NEXTGEOSS
Contributing to the Vision of GEO

Disaster Risk Reduction – NextGEOSS pilot

Dr. Charalampos (Haris) Kontoes| Research Director | NOA
Dr. Ioannis Papoutsis | Research Associate | NOA
Mr. Anestis Trypitsidis | Research Associate | NOA

NextGEOSS Webinar, 11/09/2017

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 730329

Introduction

1. NOA – Few words
2. Background knowledge
3. DRR pilot scope & objectives
4. DRR pilot workflow
5. An example

1. NOA - Few words

- NOA is the oldest research foundation in Greece, with more than 120 service (1842) in Research and Society and one of the oldest research institutes in Southern Europe
- Historically nominated by the Greek government as the sole institution in charge of natural disasters monitoring
- The Institute for Astronomy Astrophysics Space Applications & Remote Sensing (**IAASARS**) of NOA (NextGEOSS project partner) has achieved considerable excellence in the area of EO-based environmental and natural disaster monitoring and management during the last decade and through the successful implementation of ESA & EC funded projects

2. BACKGROUND EXPERIENCE

Project Legacy

Core main activities of IAASARS/NOA are related to Emergency Management Service, including natural & man-made hazards.

Few recent projects and achievements:

- BEYOND Center of Excellence - http://beyond-eocenter.eu;
- Complementary Copernicus International Hub
- Hellenic Sentinel Data Hub - https://sentinels.space.noa.gr/;
- Copernicus Emergency Management Services – Risk & Recovery;
- FireHub, a platform for EO-based fire management – http://ocean.space.noa.gr/FireHub; &
- GEO-CRADLE: fostering regional cooperation and roadmap for GEO and Copernicus implementation in N. Africa, Middle East, and the Balkans – http://geocradle.eu/

3. DRR Pilot scope & objectives

NOA's DRR Pilot aims to provide an enhanced landslide risk assessment framework based on the statistical analysis of long time series of satellite and geospatial data accessible through the NextGEOSS Data Hub.

Focus will be given on landslide susceptibility mapping, based on:

- existing models that incorporate ground velocities estimated from EO SAR data (ERS, ENVISAT, Sentinel-1),
- other non EO data such as DEM, Slope, Aspect, Geology, Soil properties, Lithology, LU/LC, Faults, precipitation, soil moisture, Seismicity, Drainage density
- registered landslides events based on the inventory provided by IGME (Institute of Geology & Mineral Exploration),

3. DRR Pilot scope & objectives

DRR pilot targets to provide products related to landslides to end-users and stakeholders, for a pilot area in Greece

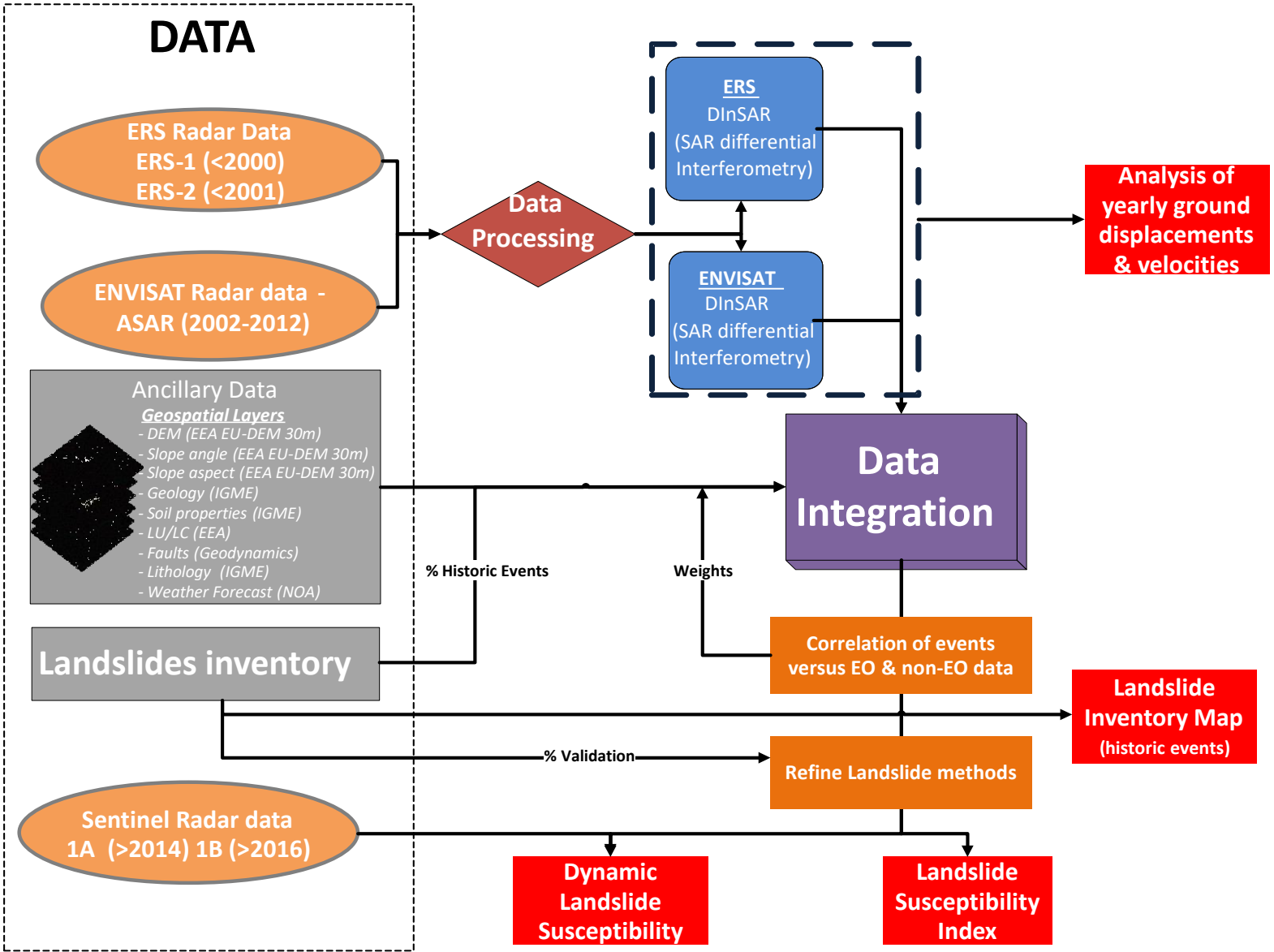
It will offer capabilities and methods to:

