Coordinating and integRating state-of-the-art Earth Observation Activities in the regions of North Africa, Middle East and Balkans and Developing Links with GEO related intiatives toward GEOSS

WATER EXTREMES MANAGEMENT

Water extremes mapping with EO: the FloodHub service of the BEYOND Center of Excellence

Alexia Tsouni, NOA, Greece

IAASARS

Limassol, Cyprus – 16/11/2016

HORIZON 2020

Water extremes mapping with EO: the FloodHub service of the BEYOND Center of Excellence

Relevant needs registered in D2.5 User Need Analysis Report I

FLOODS

- Serbia, Romania, Bulgaria:
  - ✓ Information needs
  - ✓ Funding schemes that have allowed users to obtain geoinformation
- FYROM, Albania:
  - ✓ Information needs
  - ✓ Current data sources and data access
  - ✓ Regulations driving geo-information use
- Greece, Cyprus, Turkey:
  - ✓ Information needs
  - ✓ Current data sources and data access
  - ✓ Regulations driving geo-information use
- Morocco, Tunisia, Egypt, Israel:
  - ✓ Information needs
- Saudi Arabia, United Arab Emirates:
  - X

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Water extremes mapping with EO: the FloodHub service of the BEYOND Center of Excellence

Relevant needs registered in D2.5 User Need Analysis Report I

CONCLUSIONS

- General observations and constraints:
  - ✓ In the Balkans, Middle East and North Africa a common predominant topic is climate change - and in its water management aspects (the use of water for irrigation, or in risk management and coastal zone management).
- Geo-information needs:
  - ✓ Natural risks, notably drought, floods…
- Recommendation for further exploration of end-user needs:
  - ✓ Food security and water extremes management:
    Greece, Albania, Serbia, Tunisia, Turkey, Romania, Morocco, FYROM, Egypt
  - ✓ Climate change and water management:
    Morocco, Tunisia, Egypt, Israel, Saudi Arabia, Turkey

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Relevant EC initiative: The PRIMA initiative

ec.europa.eu/research/environment/index.cfm?pg=prima

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European Commission

RESEARCH & INNOVATION
Environment

European Commission > Research & Innovation > Environment > Initiatives > PRIMA

Home | Policy topics | Initiatives | Output | Get involved

Initiatives

The PRIMA initiative

In recent years, the agricultural sector in the Mediterranean has been suffering from severe water shortages and decreasing crop yields. Today, 180 million people in the Mediterranean basin are considered 'water poor'. The lack of clean water and nutritious food has adverse effects on the health and stability of the populations.

Documents

- Commission Proposal 18 October 2016: Press Release | Memo | EC Proposal
- PRIMA Joint Programme
- PRIMA Joint Programme – Addendum (9.0 MB)
- PRIMA Inception Impact Assessment
- PRIMA Impact Assessment Consultation Strategy ()

Contact

For further information on PRIMA Stakeholder Consultation, please send an e-mail to: RTD-PRIMA-STAKEHOLDER-

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Water extremes mapping with EO: the FloodHub service of the BEYOND Center of Excellence

Relevant EC initiative: The PRIMA initiative

- The Commission has agreed on a proposal for a Partnership for Research and Innovation in the Mediterranean Area, PRIMA, which is set to develop much-needed novel solutions for sustainable water management and food production.
- The Commission's proposal already includes Cyprus, Czech Republic, Egypt, France, Greece, Israel, Italy, Lebanon, Luxembourg, Malta, Morocco, Portugal, Spain and Tunisia. The participation of Germany is currently under negotiation. As the initiative is evolving over time, more participants are expected to follow, both EU and non-EU countries.
- Funding for the €400 million partnership will come from the participating countries (currently around €200 million), matched by a €200 million contribution from the EU through its current research framework programme Horizon 2020. The partnership is scheduled to run for 10 years, starting in 2018.

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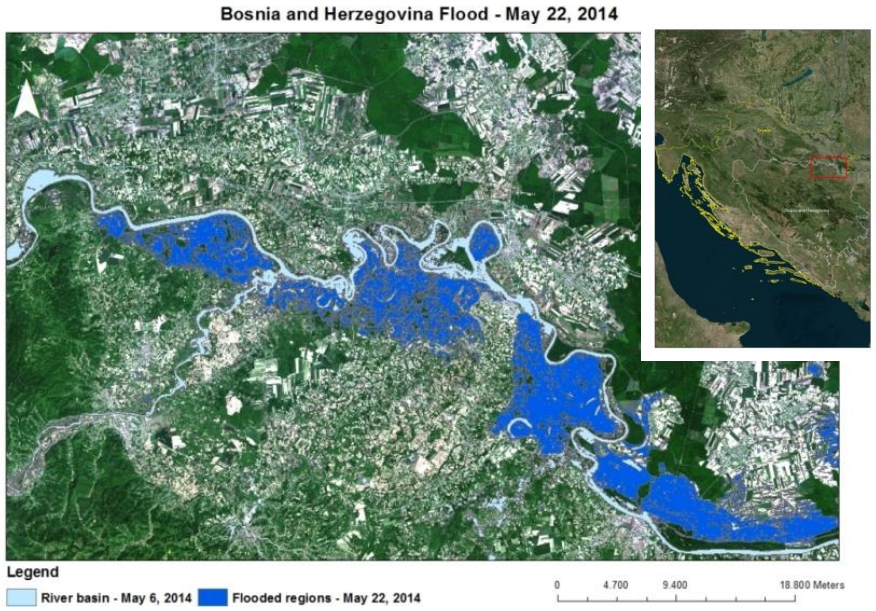
Water extremes mapping with EO: the FloodHub service of the BEYOND Center of Excellence

BEYOND's Floods Observatory for Greece & South-Eastern Europe

We register major flood events and we publish the flood mapping results produced following the processing and photo-interpretation of satellite Optical and SAR images.



