

RSEP

# WORLD SURFACE WATER DYNAMICS

17-10-2019

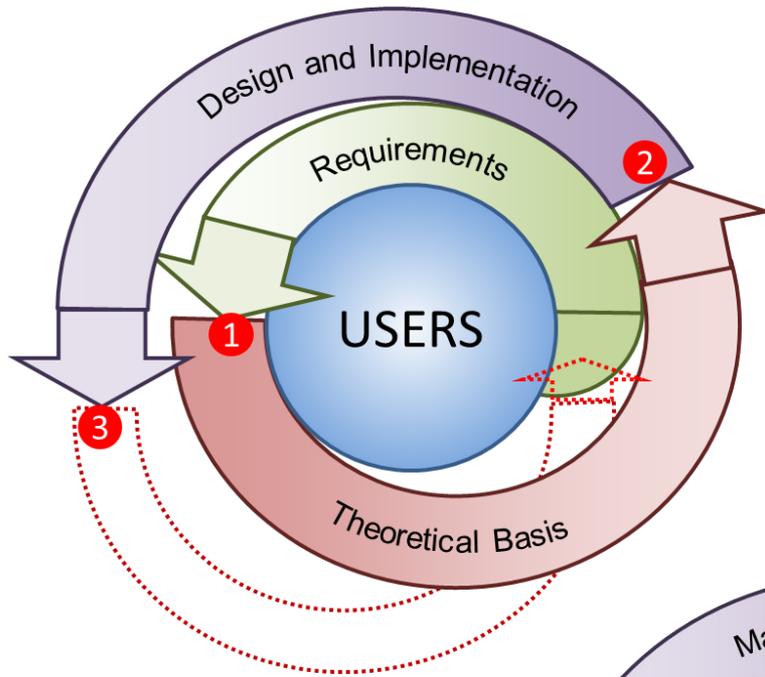
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# CONCEPT

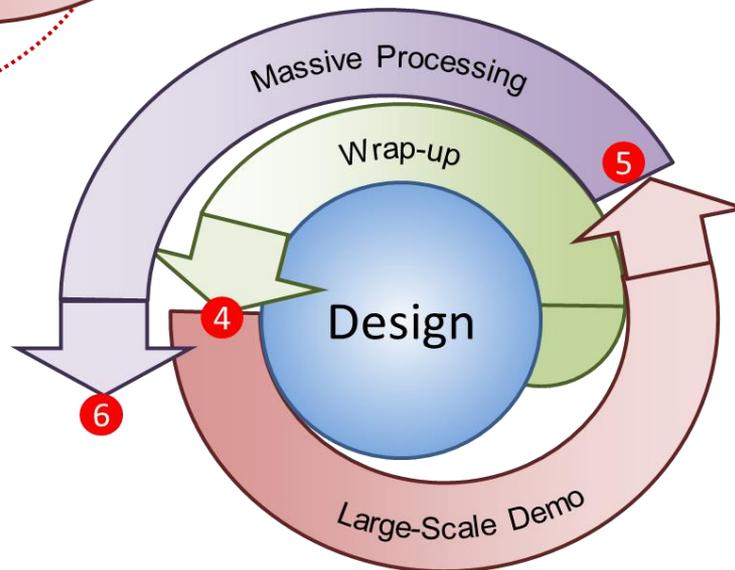
- **ESA ITT** – Water Surface Dynamics EO toolbox and demonstrators
  - intra-annual and inter-annual variations of inland open surface waters, in extent and volume with EO data (Optical + SAR).
  - Permanent, seasonal and scarce bodies and their transition
  - Monthly and yearly periodic monitoring for water extent, water surface level and river discharges;
  - Enforce the integration of in-situ data;
  - Exploit new cloud-processing and big data management paradigms;
  - Promote extensive and inclusive capacity building events
- **Status:** under evaluation
- **Large Scale demonstrator:** Spain (under MITECO coordination) can become one of the 5 sites.

