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EST. 1837

AIteam

EarthQA : A Question Answering Engine for Earth Observation Data Archives

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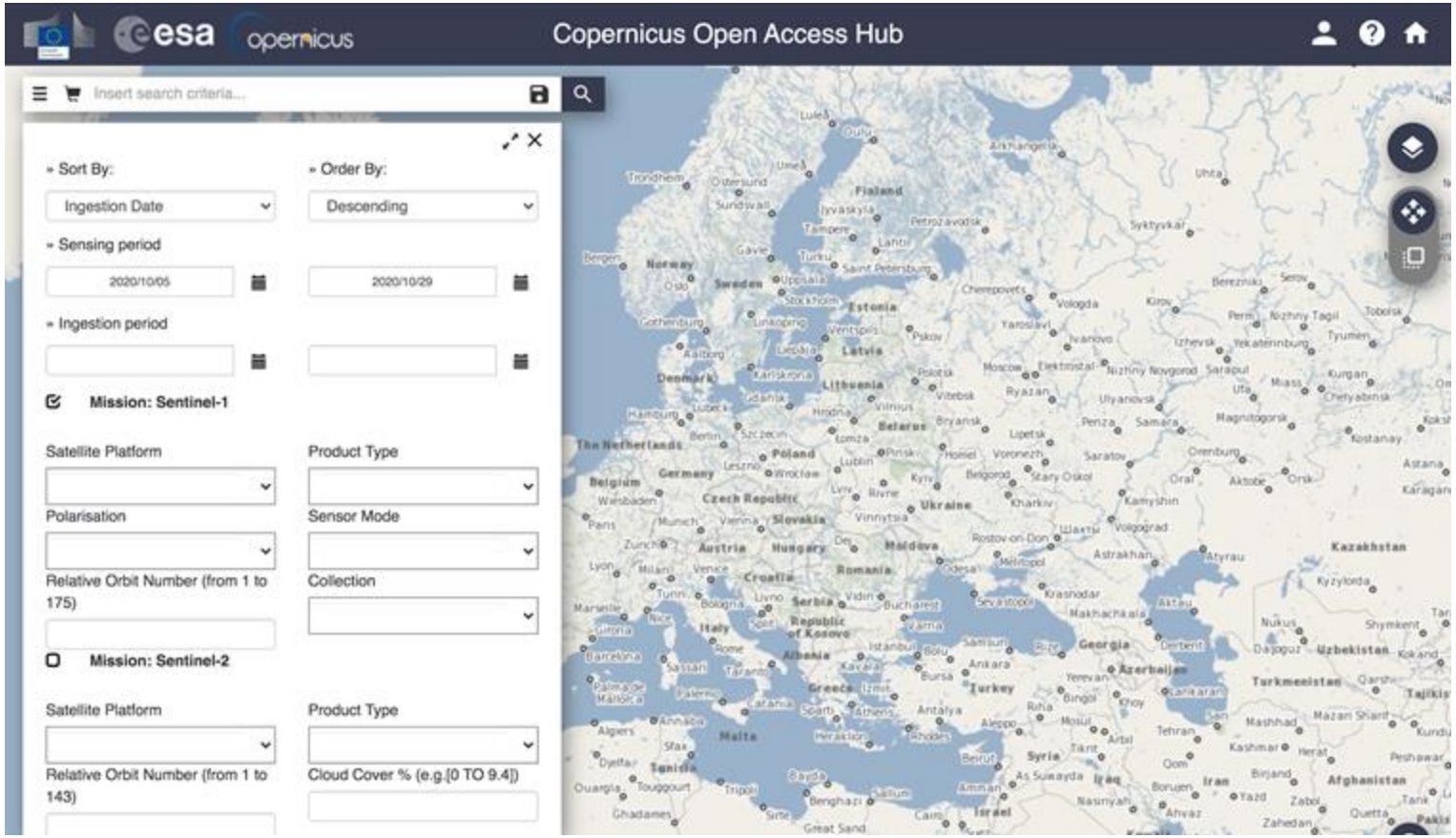
Based on a paper published in **IGARSS 2023** with Dharmen Punjani and Eleni Tsalapati

EO Product Search Example - Copernicus Open Access Hub

- Provides complete, free and open access to Sentinel-1, Sentinel-2, Sentinel-3 and Sentinel-5P user products (https://scihub.copernicus.eu).



