HYDROLOGY TEP

hydrology
tep

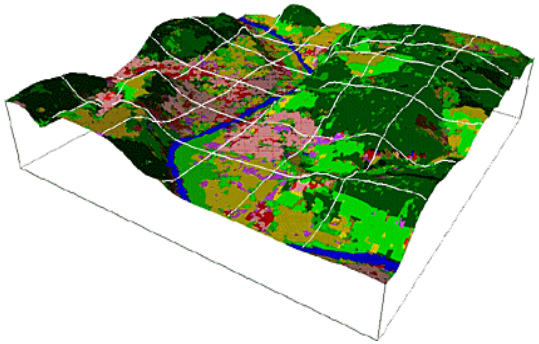
Introduction

1. Why water?
2. Why Hydrology Exploitation Platform?
3. What is Hydrology Exploitation Platform?
4. Community
5. Services
6. System
7. Challenges

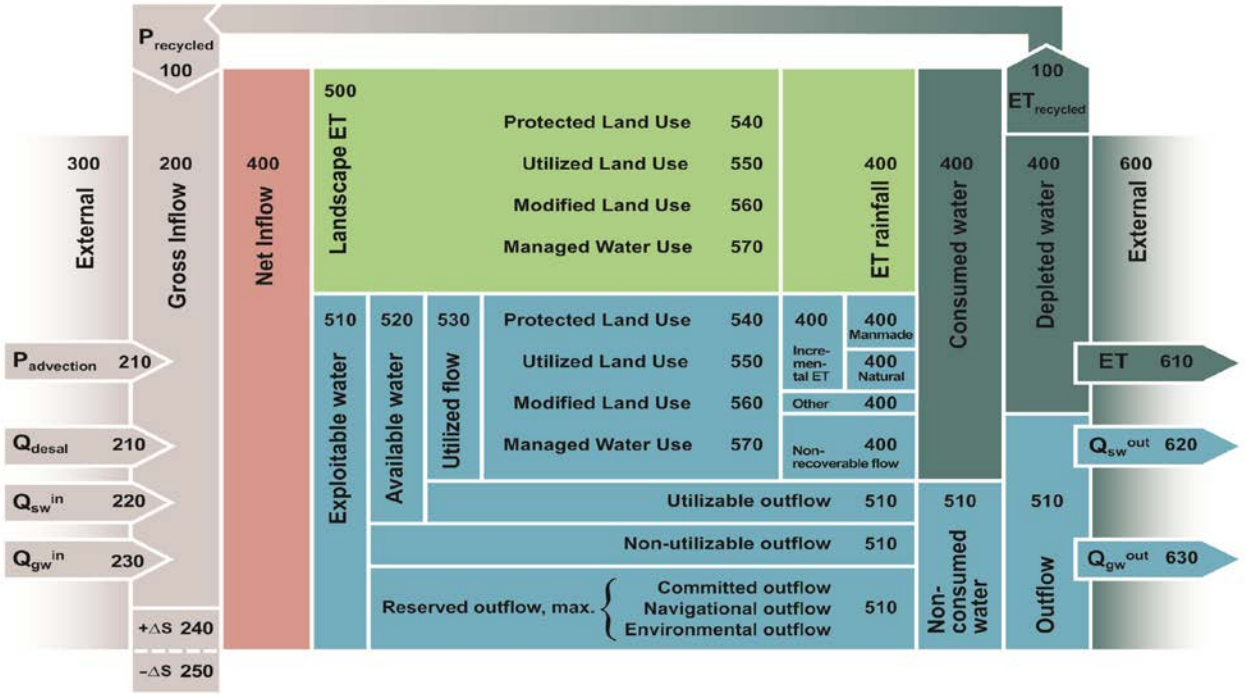
1. WHY WATER?

Water crisis as Top Global Risk. Major Global Risks by Regions
WEF Global Risk Report 2015

From hydrological EO information to water resources challenges: water productivity and water vulnerability



