IC4WATER RDI FUNDED PROJECTS BOOKLET

Project: Model-based Global Assessment of Hydrological Pressure

Outcomes and expected impact:

Expected impact:

GlobalHydroPressure aims at formulating, evaluating and refining innovative Decision Support Indicators (DSIs) for the most common hydrological pressures as well as developing technical infrastructures for their distribution on both global and regional/local level. The project is designed in response to Challenge 1 in the 2017 Joint Call, Multiple pressure effects on ecosystems and ecosystem services. The project addresses both Sub-topic 1a, Assessment of multiple pressures… (through the case studies in WP4) and Sub-topic 1b, Tools and approaches... (through the technical development in WP3-WP5). Importantly, all development will be based on in-depth assessment of stakeholder requirements (WP2). The project has a strong and obvious transnational/international component as it is based on the WorldWideHYPE (WWH) hydrological model, associated with an active and growing user community (http://hypeweb.smhi.se/). All partners are expected to substantially benefit from collaboration within this R&D environment, conceivably opening up many opportunities for new future initiatives. The long-term benefit of GlobalHydroPressure is secured both through the global portal, which will become permanent, and the local forecasting models to be developed and maintained (WP4). As described in section 1.2, Europe has a strong ambition to be in the front when it comes to climate services, and with GlobalHydroPressure we intend to contribute from a bottom-up and stakeholder-oriented perspective, which is urgently needed today. The expected impacts range from an improved societal security through improved DSIs for both early warning and long-term planning pertinent to different hydrological pressures and hazards, over better support for water resources and environmental management, to new business opportunities both for climate service operators (section 2.4) and for consultants or other private actors wishing to exploit the results for building further tailored services.

Key expected outputs:

- Improved understanding of stakeholder's needs and expectations related to key hydrological pressures
- New validated hydrological Decision Support Indicators (DSIs) for the most common hydrological pressures
- An improved global climate service providing DSIs at a high resolution and different future time horizons
- Local tailored hydrological forecast systems and DSI providers with quantified performance/accuracy

•Prototypes of stakeholder DSI and forecast communication and presentation tools •Capacity building through cross-case knowledge transfer, increased public understanding and awareness •Several scientific publications, technical reports and scientific conference contributions
List of deliverables expected:
Deliverables (month/s)
D1.1 Final report, including post-project plan (36)
D2.1 Synthesis report on stakeholder and end-user needs (6)
D2.2 Synthesis report on the suitability, accuracy, and added value of the developed platforms and indicators for local decision making and policy support (36)
D3.1 Bias corrected high-resolution satellite-based global precipitation data set for input to WW-Hype (16)
D3.2 Calibrated WW-Hype both at regional and global scales and report on WW-HYPE performance (24)
D3.3 WW-HYPE with updated indicators (36)
D4.1 Local observations delivered to WP3 (12)
D4.2 Tailored Decision Support Indicators (DSIs) (18)
D4.3 Report on local model development (24)
D4.4 Report on DSI accuracy and applicability (36)
D5.1 Pre-operational App (36)
D5.2 WW-Hype open/free course (36)

Expected research results to communicate and disseminate (in very general terms)	**Target groups for communication and dissemination activities:**
1.Quantitative impact and risk assessment of hydrological pressures associated to climate variability and change in global scale	Decision makers globally
2. Local tailored hydrological forecast systems and DSI providers with quantified performance/accuracy	Decision makers from specific case studies and local end users
3. New validated hydrological Decision Support Indicators (DSIs) for the most common hydrological pressures	Local decision makers
4. Prototypes of stakeholder DSI and forecast communication and presentation tools	Local decision makers and end users