EO product search - Copernicus Open Access Hub

Our Vision

EO product search should be like searching with Google and it should also target non-expert EO data users!

The EarthQA Question Answering Engine

- EarthQA is based on the following technologies:
  - **Question answering**
  - **Knowledge graphs**
  - **Ontologies**

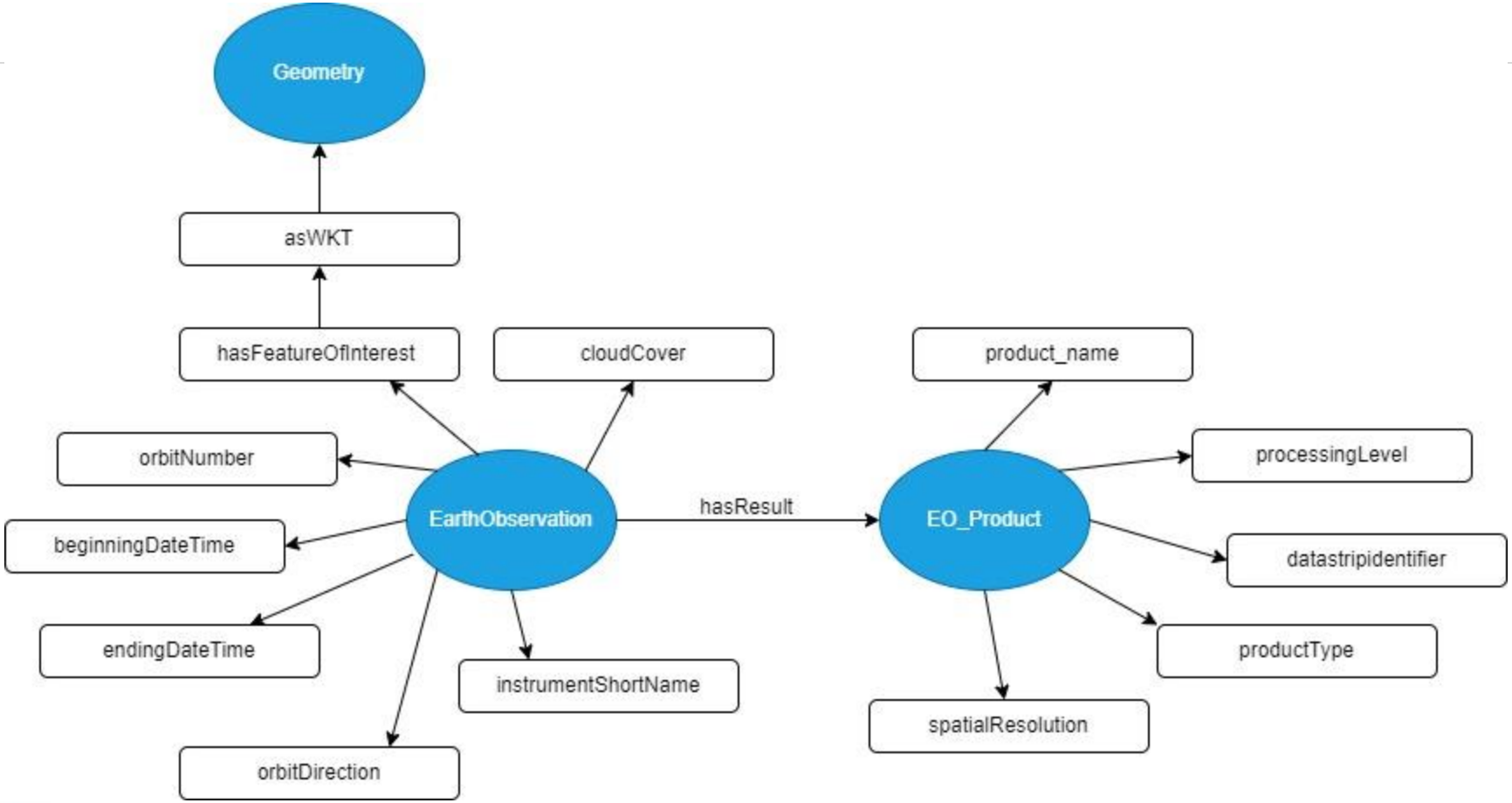
- We consider the **EO product search problem** as a **question answering problem over knowledge graphs encoded using appropriate ontologies.**