Water Accounting: Link water fluxes to land / water use



2. WHY HYDROLOGY EXPLOITATION PLATFORM?

2.1 NEW INFORMATION PARADIGM

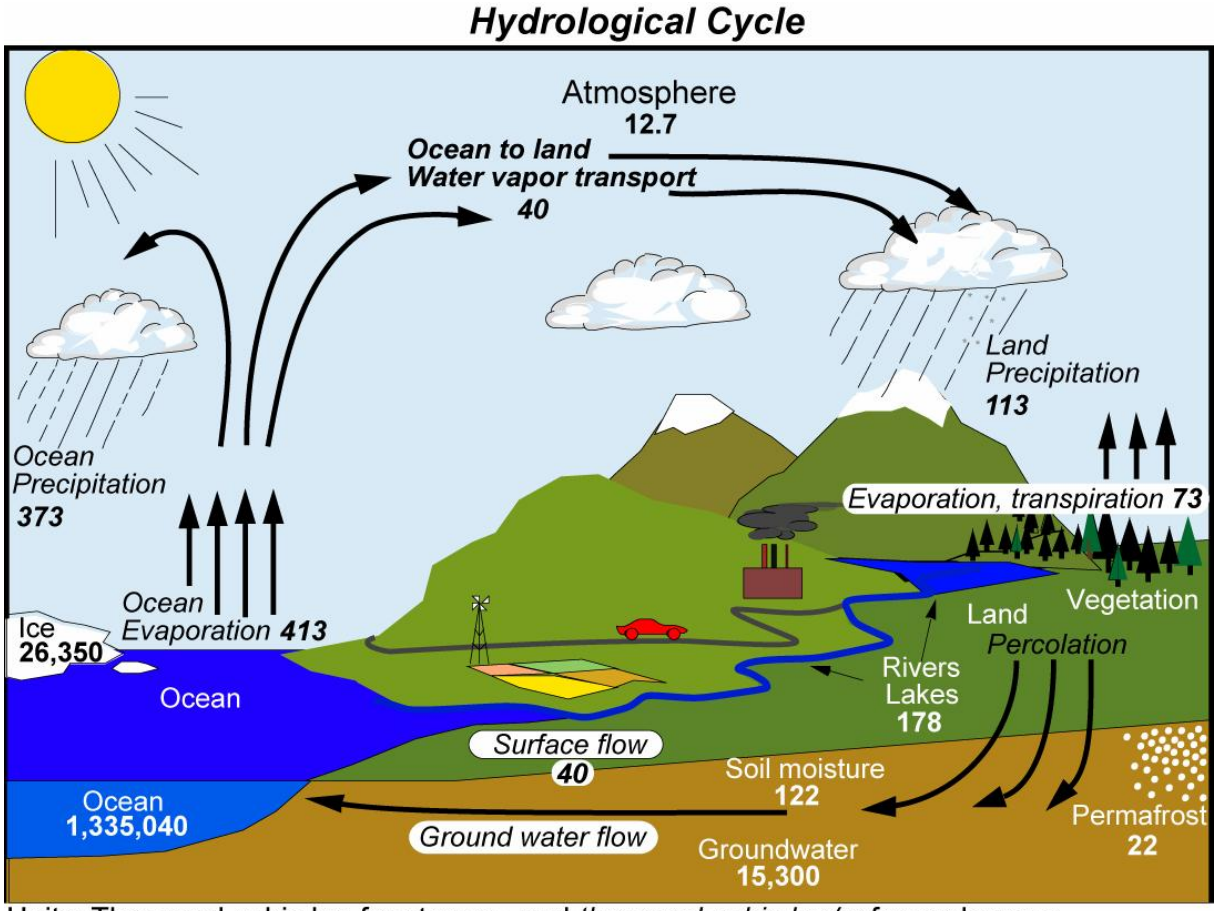
- **Growing diversity of data**
  - Sources: In-situ, EO, Meteorological, socioeconomic…
  - Geophysical variables:
    - Water stocks: soil water, flood area/volume, reservoirs, snow cover, glaciers, frozen ground…
    - Water fluxes: precipitation, evaporation, transpiration, glacier melt, snow melt, soil water depletion, river discharge, river water withdrawal, groundwater discharge, groundwater withdrawal
- **Growing complexity of EO data**
  - Water variables available in these data files?
  - Spatial/temporal resolution and coverage of these data?
  - Which is the difference between L1 and L2 products?
  - Which is the difference between two missions products?