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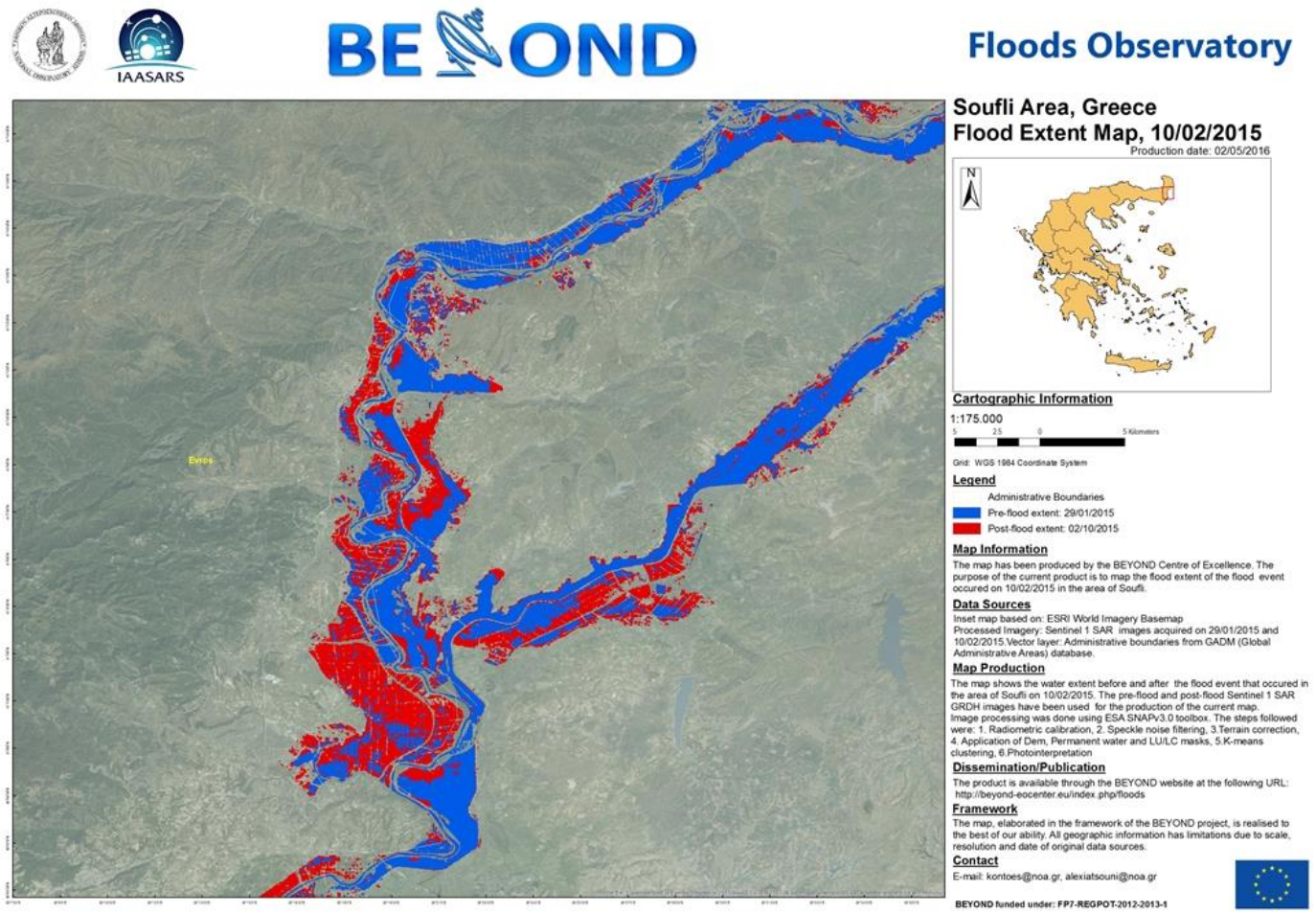
BEYOND's Floods Observatory for Greece & South-Eastern Europe