The Two EarthQA Knowledge Graphs

- A **knowledge graph encoding metadata of EO products from the CREODIAS archive.** This is part of the Copernicus knowledge graph.

- The **geospatial knowledge graph YAGO2geo (https://yago2geo.di.uoa.gr/)** containing information about **geographic objects** (e.g., lakes) and **their geometries** (e.g., polygons).

A Subset of the EarthQA Ontology

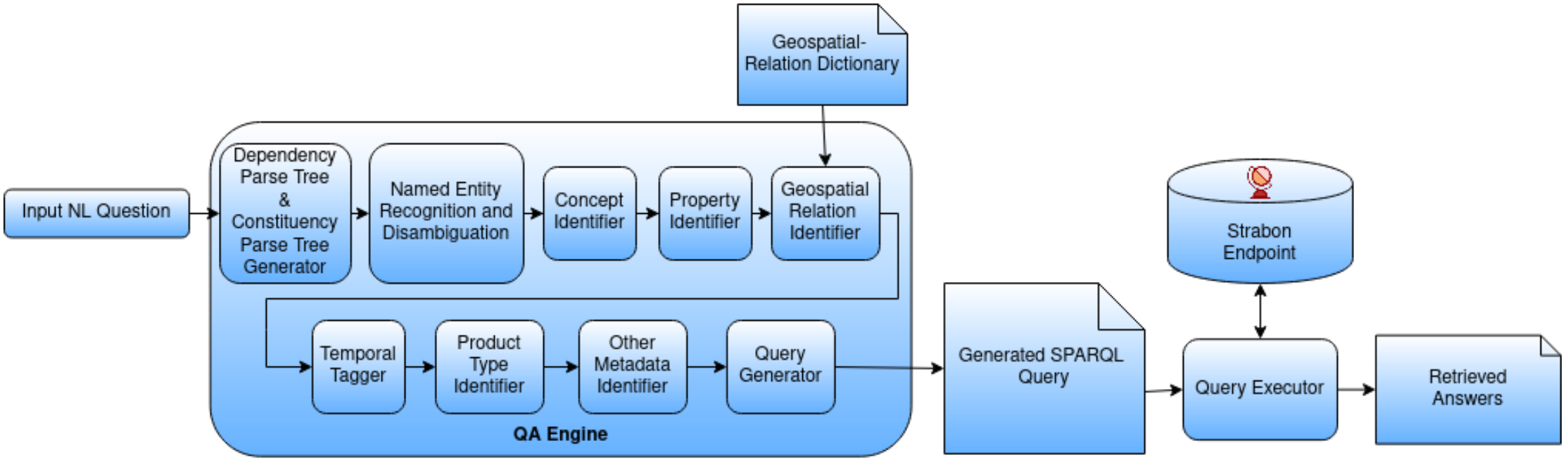


EarthQA - Capabilities

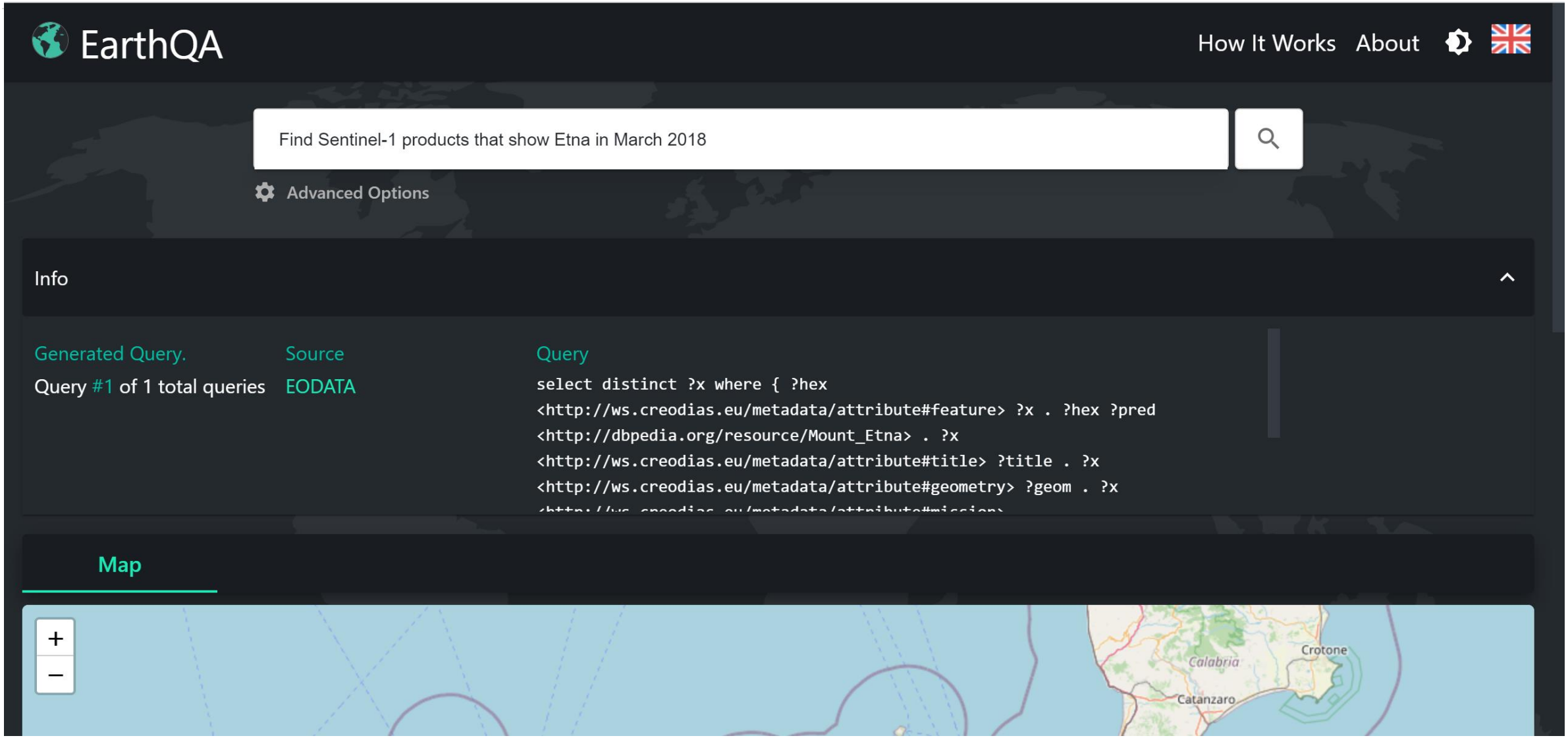
- In its current version, EarthQA accepts questions in **natural language (English)** that ask for EO products having certain properties and returns links to such products. **The properties can refer to EO product metadata (encoded in the Copernicus ontology) and relevant geographical knowledge from YAGO2geo.**

- Example user requests:
  - Find Sentinel-1 products that show Etna in March 2018.
  - Find Sentinel-2 MSI products that show Etna, have cloud cover below 10% and have been taken during March 2017 or 2018.
  - Retrieve all GRD Sentinel-1 images that cover the Black Sea and have been taken during the period 1/06/19-1/15/19.
  - Find Sentinel-3A Water Full Resolution products that covers Corsica with the data collected in January 2018.

