



UNITED NATIONS  
Office for Outer Space Affairs

**1<sup>st</sup>Space4water**  
Stakeholder Meeting

27-28 October 2022  
@ the Vienna International Centre

## H2020 projects on EO at IHE Delft - needs of data users-

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**IHE  
DELFT**  
Institute for  
Water Education  
under the auspices  
of UNESCO

## The Water-ForCE project: A roadmap approach for future Copernicus explorations for Water



Water - ForCE

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# Copernicus Services



**All deliver some water or hydrological parameters as services**

## EU Horizon 2020 Space Programme

**Copernicus evolution:**  
**Mission exploitation concept for WATER**

### Scope:

The main goal is to analyze current and planned EO space capacities together with innovative processing, modelling and computing techniques to reinforce the existing portfolio offered under Copernicus and to propose an integrated approach for a coherent and consistent *inland water* monitoring system.

# EU Horizon 2020 Space Programme

Copernicus evolution:  
Mission exploitation concept for WATER

**Water** scenarios **For** Copernicus **Exploitation**  
(CSA for 2021-2023)

**Approach**  
**Develop Roadmap for Copernicus WATER**  
**services**

## The Roadmap requirements



- ❖ Analyse EU policies (WFDirective, Bathing WD, Flood Risk D..) to identify where Copernicus Services could be more effectively used both in developing policies and monitoring their implementation.
- ❖ Identify gaps and enlarge service portfolio (**based on user needs**)
- ❖ Specify requirements for future Copernicus sensors (e.g. Sentinel-2E new bands) to improve water portfolio
- ❖ **Facilitate** closer **cooperation** between in situ, remote sensing and modelling communities
- ❖ Define the relationship between Core Services and Downstream Services

# Consortium



Water - ForCE



@H2020WaterForCE

WaterForCE

waterforce.eu

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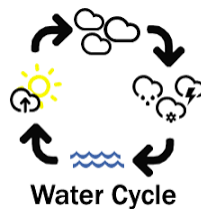
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# Water ForCE approach



## WHAT RS products?

- Leaf Area Index
- Temperature
- Evapotranspiration
- Rainfall
- Water storage
- Snow
- ...



## Representing WHAT?

### FLUXES

- Rainfall
- Evapotranspiration
- Surface runoff

### STORAGE

- Snow, Interception, soil water, Surface water, groundwater,...



## FOR WHOM?

- Water managers
- Scientists
- ...

## SOLVING WHICH PROBLEM?

- Water resources management
- Climate/land use change impacts
- Irrigation management
- Water dependent ecosystem management
- Drought/flood management



## To do what?

- Modelling
- Monitoring
- Water accounting
- Water quality

Water - ForCE

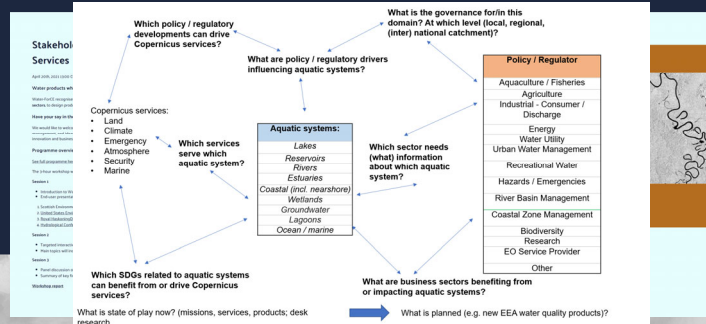


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## Project concept

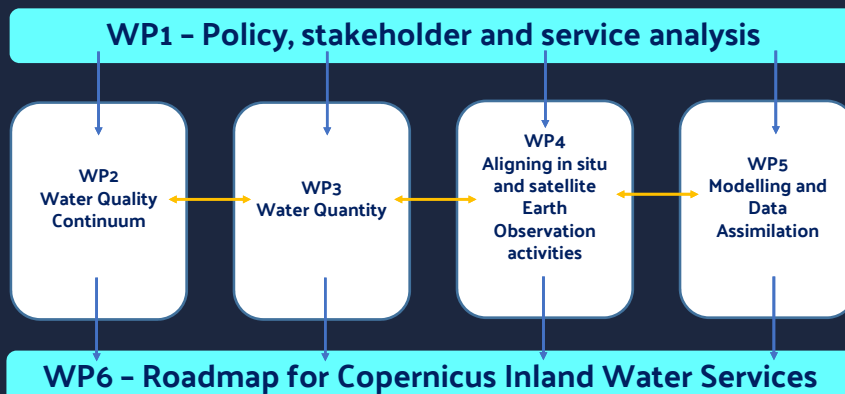
### WP1 - Policy, stakeholder and service analysis