Case study: Floods in Greece, Evros 10/02/2015



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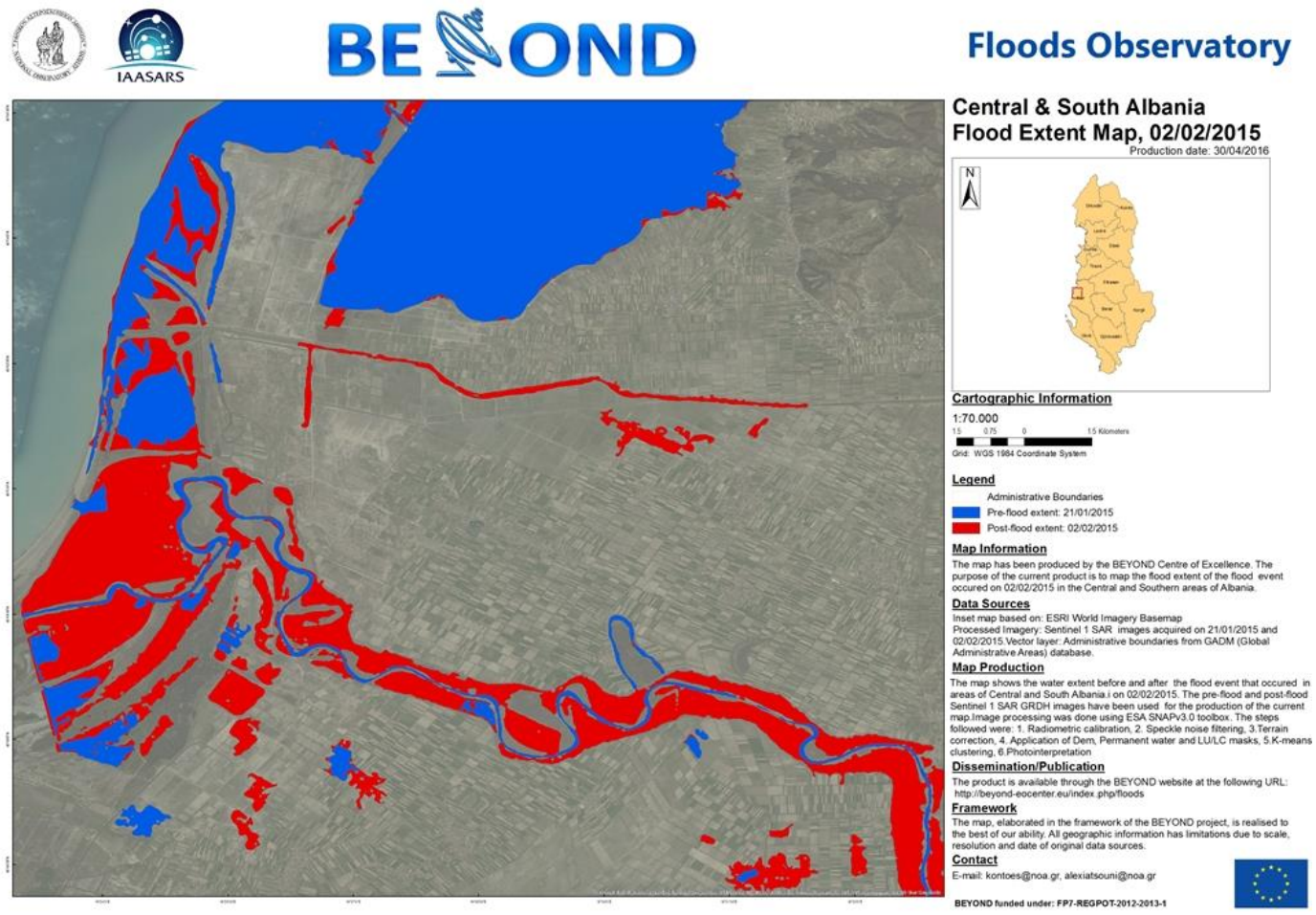
BEYOND's Floods Observatory for Greece & South-Eastern Europe

Case study: Floods in Albania 02/02/2015



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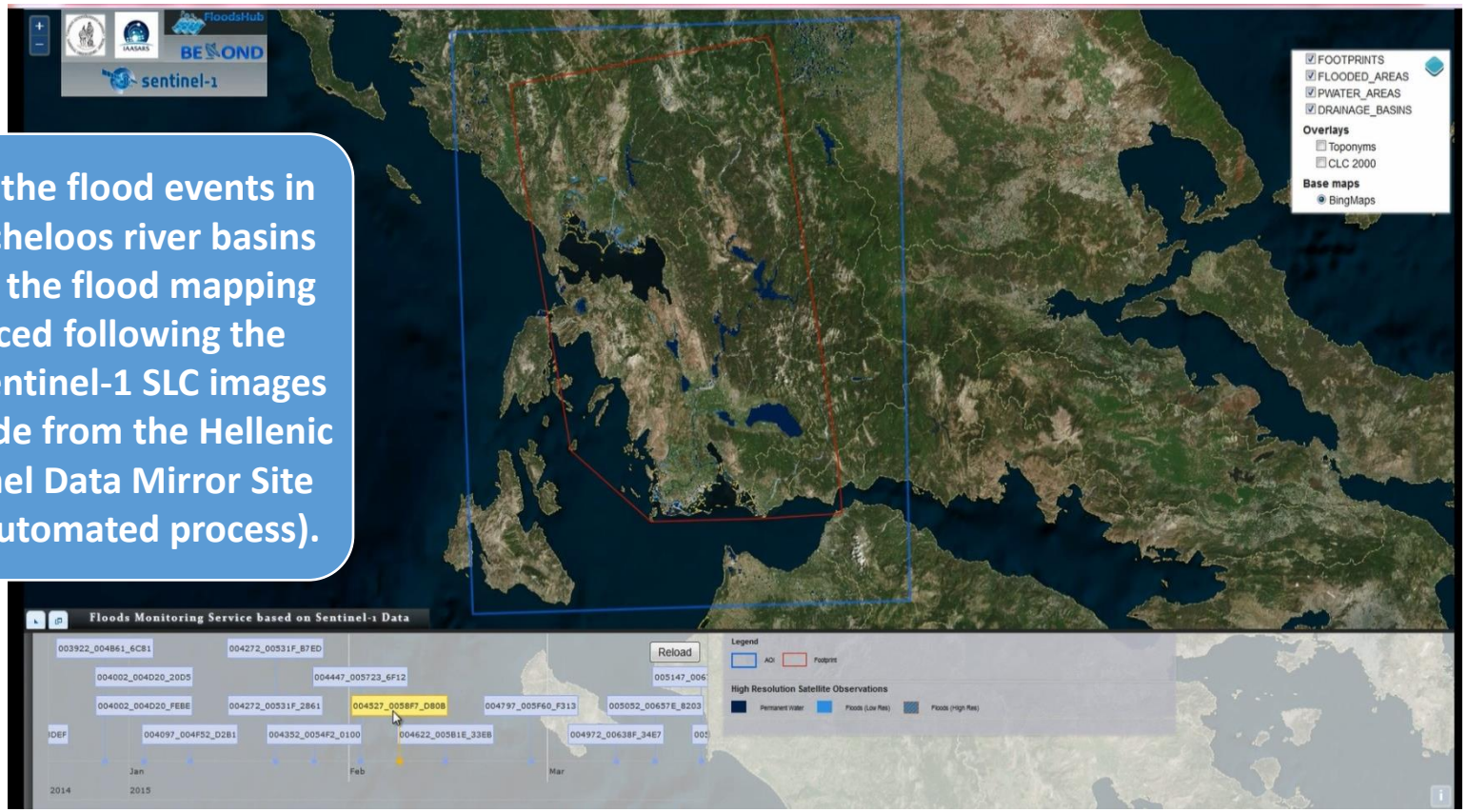
Water extremes mapping with EO: the FloodHub service of the BEYOND Center of Excellence