# PROJECT FLOW



- 1 Requirement Review
- 2 Preliminary Design Review
- 3 Critical Design Review

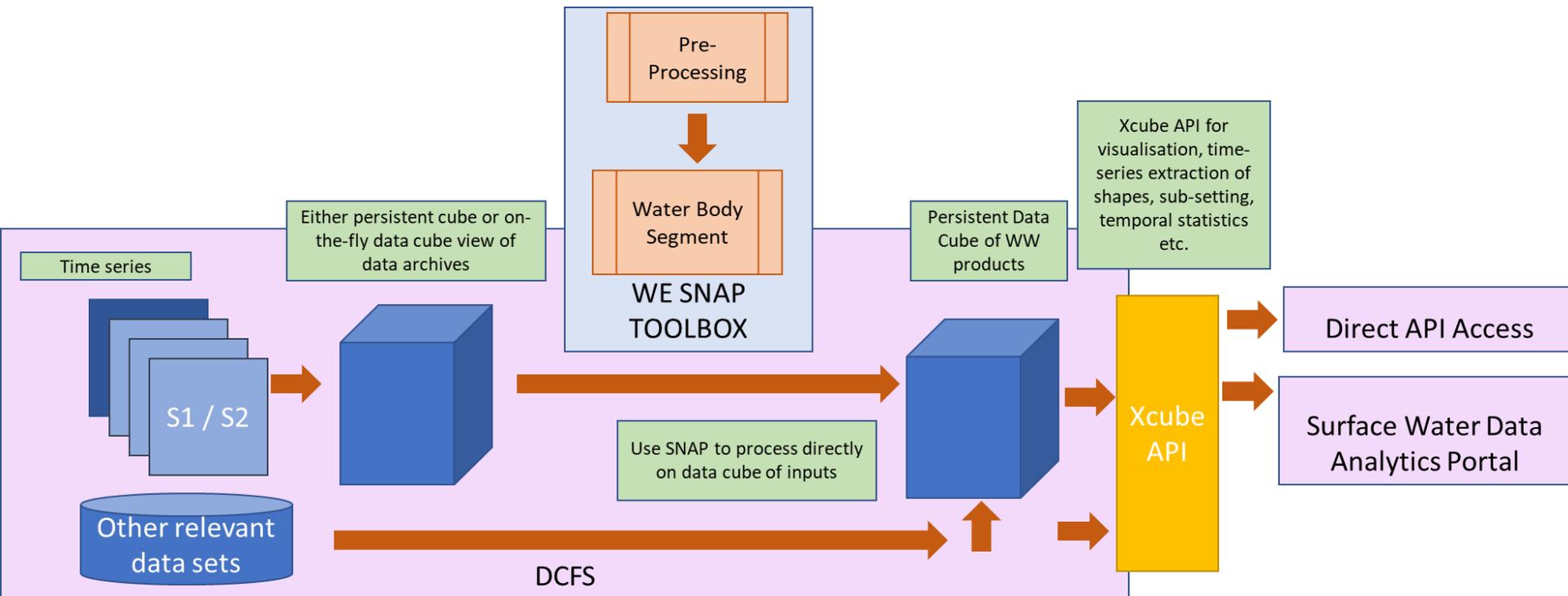
PROOF OF CONCEPT



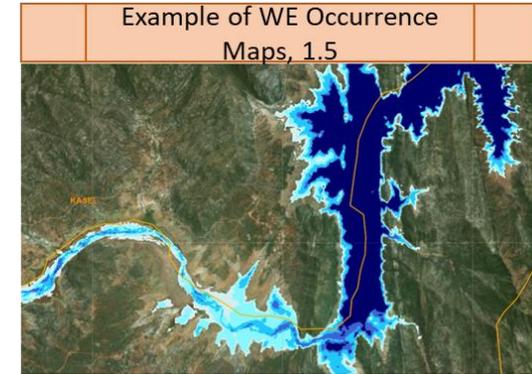
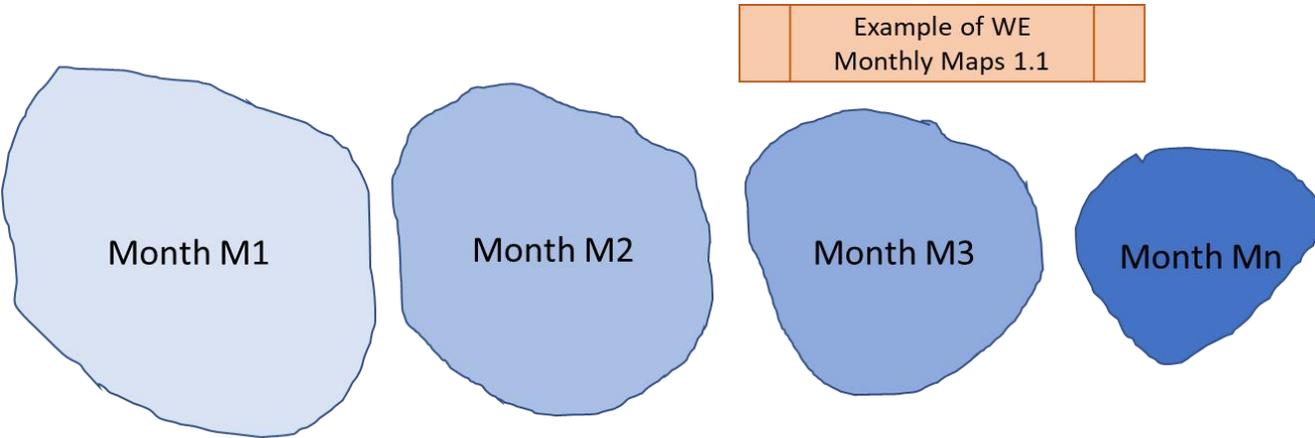
- 4 System Qualification
- 5 Service Demonstration Review