2.2 MORE & MORE USERS

- **Growing diversity of users**
  - Type of Organisations: Universities/Research Centers, Water Authorities, Water Operators, Private Companies, International Organisations, NGOs, Policy making, Service Provider
  - Applications: Water Resource Management, Environment Monitoring, Disaster Monitoring, Agriculture….
- **Growing complexity of users areas of research**
  - Region of Interest: global, trans-boundary, river basins, hydro models
  - Long-term analysis: e.g. Climate Change ECV,
  - Holistic approach: Water Cycle studies
  - Domains: floods, droughts, hydropower, irrigation…

2. WHY HYDROLOGY EXPLOITATION PLATFORM?

WATER CYCLE EXAMPLE



Units: Thousand cubic km for storage, and *thousand cubic km/yr* for exchanges

2. WHY HYDROLOGY THEMATIC EXPLOITATION PLATFORM?

2.3 NEW WAYS OF WORKING

- I want to **upload and process** quickly and easily my hydrological model based on EO data
- I want a **rapid and user-friendly access** to the wide and large variety of EO data, services and toolboxes for hydrology
- I want to easily **integrate** data, services and toolboxes
- I want to **share and compare** the results of my research with a community group. I also want to replicate their results.
- I want a **cost-effective model** for data access and process adapted to my user needs
- I need to have **expert and customised support** within my area of research

I DO NOT WANT TO SPEND:

- My computer/infrastructure resources downloading data
- My research time on data access activities
- Many resources on ICT resources

SAVE TIME & RESOURCES: users shall be able to concentrate in their priority tasks rather than in secondary tasks (e.g. ICT tasks).

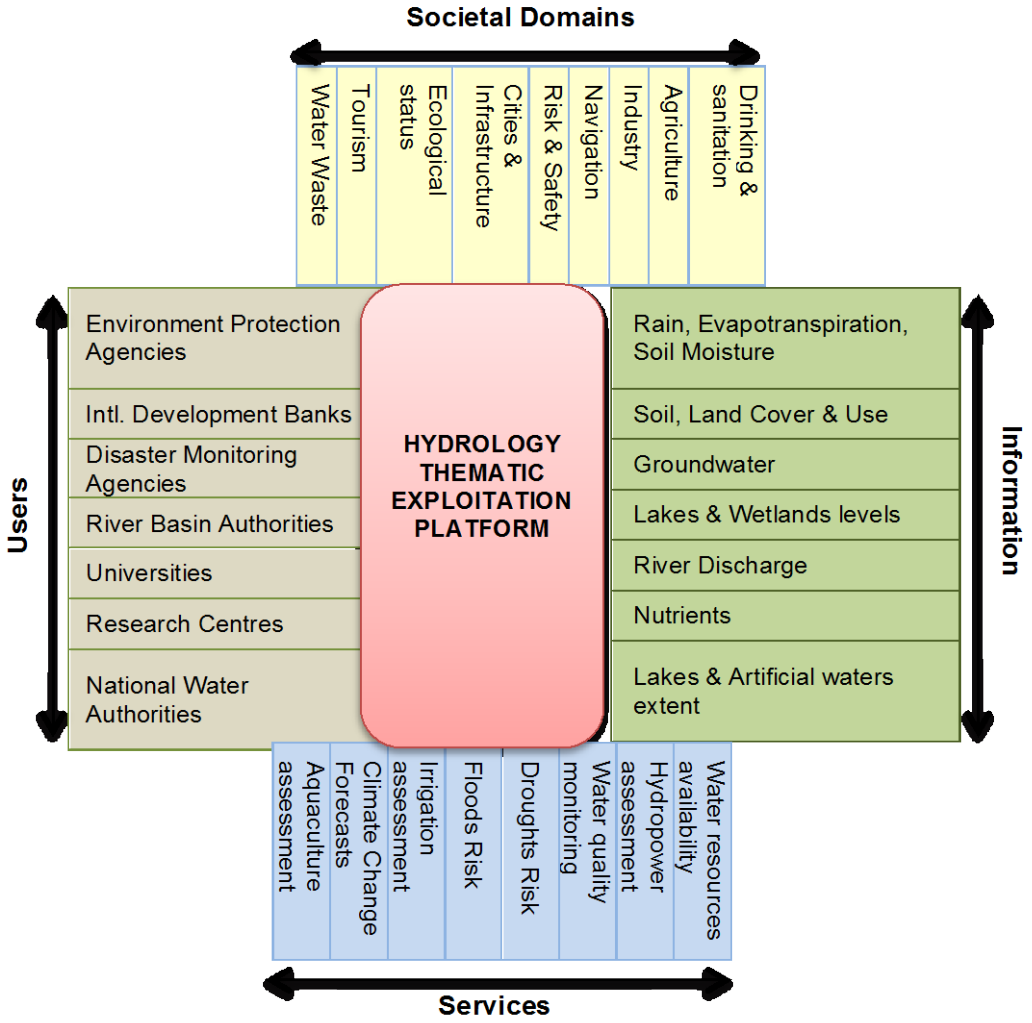
3. WHAT IS THE HYDROLOGY EXPLOITATION PLATFORM?