FloodHub: BEYOND's Floods Monitoring Service — Overview

We monitor all the flood events in Arachthos & Acheloos river basins and we publish the flood mapping results produced following the processing of Sentinel-1 SLC images of IW swath mode from the Hellenic National Sentinel Data Mirror Site (the first fully automated process).



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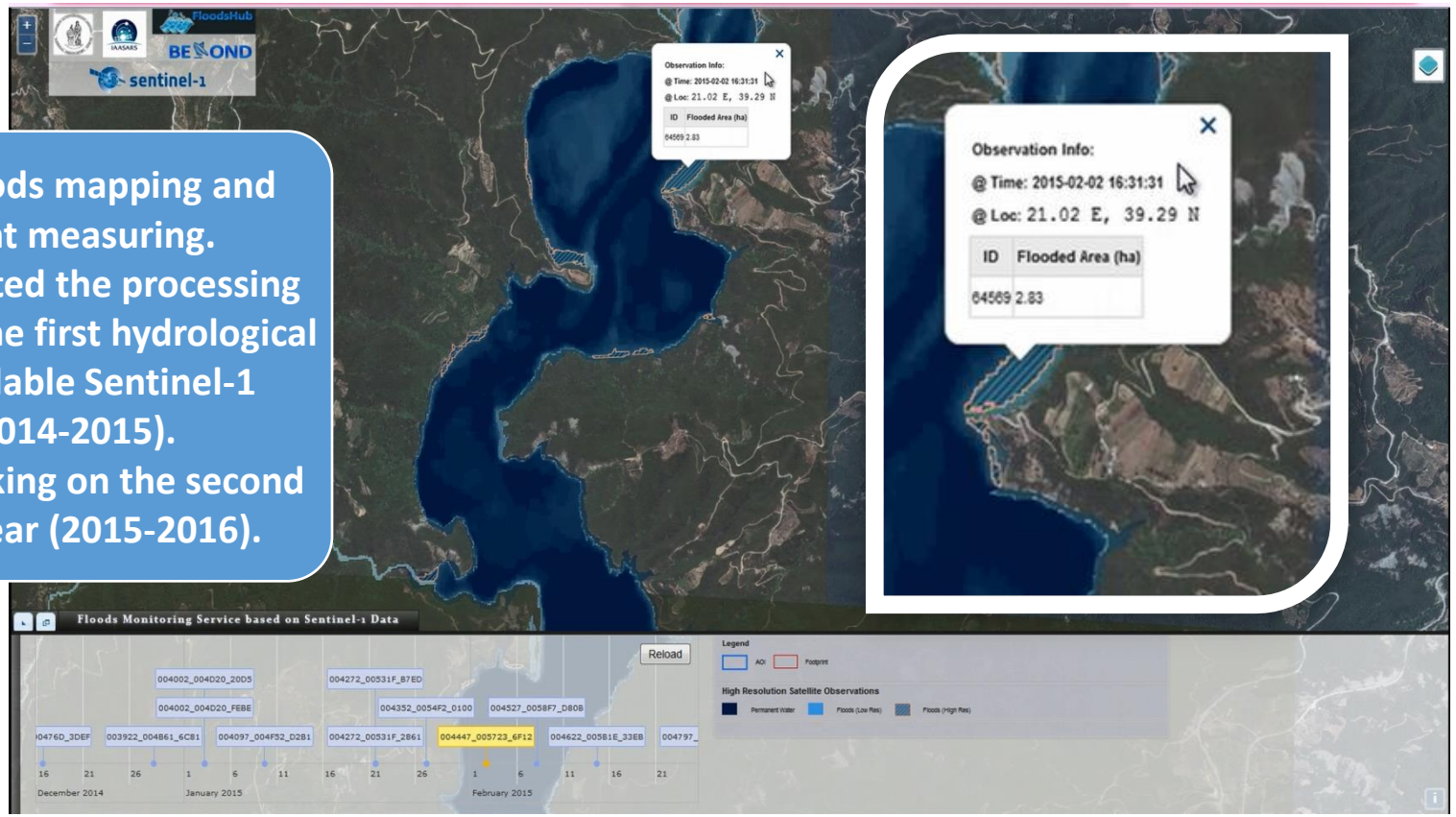
Water extremes mapping with EO: the FloodHub service of the BEYOND Center of Excellence

FloodHub: BEYOND's Floods Monitoring Service — Detail

We provide floods mapping and floods extent measuring.
We have completed the processing and analysis for the first hydrological year with available Sentinel-1 images (2014-2015).
We are now working on the second hydrological year (2015-2016).



