



LUND
UNIVERSITY



UNIVERSIDADE FEDERAL
DE ALAGOAS

GlobalHydroPressure

MODEL-BASED GLOBAL ASSESSMENT OF
HYDROLOGICAL PRESSURE



NIBIO

NORWEGIAN INSTITUTE OF
BIOECONOMY RESEARCH

SMHI



Norwegian
Water Resources and
Energy Directorate



Key Objectives

- Explore how a global hydrological modelling and forecasting system can be used for **quantitative impact and risk assessment of hydrological pressure** associated with climate variability and change.
- Have a comprehensive **multi-scale and multi-pressure approach** where hydro-meteorological hazards, operating at different scales, are considered together with additional environmental pressures.
- Tailor assessment and adaptation to **local and regional conditions** using local data, location-specific critical thresholds, etc.
- Have a **bottom-up approach** to climate change adaptation where end-users are involved in all phases of the modelling and analyses

Partners

- Sweden
 - Div. of Water Resources Eng., Lund University
 - Swedish Meteorological and Hydrological Institute (SMHI)
- Norway
 - The Norwegian Water Resources and Energy Directorate (NVE)
 - Norwegian Institute of Bioeconomy Research (NIBIO)
- Brazil
 - Federal University of Itajubá, Brazil (UNIFEI)
 - Federal university of Alagoas, Brazil (UFAL)

Key innovative aspects

- **Combine existing global and local hydrological models** for improved assessment of hydrological pressure.
- **Explore recent historical events** and for stakeholder communication for improving **understanding of vulnerabilities.**
- Use a **multi-scale approach** to better understand and describe different local pressures/risks/vulnerabilities as well as their associated uncertainties.
- **Stakeholders** are in the centre of decisions and products.

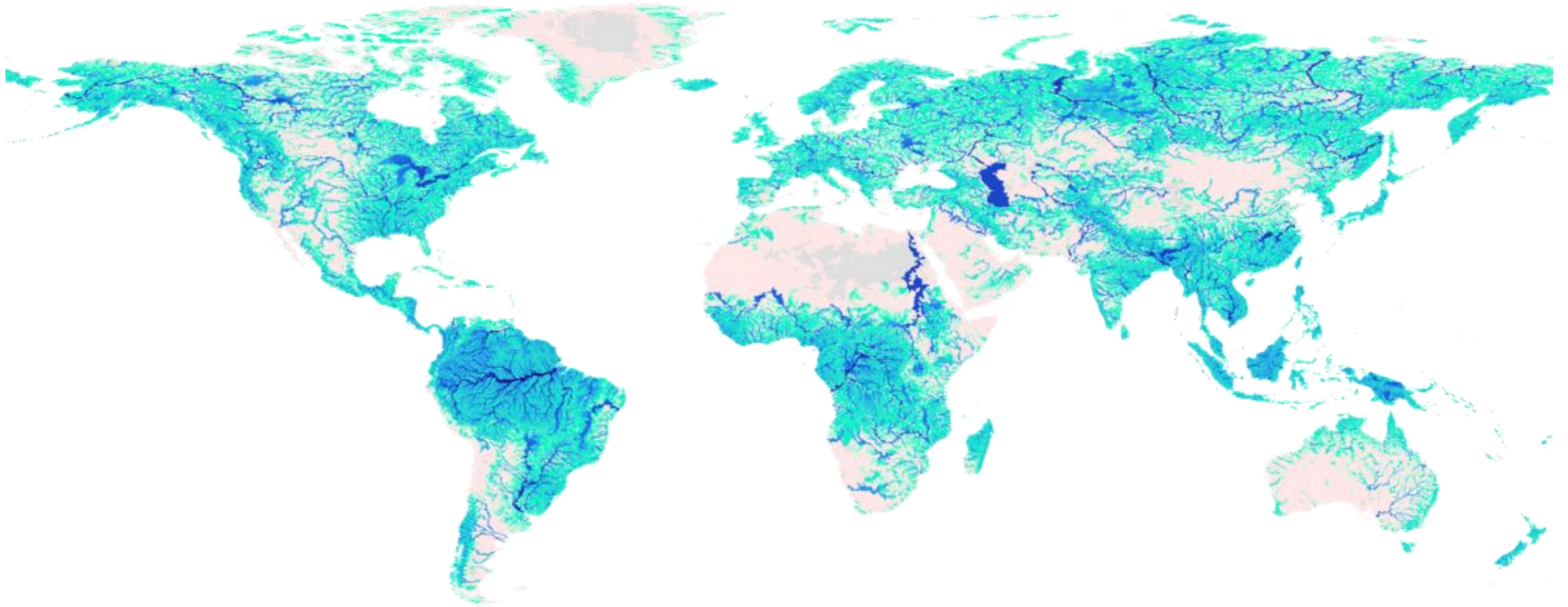
Work Packages

- **WP1** Management (lead: Prof. Cintia B. Uvo, LU)
- **WP2** Stakeholder interaction (joint lead: Dr. Rasmus Astrup, NIBIO and Dr. Stein Beldring, NVE)
- **WP3** Global development (lead: Dr. Hossein Hashemi, LU)
- **WP4** Case studies and indicators (lead: Dr. Jonas Olsson, SMHI)
- **WP5** Outreach and exploitation (lead: Carlos Ruberto Fragoso Jr., UFAL)