- **COMMUNITY PLATFORM:** An open, collaborative and inclusive community where users can share information, knowledge, algorithms, methods, tools, results,products, services…

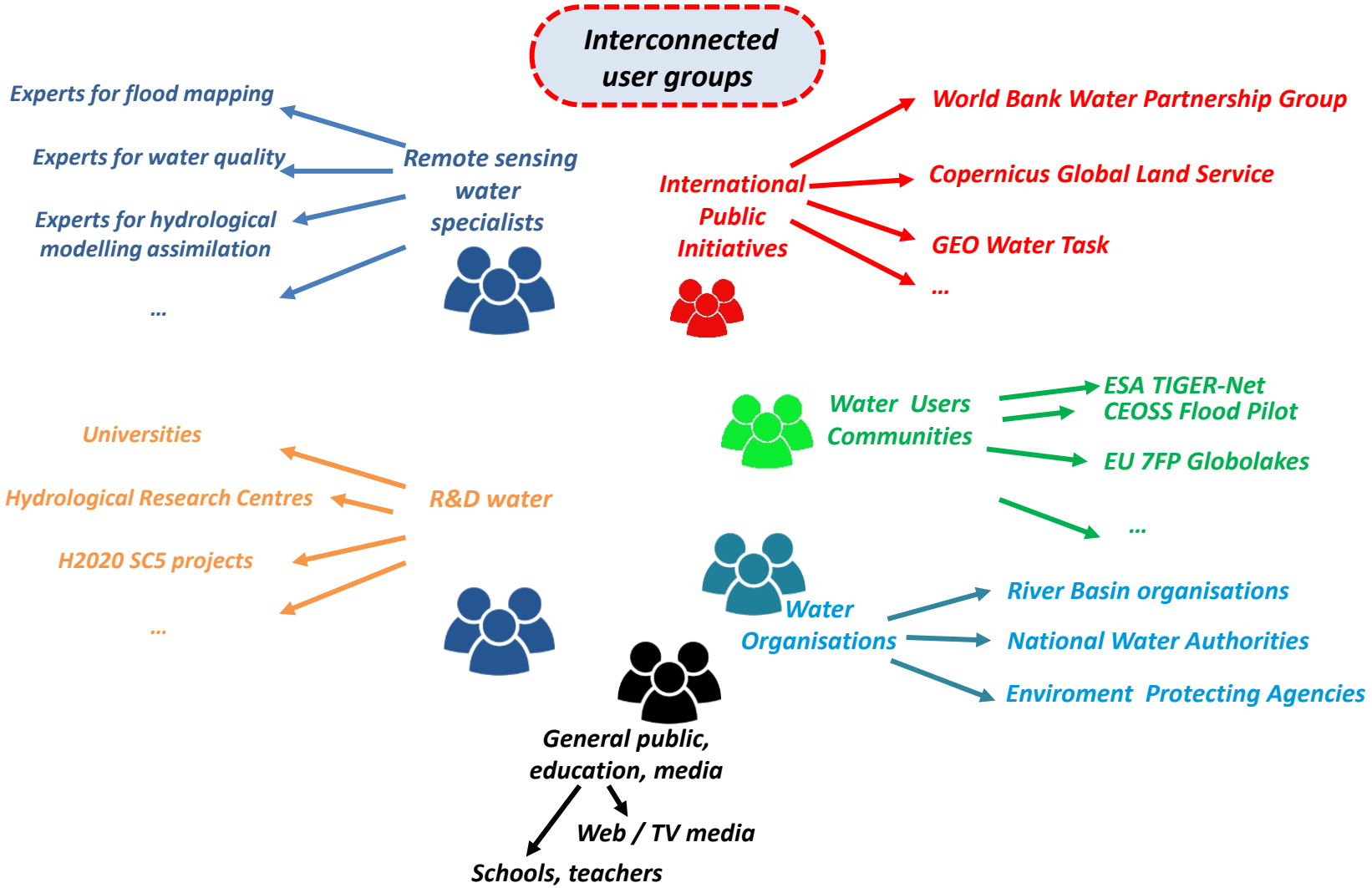
- **SERVICE PLATFORM:** A portal providing EO services/products customised for hydrology applications:
  - Flood monitoring and small water bodies mapping
  - Water quality and level
  - Hydrological modelling