- 6 Final Review

LARGE-SCALE WITH  
5 TESTING SITES

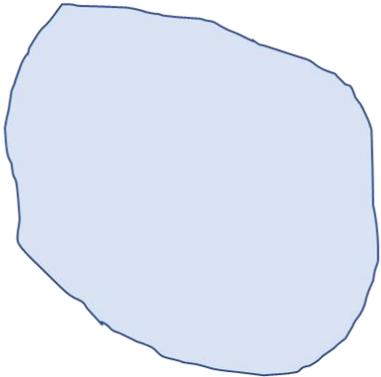
# BUSINESS AND DATA LAYERS



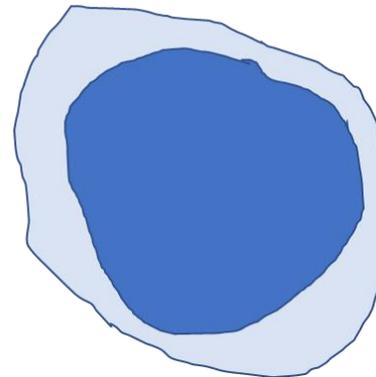
# WATER EXTENT SAMPLES



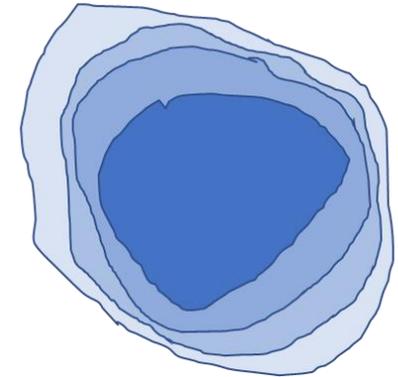
Example of WE Yearly maximum extend map 1.3