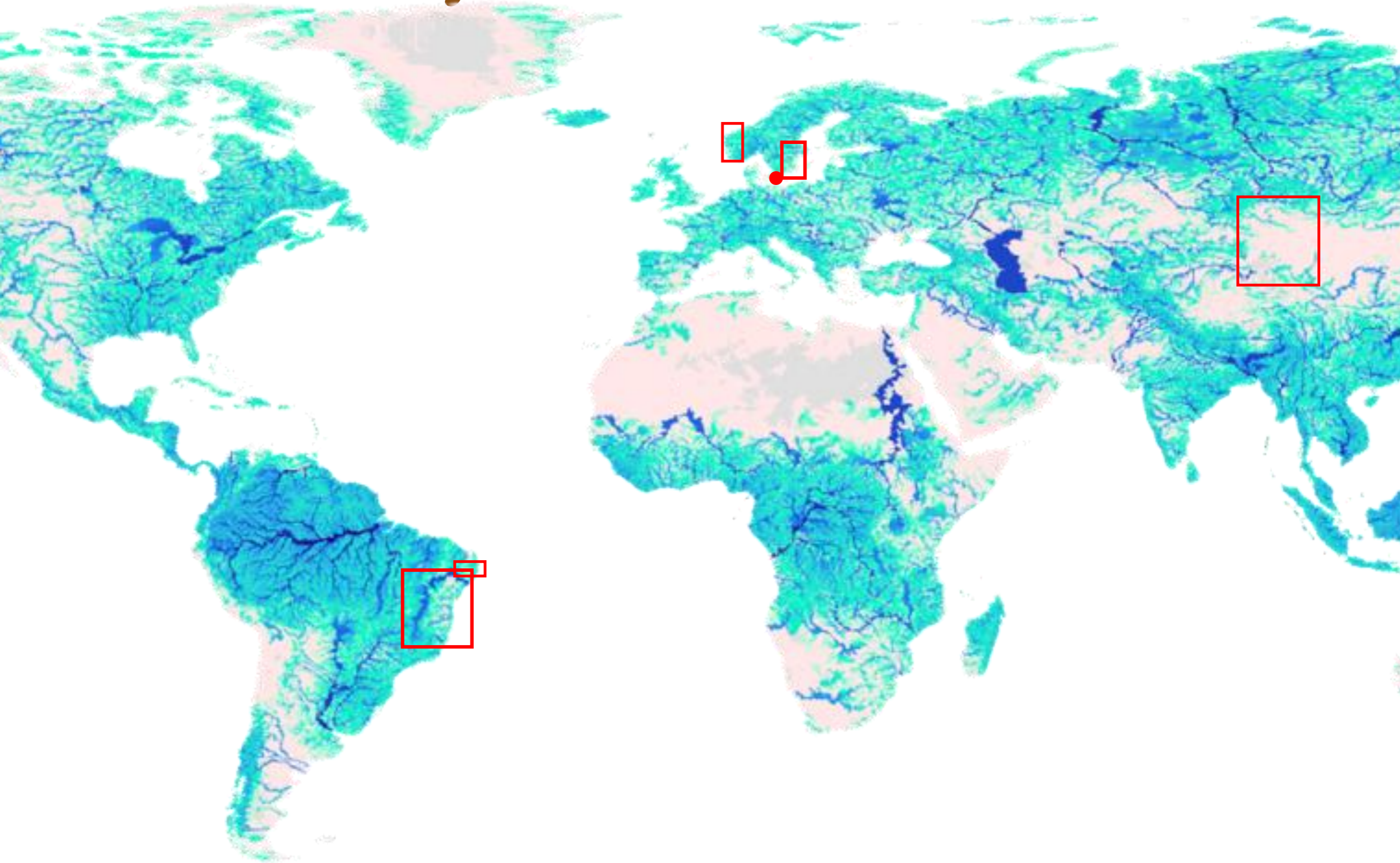
Case Studies

- Malmö City, Sweden
 - Pluvial flooding in urban environment
- Southern Sweden
 - Drought and water scarcity
- São Francisco and Sapucaí River basins, Minas Gerais, Brazil
 - Fluvial flooding risk, droughts, water availability for agriculture and hydropower
- Mundaú and Paraíba do Meio River basins, Alagoas, Brazil
 - Fluvial flooding risk
- Xinjiang Uyghur Autonomous Region, China
 - Water availability for agriculture, water supply and hydropower
- Western Norway
 - Water availability from Hydropower

