMATE PROJECTS



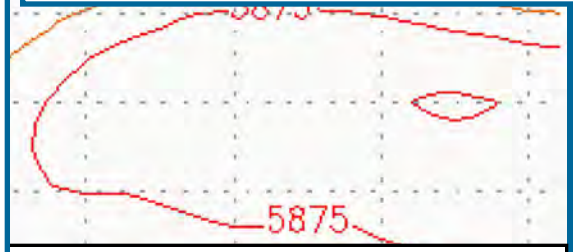
Need for synthesis between regions: Summer / 2010

Polland, SE Germany, Czech Rep.



Central Russia

Pakistan



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Potential for collaboration with GWSP

- At the Regional Hydroclimate Project (RHP) level:
  - Global Catchment Initiative
  - Regional Downscaling
- With HAP (discussions regarding activities are underway)
  - Use of Hydrological Ensemble Forecasting
- (Near?) Future Joint Exploratory Workshop
- Possible Joint GEWEX-GWSP Conference
- ……

Thank You