- **SYSTEM PLATFORM:** A technical framework where users can :
  - discover, access, process, visualise, manipulate and compare data
  - share infrastructure and computer resources through the Cloud
  - integrate their own hydrological models and data

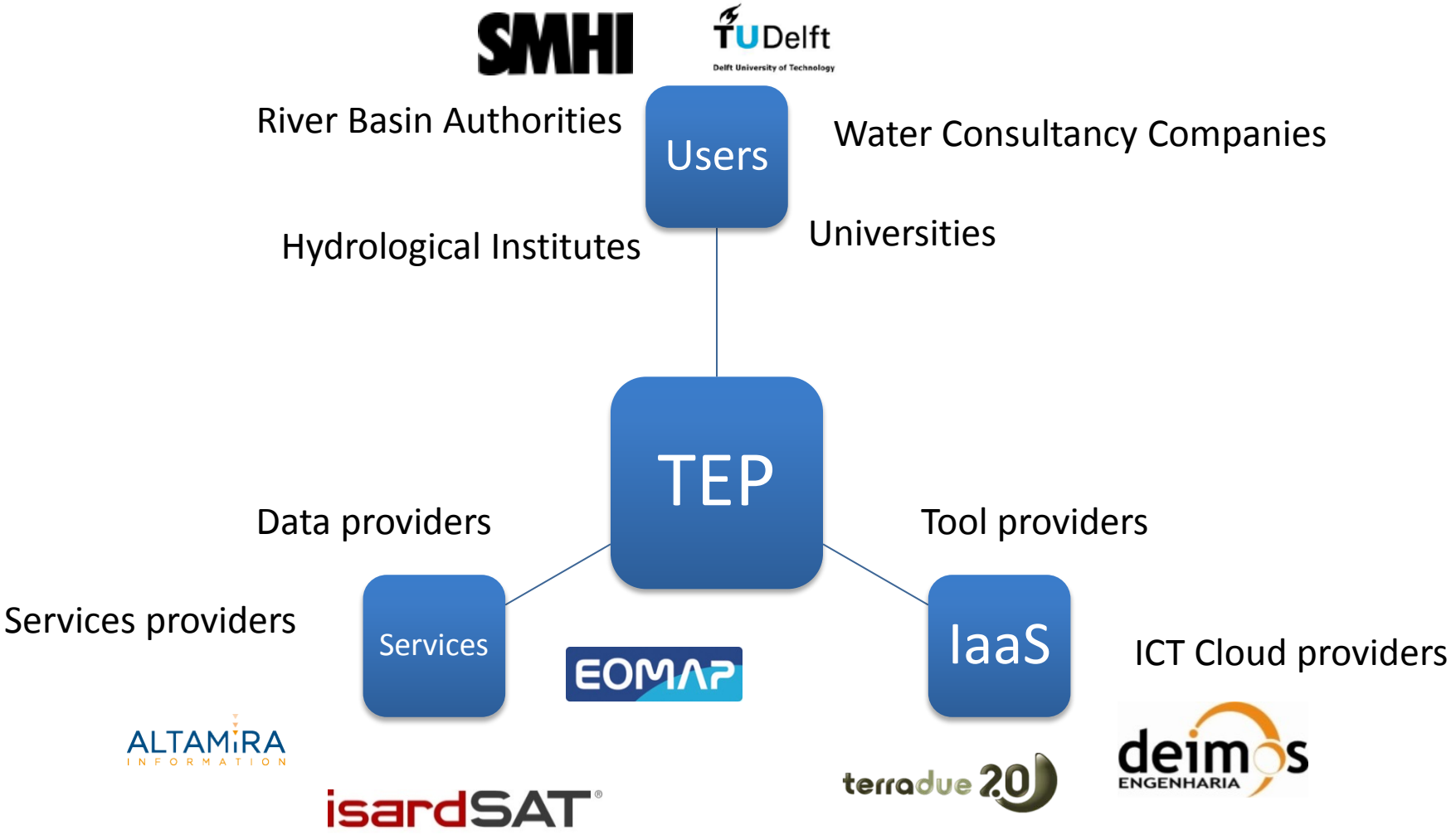
3. WHAT IS THE HYDROLOGY EXPLOITATION PLATFORM?