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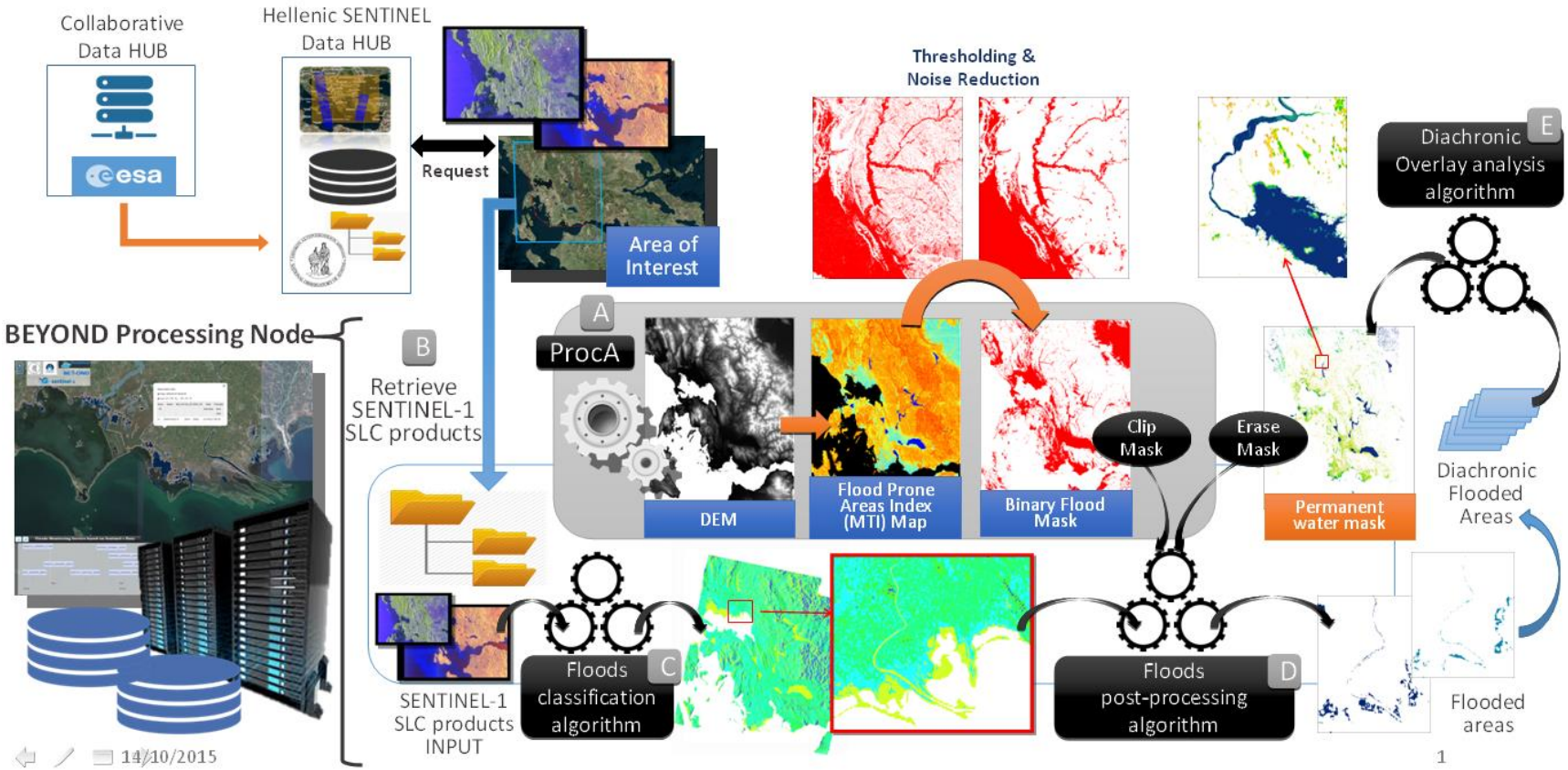
Water extremes mapping with EO: the FloodHub service of the BEYOND Center of Excellence

FloodHub: BEYOND's Floods Monitoring Service Architecture



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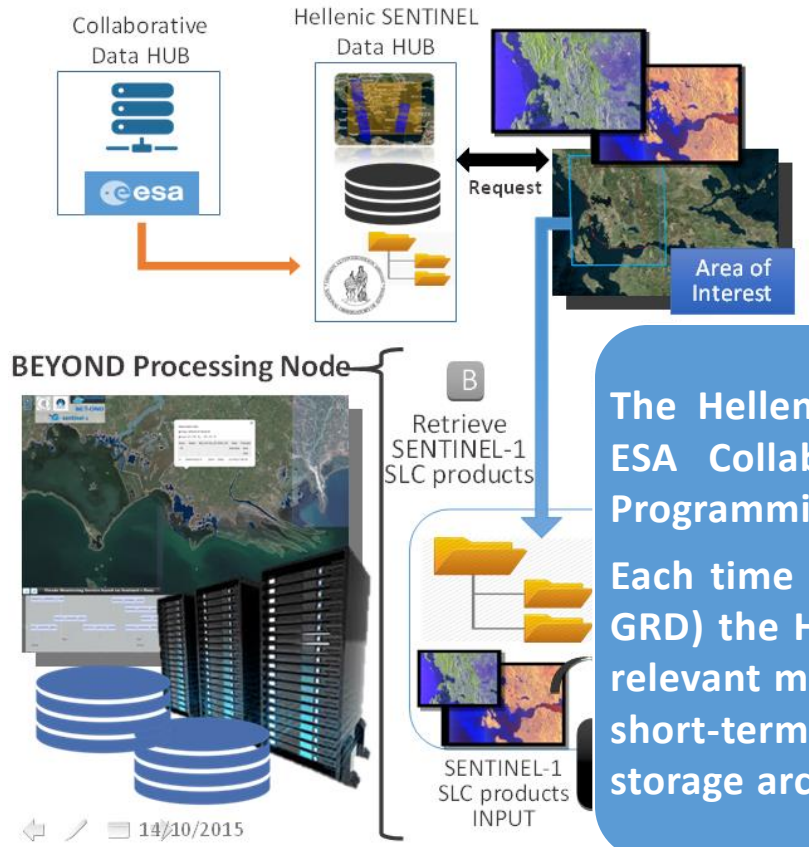
FloodHub: BEYOND's Floods Monitoring Service Architecture