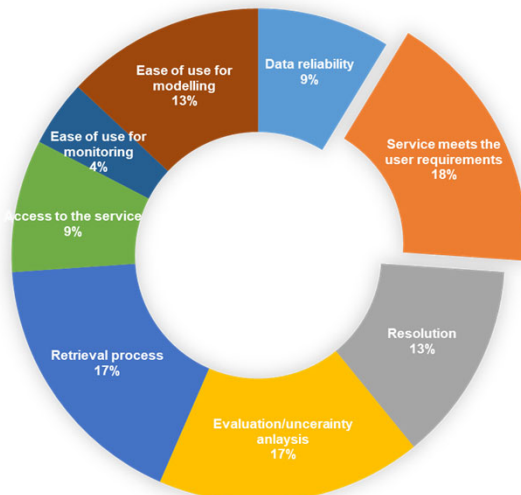
- Compile the list of stakeholders (individuals, researchers, user organisations, etc.)
- Assess sectorial policies and legislation
- Report on user needs and requirements
- Report on business opportunities
- Provide directions to WP2-WP5 and input for the Roadmap

## Project concept

### Roadmap for Copernicus Water Services



## EO Gaps (from literature review)



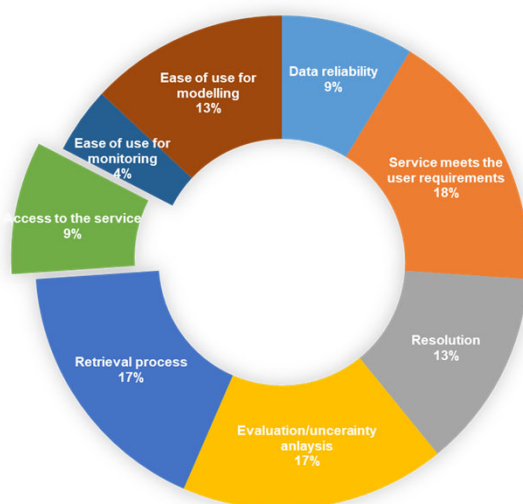
% in chart related to frequency of appearance in the reviewed papers

- Need for very skilled people to get the most out of RS products and overcome gaps
- Not all the areas in the world are equally covered
- Lack of validation of some global RS products for all contexts
- Some data only measured at canopy, specially in densely vegetated areas

### Recommendations:

- Use of MW sensors
- Technical upgrades
- Training programs and initiatives to users

## EO Gaps

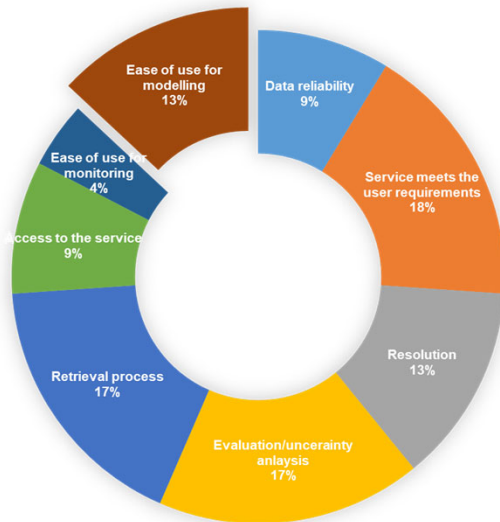


- Lack of sufficient human and technical capacity
- Lack of a stable environment to ensure continuity, maintenance and updating
- Lack of funding
- Poor internet connection
- Logistical and computational challenge
- Associated license cost or restrictive licensing which challenges the transparency of analyses and limits the use of EO data

### Recommendations:

- Cloud computing as a way of sharing data
- Capacity building
- Develop platforms that are easy to use for a range of users

## EO Gaps

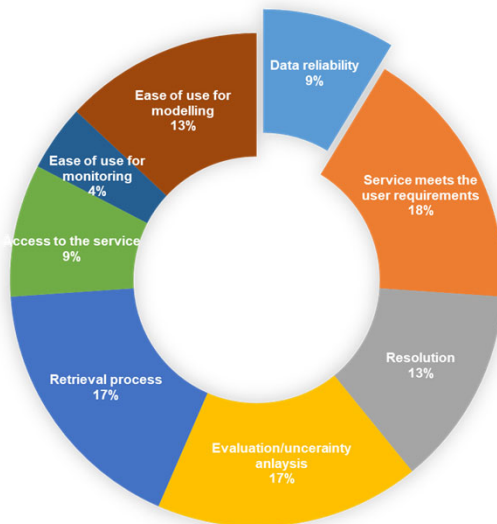


- Need to improve early detection models
- Integration with in situ data and hydrological models is perhaps the most promising way to leverage remote sensing data for WRM