4. COMMUNITY PLATFORM

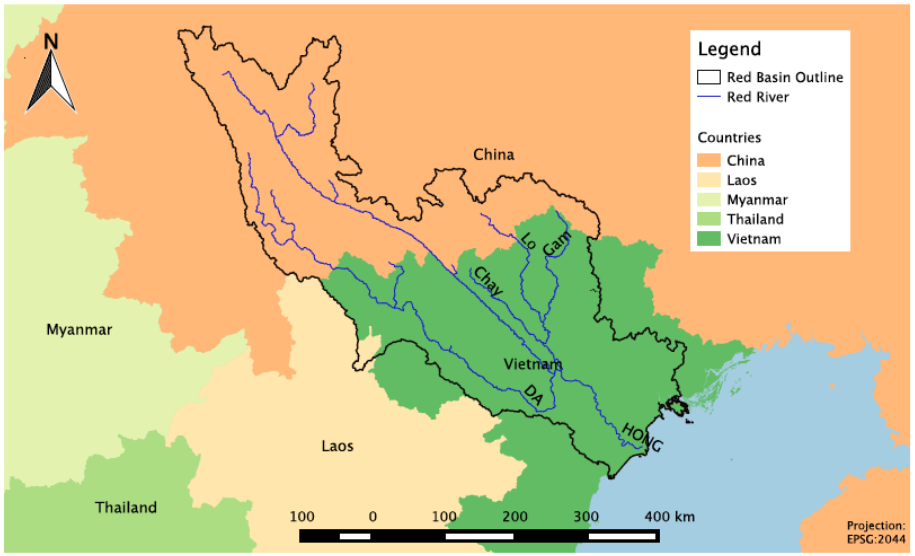


4. A FULLY-OPEN COMMUNITY PLATFORM

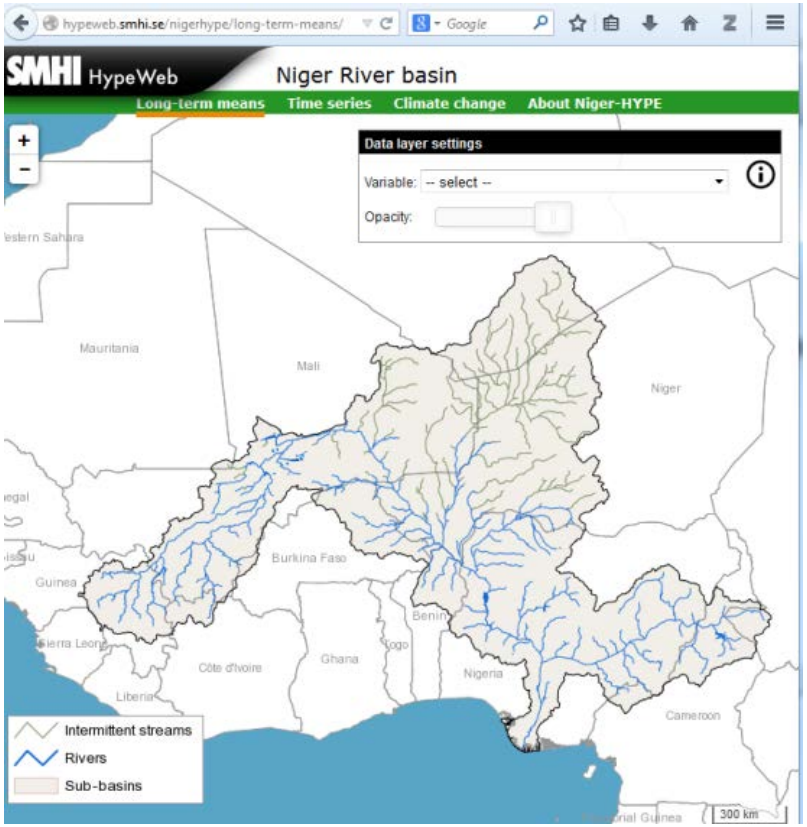


4. COMMUNITY PLATFORM: Pilot Project Users

RED RIVER (CHINA-VIETNAM)



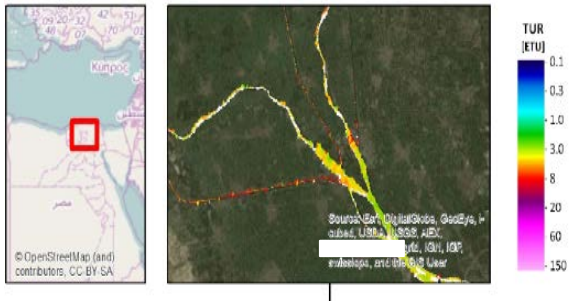
NIGER RIVER (EAST-AFRICA)