DATA RETRIEVAL

The Hellenic SENTINEL Data HUB continuously monitors the ESA Collaborative Data HUB via a dedicated Application Programming Interface (API).

Each time a SENTINEL acquisition is available (Level-1, SLC or GRD) the Hellenic SENTINEL Data HUB extracts and stores the relevant metadata as well as the acquisition raw data first at a short-term and finally at a local (NOA premises) long-term storage archive (100 TB volume).

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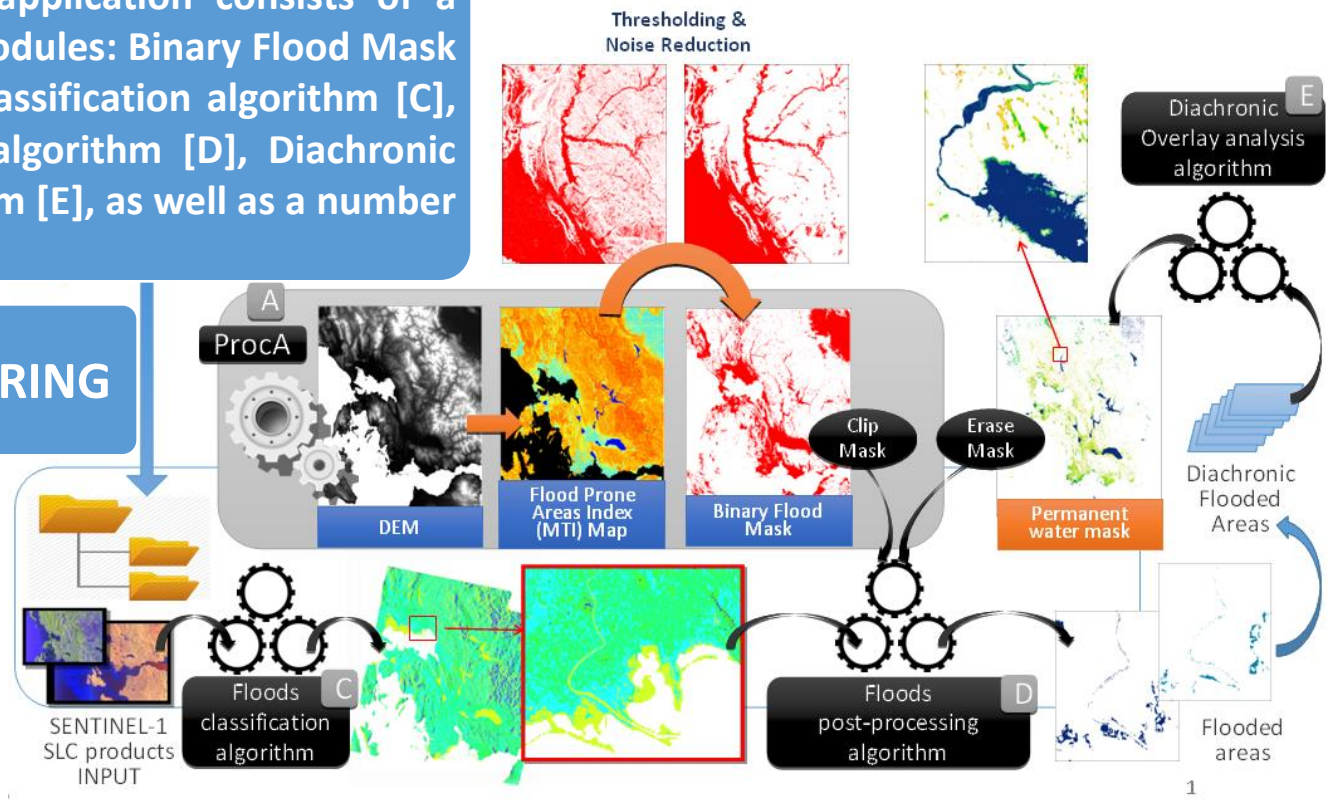
Water extremes mapping with EO: the FloodHub service of the BEYOND Center of Excellence

FloodHub: BEYOND's Floods Monitoring Service Architecture

The floods monitoring application consists of a number of processing modules: Binary Flood Mask extraction [A], Floods classification algorithm [C], Floods post-processing algorithm [D], Diachronic Overlay analysis algorithm [E], as well as a number of input data layers.