Global Model Domain



Case Study Domains



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Pluvial Flooding Malmö 31/08/2014

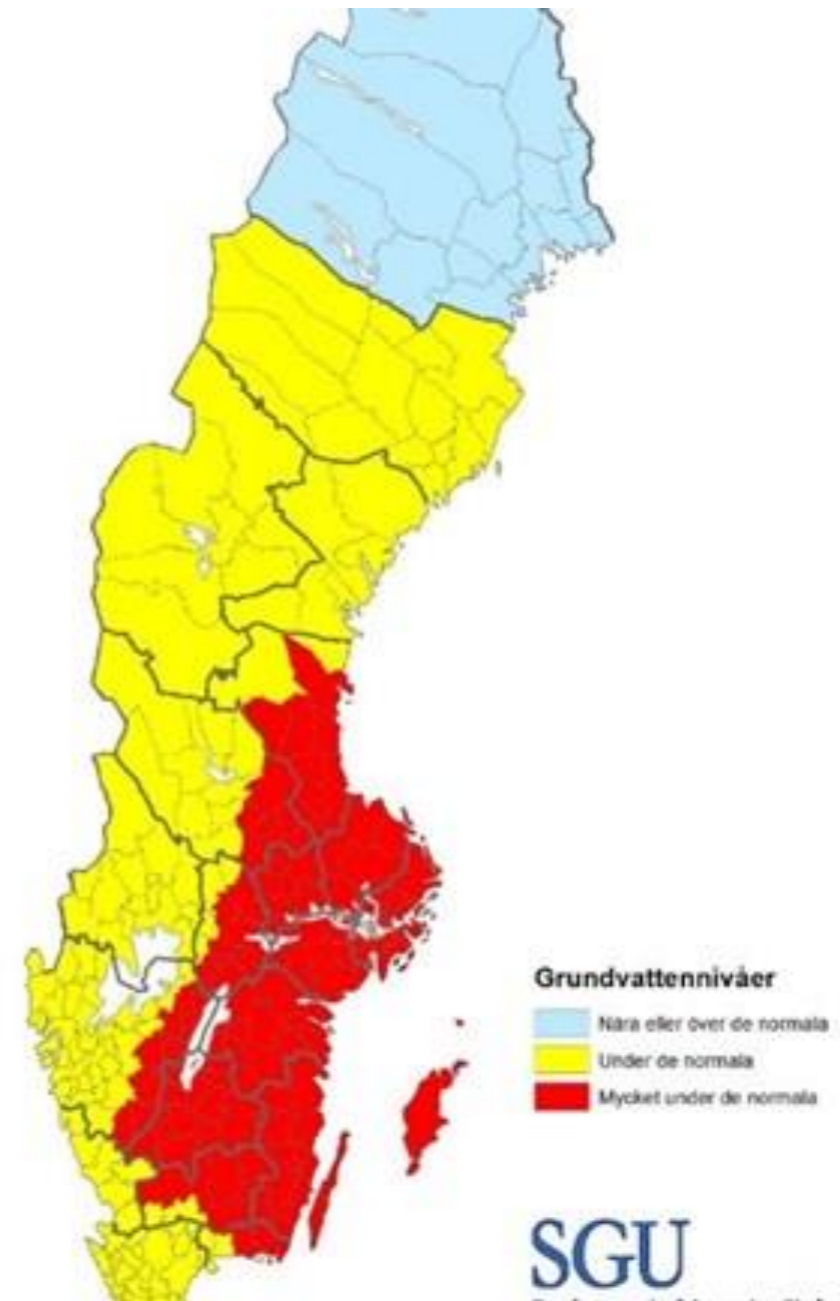


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Droughts in Southern Sweden

- Groundwater levels



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Hydropower station 3 Marias

- Height: 75 m
- Flooded area: 1040 km²



January 2013

September 2013

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Santana do Mundaú 2010



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Xinjiang Uyghur Autonomous Region