### Recommendations:

- Transparency in RS methodologies
- Transition to standardized approaches so that users can understand how products are developed

## EO Gaps



- Failure of equipments/sensors
- Need to have in situ measurements to be able to calibrate/validate models/measurements
- Cloud contamination is still a big issue that hinders the use of some RS products

### Recommendations:

- Technical upgrade
- Combination of products



# The Eiffel project: Revealing the role of GEOSS as the default digital portal for building climate change adaptation & mitigation applications



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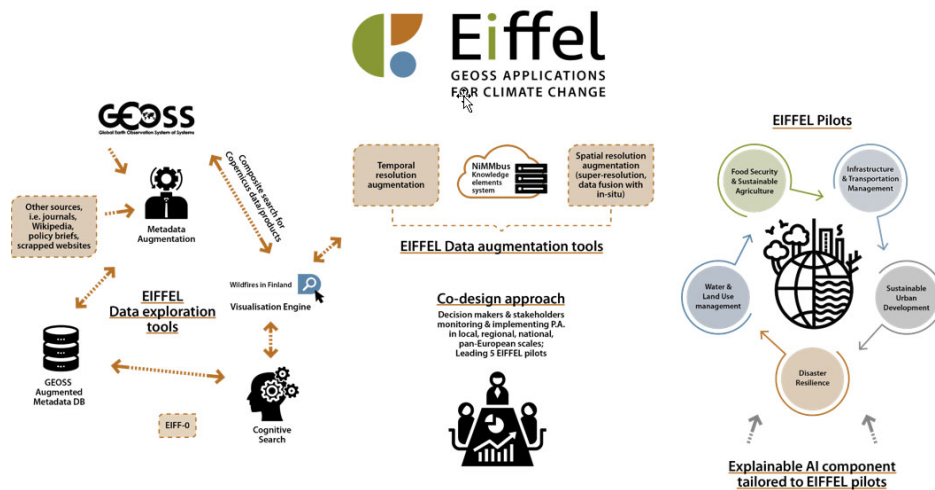


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## Concept and consortium



Source: eiffel4climate.eu/



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## Concept and consortium

### ➤ Addressing the needs:

- Semantic representation of Earth Observation data (Linked Open Data)
- Semantic and visual queries; tree-view structure, relevance rank
- Augmenting GEOSS metadata: Add missing keywords, link external info, provide analytics insights
- Stochastic methods for augmenting the temporal resolution and quality of Climate Change-related datasets
- Augmentation of the spatial resolution of Climate Change-related datasets using super-resolution and data fusion (in-situ)



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## Concept and consortium

### *The Consortium*

19 partners

8 European countries

Greece  
Spain  
Netherlands  
UK  
Lithuania  
Switzerland  
Finland  
Germany



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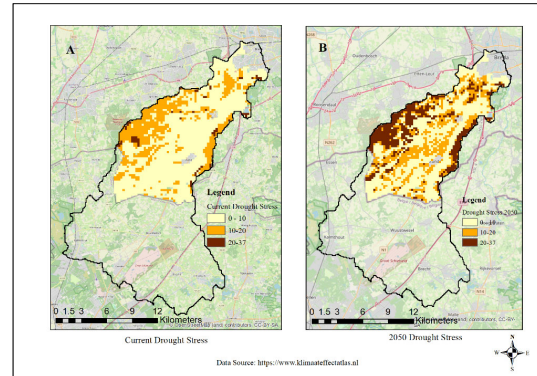


## Water and Land-Use Management



➤ IHE Delft: Climate change adaptation to droughts, the case study of Aa of Werijs in The Netherlands

- Decision Support System to assess the impact of potential measures focusing on water management, land use and soil carbon changes within a river basin.
- Regional and cross-border scale
  - Netherlands-Belgium, Aa river basin
  - Noord-Brabant Province



Current Drought stress (A) & 2050 High Drought Stress (B) in the Dutch part of the Catchment (Data Source: Climate Impact Atlas)



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[www.eiffel4climate.eu](http://www.eiffel4climate.eu)



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*Thank you!*

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