Case studies: location, type of experiments:	
WP4.1 Malmö City, Sweden (lead: Dr. Johanna Sörensen, LU) This case study will focus on pluvial flooding in an urban environment. Pluvial flooding is generally caused by short-lived, localized, high-intensity rainfall events, producing volumes exceeding the drainage capacity. Cities are particularly vulnerable in light of the large fraction of impervious surface. Parts of Malmö City has been flooded a number of times in the last decade and in 2014 the worst urban flood in Sweden on record took place, with an estimated damage of 25 M€.	Stakeholders to be participating include the Swedish Civil Contingencies Agency (MSB), the Swedish Water & Wastewater Association (Svenskt Vatten), the local water utility company (VA Syd), municipal governments in Malmö, county administrative board of Scania, consultant companies, urban population, risk-related activities (hospitals, emergency services, power stations, etc.).
WP4.2 Southern Sweden (lead: Dr. Jonas Olsson, SMHI) WP4.2 will focus on drought and water scarcity. In 2016-2017, southern Sweden experienced a substantial precipitation deficit and in early summer the region faced the worst water scarcity in several decades. Water use was restricted in some 50 municipalities in 12 counties, but eventually a rainy end of the summer improved the situation. Nevertheless, the event became a real eye-opener as water scarcity is unusual in the area and consequently the preparedness was low.	The primary receiver of the developments within GlobalHydroPressure will be the operational hydrological forecasting unit at SMHI, who will participate in the project. Secondary stakeholders include e.g. county administrative boards, municipalities, national authorities and hydropower companies. The Principal User in WP4.2 is the County Administrative Board of Jönköping.
WP4.3 Minas Gerais, Brazil (lead: Dr. Michelle Reboita, UNIFEI) WP4.3 focuses on both drought and fluvial flooding (i.e. river overtopping) in the São Francisco and Sapucaí River basins, where the former is very big and important for e.g. agriculture and hydropower production and the latter is smaller and mountainous. Both basins were heavily affected by the unprecedented drought 2012-2017. Sapucaí River experienced a serious flood in 2000, when most of Itajubá City (population ~100 000) was flooded.	Stakeholders to be participating include National Water Agency (ANA), National Center for Monitoring and Alert of Natural Disasters (CEMADEN), Minas Gerais Water Management Institute (IGAS), Sanitation Company of Minas Gerais (COPASA), municipal governments, through civil defenses, watershed committees, urban population, agricultural producers, hydropower plants.
WP4.4 Alagoas, Brazil (lead: Dr. Carlos Ruberto Fragoso Júnior, UFAL) WP4.4 focuses on fluvial flood risk in Mundaú and Paraíba do Meio River basins. These rivers are extremely susceptible to flooding due to shallow soils combined with an intense anthropogenic land-use. More than 10 cities are located along the rivers and severe flooding of the urbanized floodplains has occurred repeatedly for over 100 years. In 2010, ~50 000 inhabitants became homeless and the economic damage was estimated to USD 300 000 000.	National Center for Monitoring and Alert of Natural Disasters (CEMADEN), municipal and state governments through civil defenses and Agency for Environment and Water Resources, watershed committees, urban population, agricultural producers.
WP4.5 Xinjiang Uyghur Autonomous Region, China (lead: Dr. Hong Li, NVE) Water availability for e.g. agriculture, water supply, and hydropower production is the key issue in WP4.5. The Xinjiang Uyghur Autonomous Region is the area on Earth which	The stakeholders include local governments, farmers and hydropower companies. The end-users additionally include public, because their daily life is influenced if government

is most remote from any ocean. The area has ~20 000 glaciers that are continuously retreating, by 20-30% since the 1950s, reducing (or even deleting) runoff in the lower reaches of some rivers. A key event was when the Urumqi Glacier split into two small branches in 1994.	change domestic water price or set limitations on water amount they can use.
WP4.6 Western Norway (lead Dr. Stein Beldring, NVE) The main issue will be drought affecting water availability for hydropower production, but also floods will be studied. Western Norway is a region dominated by steep terrain, high amounts of precipitation caused by extratropical cyclones migrating from west to east across the Atlantic, a seasonal variation in snow cover and several glaciers covered catchments. In winter 2010, low lake and groundwater levels threatened water supply and electricity prices rose to unprecedented levels.	End users will be Naturfareforum, Norway, County Governor of Western Norway and the hydropower company BKK in Norway.
Water Policy context / project contribution to policies (National, European, International – UN SDGs):	