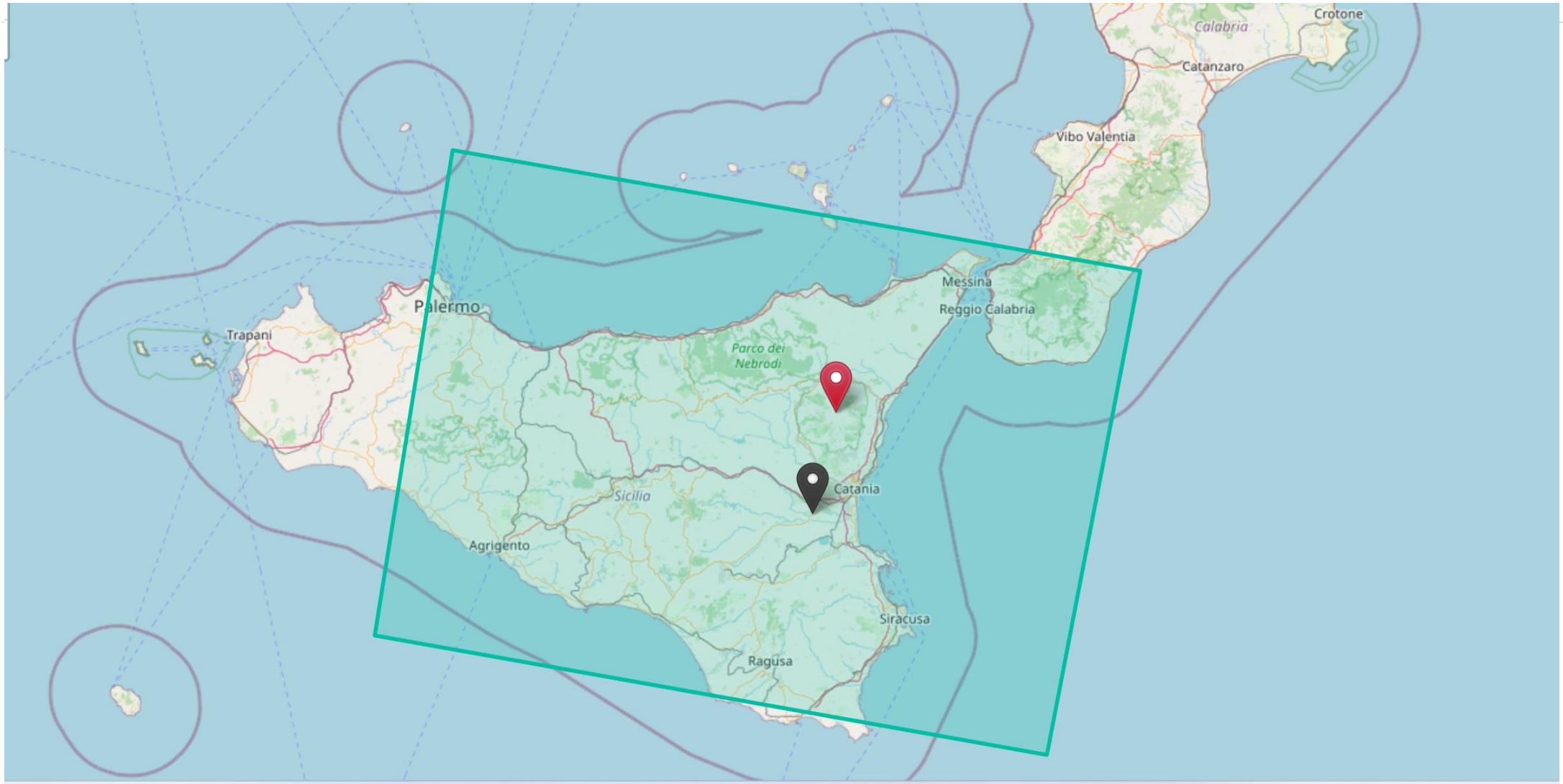
EarthQA – Software Architecture



Demo at http://earthqa.di.uoa.gr/



http://earthqa.di.uoa.gr/



EarthQA as Baseline in our ESA Project

e-geos
AN ASI / TELESPAZIO COMPANY

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Technische Universität Berlin

Thank you!

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