USERS: AGHRYMET, DNH Mali, WASCAL Burkina Faso, ABN Niger, HUNRE Vietnam, WRU Vietnam…

EXISTING WATER INFORMATION SERVICES BASED ON EO DATA

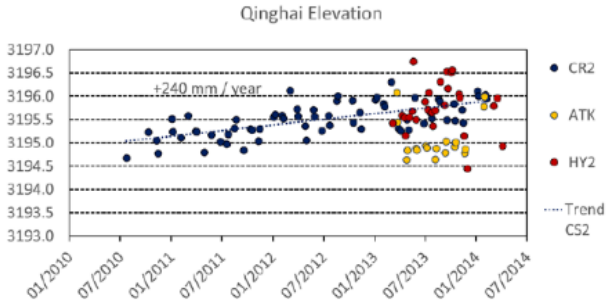
WATER QUALITY



FLOODS

WATER BODIES MAPPING

WATER LEVEL

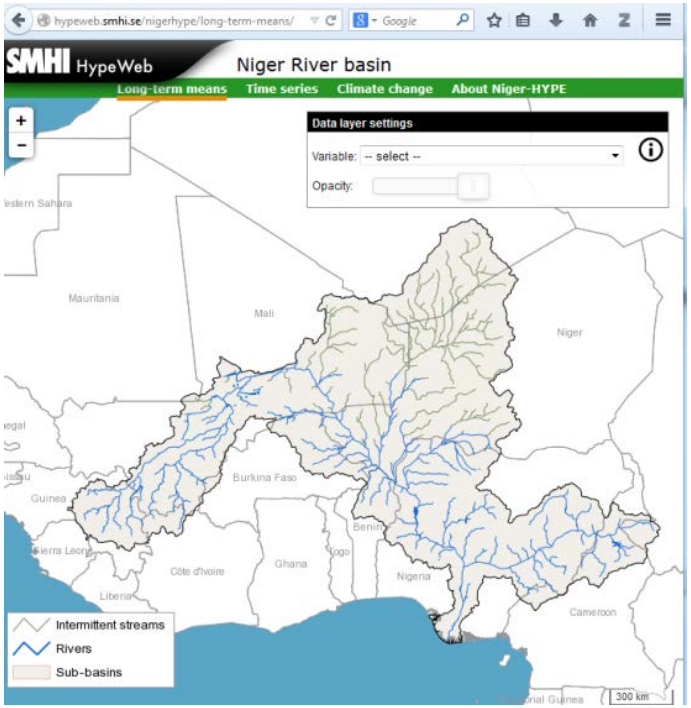


5. SERVICE PLATFORM: Hydro Models Integration

HEP is capable of **integrating and processing hydrological models** (e.g. SWAT) into the plattform, exploiting access to EO services and products..

EXAMPLE: **Niger-HYPE MODEL**.

- **End-user dialogues** that can be divided into several nested loops
- The outputs are **hydrological maps or time-series**, which are also transformed into various indices, e.g. drought or flood risk, and visualized **Automatic calculations in real-time** (e.g. forecasts) or up-grading with better quality, new functionality, water indices or new kind of information.
- **Continental, trans-boundary, or local domain**
- Combination with Earth observations and in-situ sensors.
- **Data assimilation** functionalities available using EO data



http://hypeweb.smhi.se/nigerhype/

5. SERVICE PLATFORM: WOIS integration

Water Observation Information System (WOIS) on TEP

- Open source tool to **improve IWRM of African water authorities** by exploiting Earth Observation (EO) technology
- **Locally implemented & demonstrated** WOIS at 8 African water authorities
- **WOIS on TEP to enable African institutions large remote data access and processing** e.g. for water resource monitoring at basin scale

- Transboundary Observation Capacity
- Transparent tool for Reporting & IWRM
- Sustainability through Open Source & CB

5. SERVICE PLATFORM: Welcome to new services!!!

WE ARE OPEN FOR NEW SERVICES & DATA PRODUCTS!!!!