Example of WE Yearly map 1.2



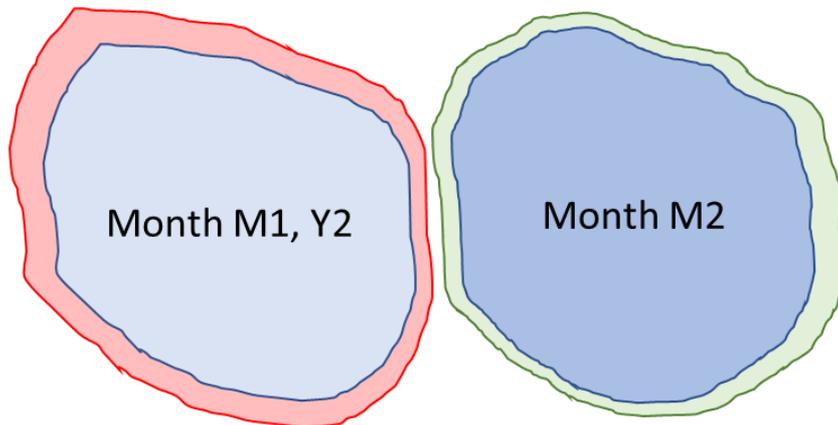
Example of WE Yearly map of seasonality 1.4



# WATER EXTENT SAMPLES

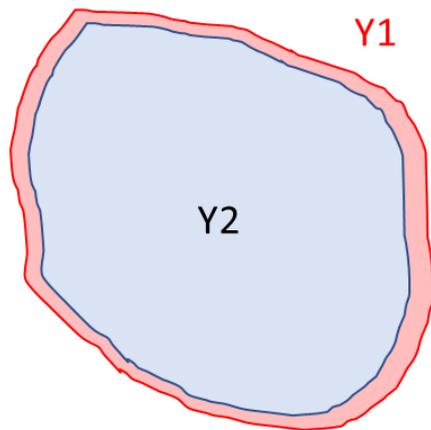
Month M1, Y1

Month M2, Y1

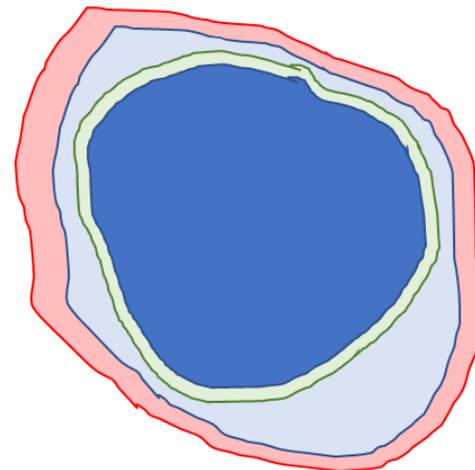


Example of WE Monthly CD Maps 2.1; red decreases, green increases

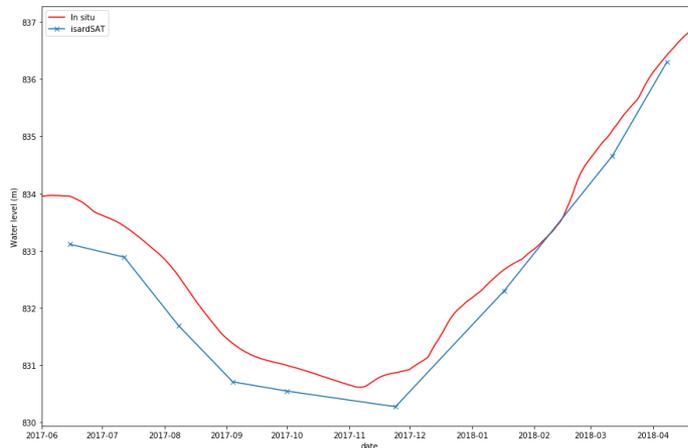
Example of WE Yearly maximum extend CD map 2.3