FLOODS MONITORING



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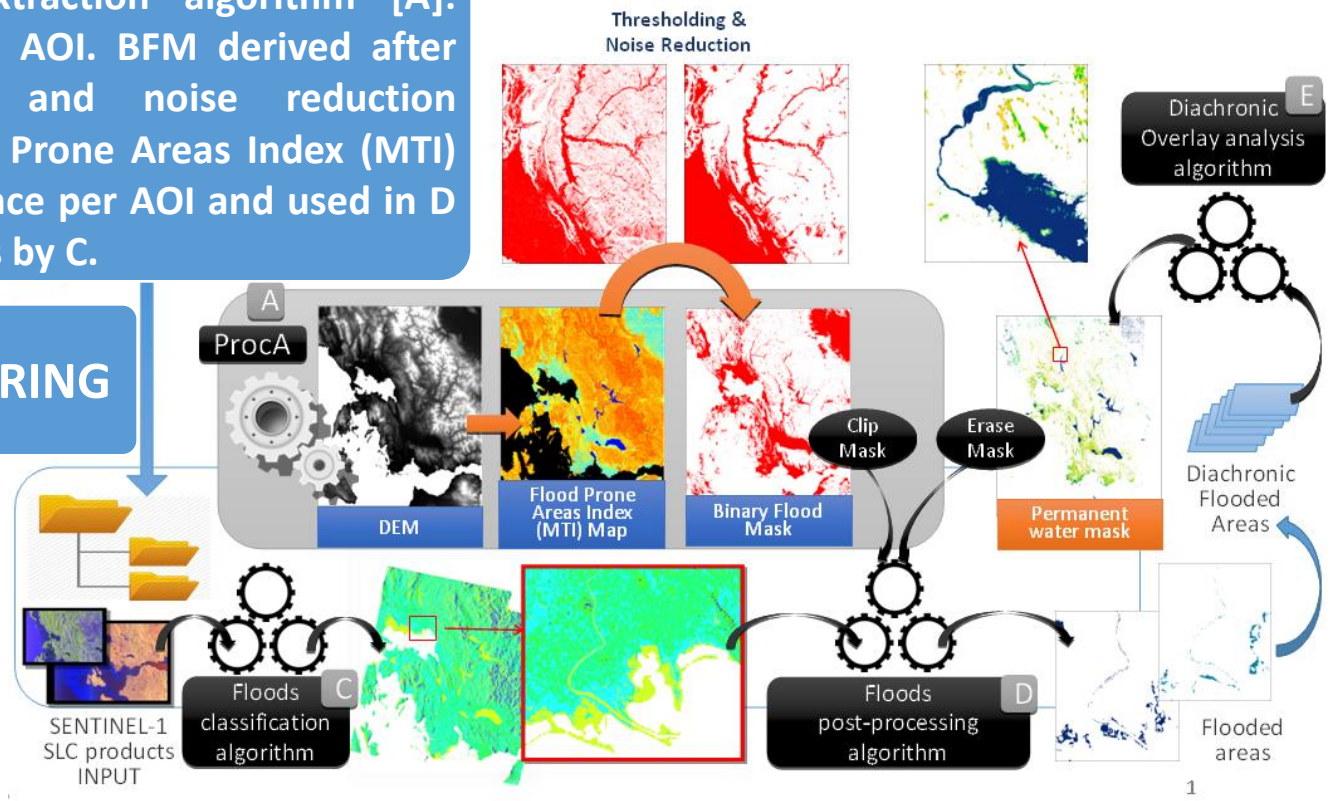
Water extremes mapping with EO: the FloodHub service of the BEYOND Center of Excellence

FloodHub: BEYOND's Floods Monitoring Service Architecture

Binary Flood Mask extraction algorithm [A]: HR DEM input for each AOI. BFM derived after applying thresholding and noise reduction techniques to the Flood Prone Areas Index (MTI) Map. BFM calculated once per AOI and used in D to validate flooded pixels by C.

FLOODS MONITORING



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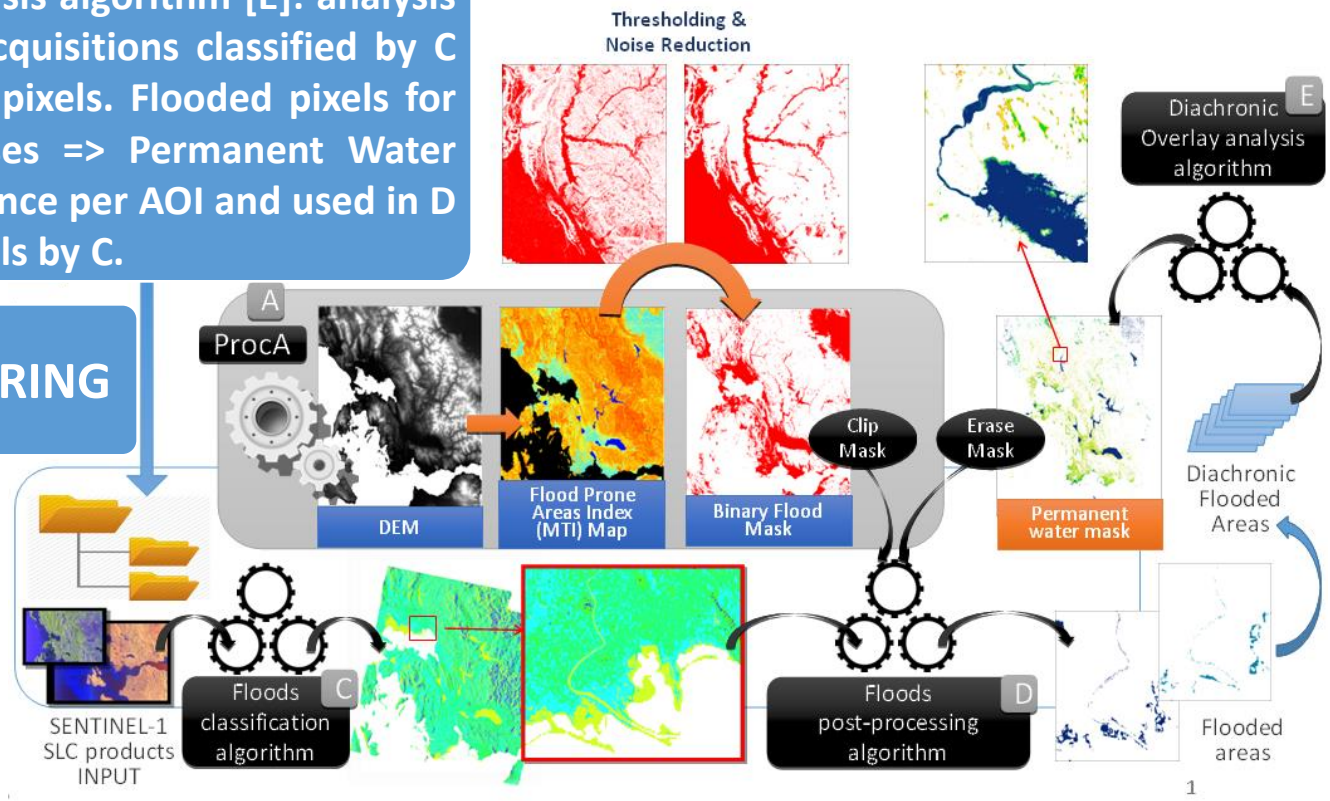
FloodHub: BEYOND's Floods Monitoring Service Architecture