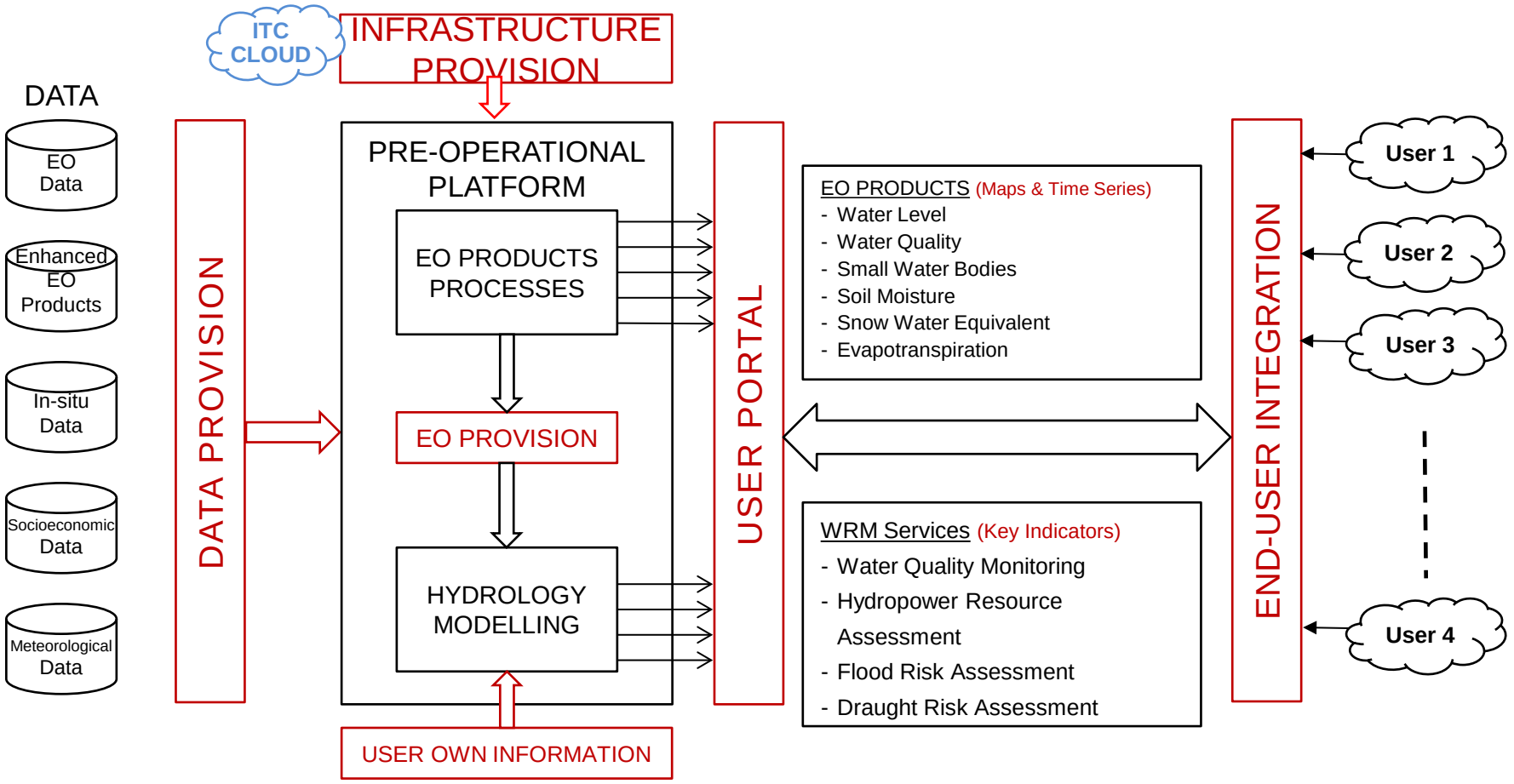
- Similar services, products, models from different providers
- New services: drought monitoring, hydropower assessment, irrigation assessment, Water Cycle Monitoring…
- New/Improved data products: river discharge, soil moisture based on SMOS…
- New/Improved hydrological models
- New/Improved input data (EO, meteo, in-situ, socioeconomic…)

RULES & PROCEDURES

- The service/data provider defines the service/data policy (e.g. Open, restricts, quota restricted…) and service/data access scenarios (in-platform use, download, group restricted…)
- The platform guarantees the confidentiality (e.g. IPR) of the software and data provided

AN EXAMPLE OF SYSTEM DIAGRAM

EO DATA: S1,S2,S3, ENVISAT, SMOS, CS2, LANDSAT-8, RapidEye, RADARSAT, TerraSAR…



7. CHALLENGES

- How to sustain HEP after ESA funding period?
- How to make a significant change from previous exploitation platforms?
- How to enlarge the community without saturating users?
- How to reach a critical mass of users?
- How to attract new pilot project users?
- How to customise services and products for each case?

On behalf of Hydrology TEP team
THANKS

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