Example of WE Yearly C.D map 2.2



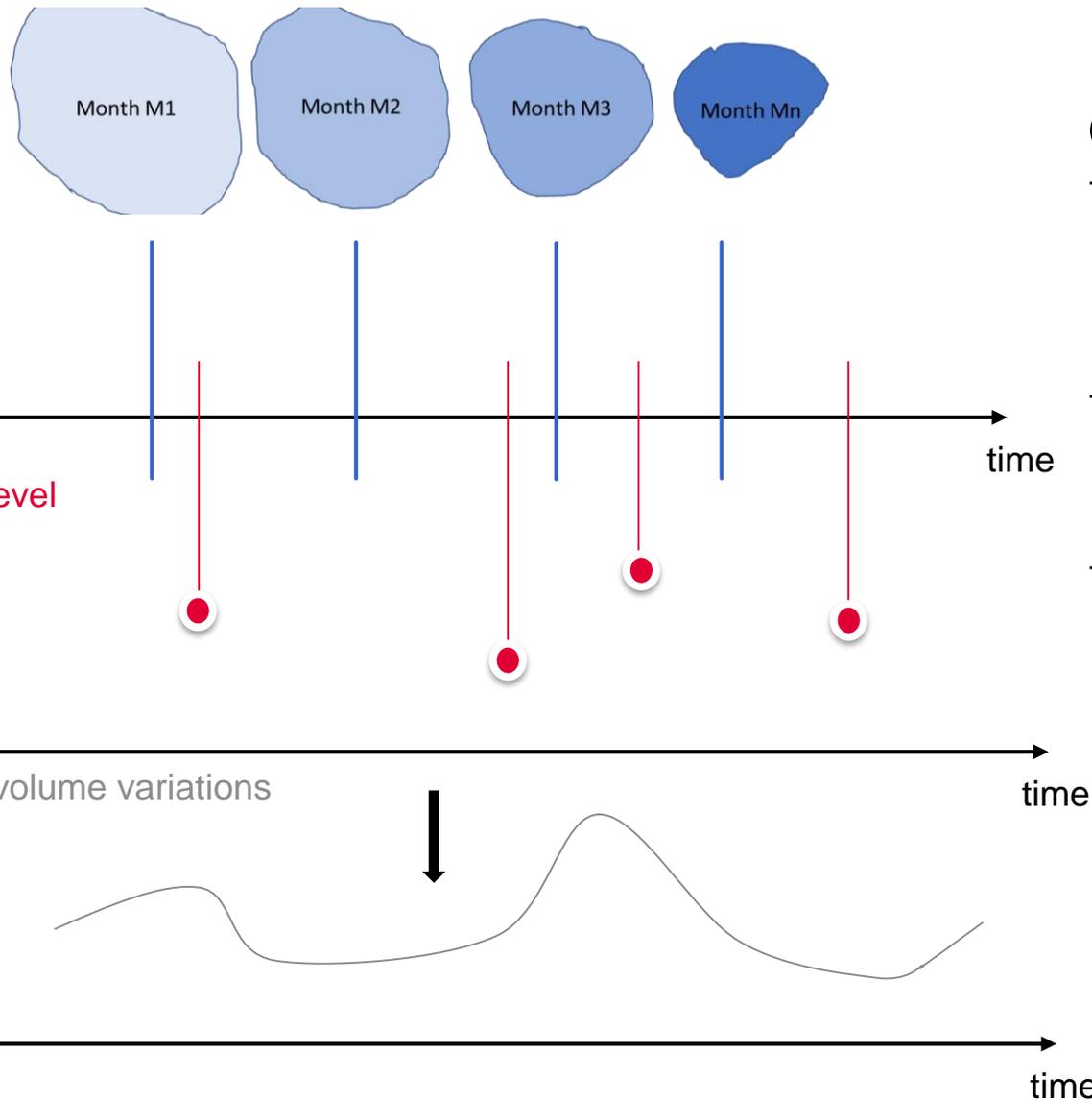
Identification of locations with high likelihood of water using the water extent locations, at each month, and intersects them with altimeter satellite tracks. These resulting area of interest are called virtual stations, from which water level time series are extracted.



Yakutsk Virtual Stations S3A/S3B

Ebro virtual station time series: Comparison of in situ gauges data (red) and isardSAT HTEP algorithm results (blue) from June 2017 to April 2018

# WATER VOLUME ANALYTICS



## Challenges

- **Water extent** unknown pixels due to data corruption (clouds, data gaps from input satellite missions optical + SAR)
- **Water level** altimeter outlier waveforms due to land pollution in transient inland water bodies
- **Water volume**
  - Space time interpolation
  - Highly varying water level and extent for a virtual station



# Thank you

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