- Depletion of Glaciers since 1950

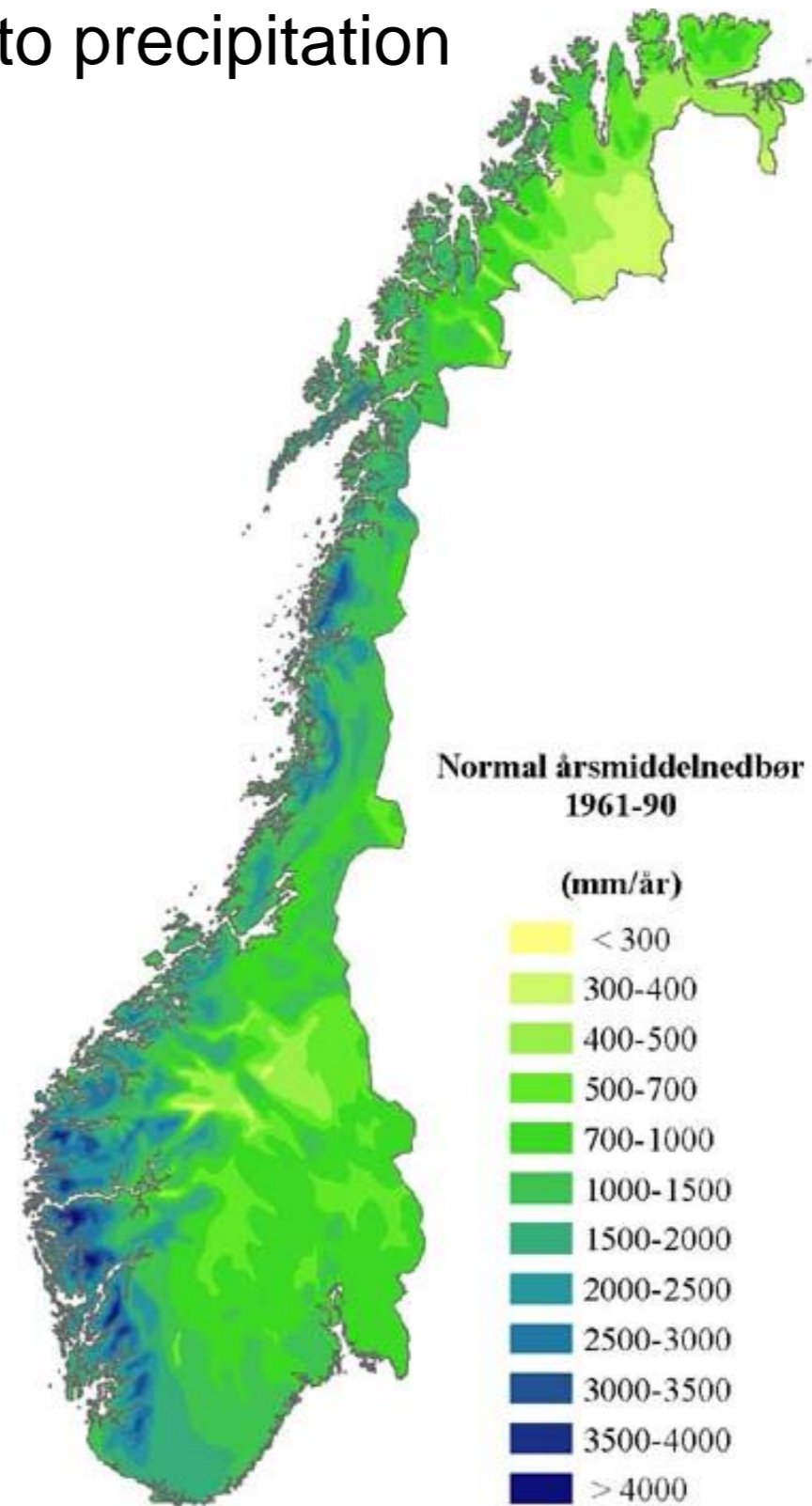


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Western Norway

- Droughts and floods connected to precipitation



Outreach

The screenshot displays the Copernicus Climate Change Service website interface. At the top, the Copernicus logo and 'Climate Change Service' are visible. A navigation menu includes links for 'C3S', 'C3S_422_LOT1_SMHI', 'CLIMATE IMPACTS', 'SEASONAL FORECASTS', 'SHOWCASES', 'USER GUIDANCE', and 'ABOUT'. The main content area features a global map showing projected temperature changes in degrees Celsius. A color scale on the left indicates the magnitude of change, ranging from blue (<math>< 0</math>) to purple (15). The map shows significant warming, particularly in the Northern Hemisphere. A sidebar on the right provides configuration options for the map, including 'Indicators and models', 'Indicator type' (Temperature), 'Climate Impact Indicator (CII)' (temperature (mean)), 'Model/Projections' (Global, Model Ensemble: Global (2 deg), Ensemble member: Ensemble mean), 'CII Settings' (Impact period: 2041 to 2070, Emission scenario (RCP): Moderate (RCP 4.5)), and 'Map Layers' (CII reference period, CII impact period, CII confidence, Agreement on sign of change, Ensemble value range). The footer contains 'About C3S', 'Contact us', 'Disclaimer / Privacy', and 'Cookies'.