Diachronic Overlay analysis algorithm [E]: analysis over many SENTINEL acquisitions classified by C as flooded/non-flooded pixels. Flooded pixels for at least 85% of all cases => Permanent Water Mask. PWM calculated once per AOI and used in D to eliminate flooded pixels by C.

FLOODS MONITORING



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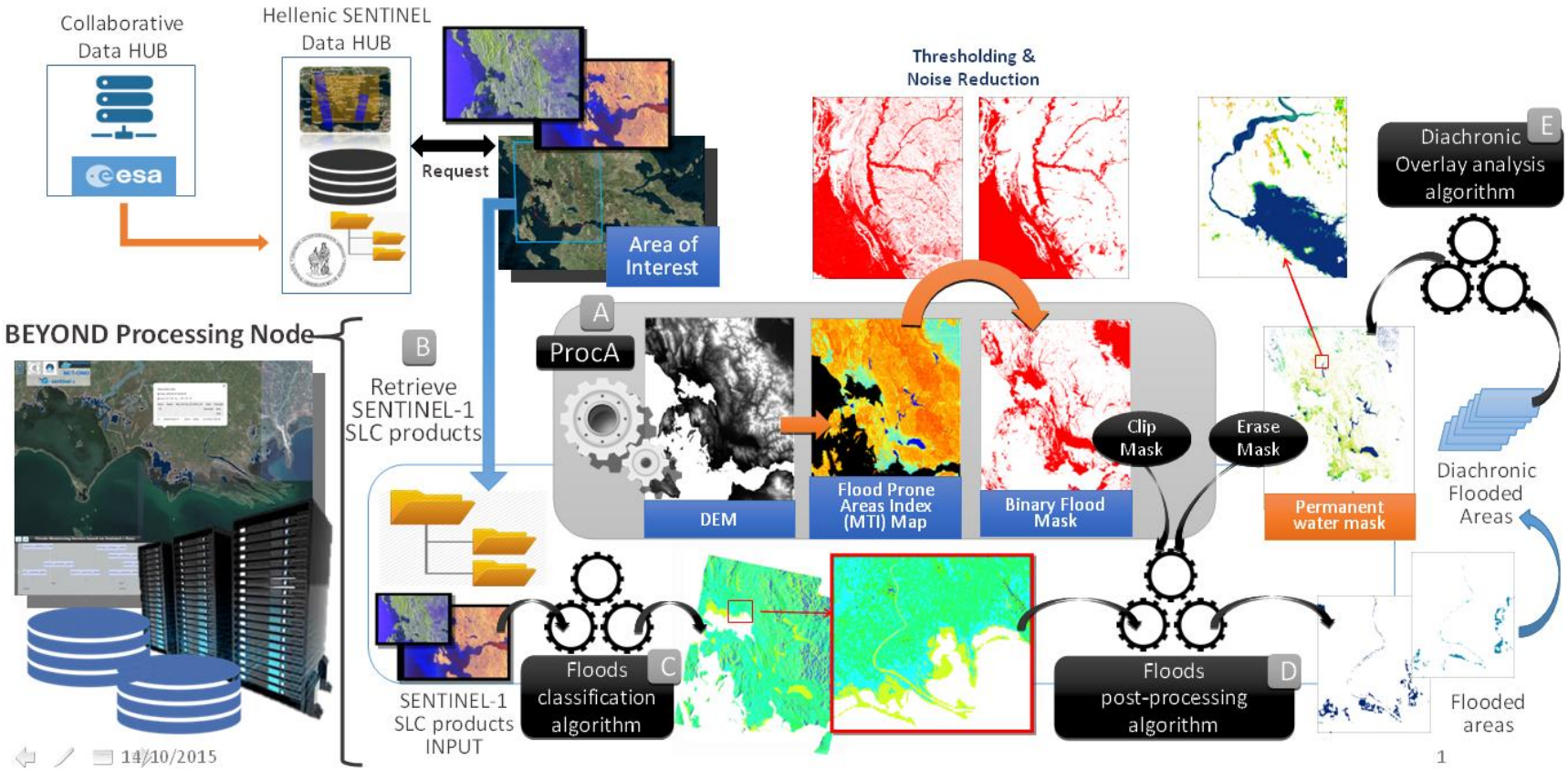
FloodHub: BEYOND's Floods Monitoring Service Architecture



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