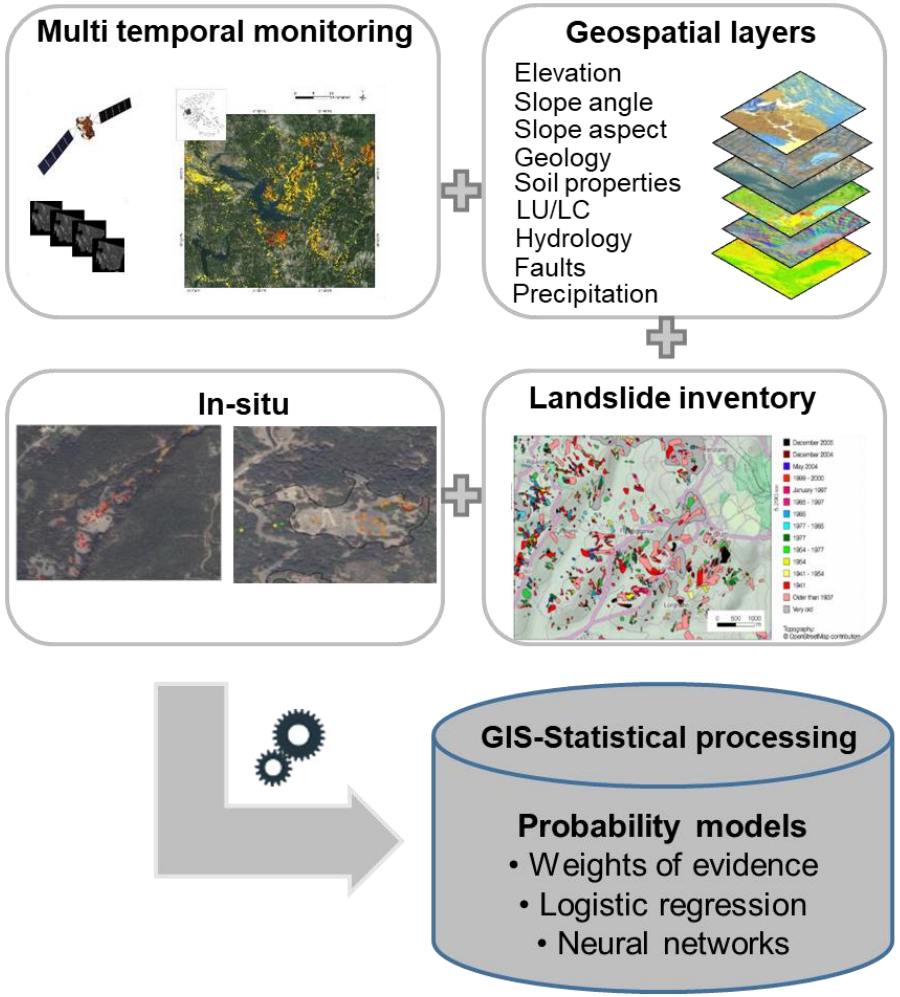
- transparently query, visualize and access products of relevance to the pilot datasets,
- deliver a robust and transferable solution for dynamic mapping and monitoring of landslide hazard zones, in complex geo-environmental settings

4. DRR pilot Workflow

NEXTGEOSS
Contributing to the Vision of GEO

Disaster Risk Reduction





5. A scenario

DRR Scenario 1 – Landslide:

- A forecast alert of heavy rain can trigger the update of the Landslide Susceptibility with the detection of possible vulnerable areas based the forecast and on ground deformations time series and velocity maps (Sentinel-1 SAR data).

February 2015

Source: kathimerini.gr

October 2016

Source: newsbeast.gr

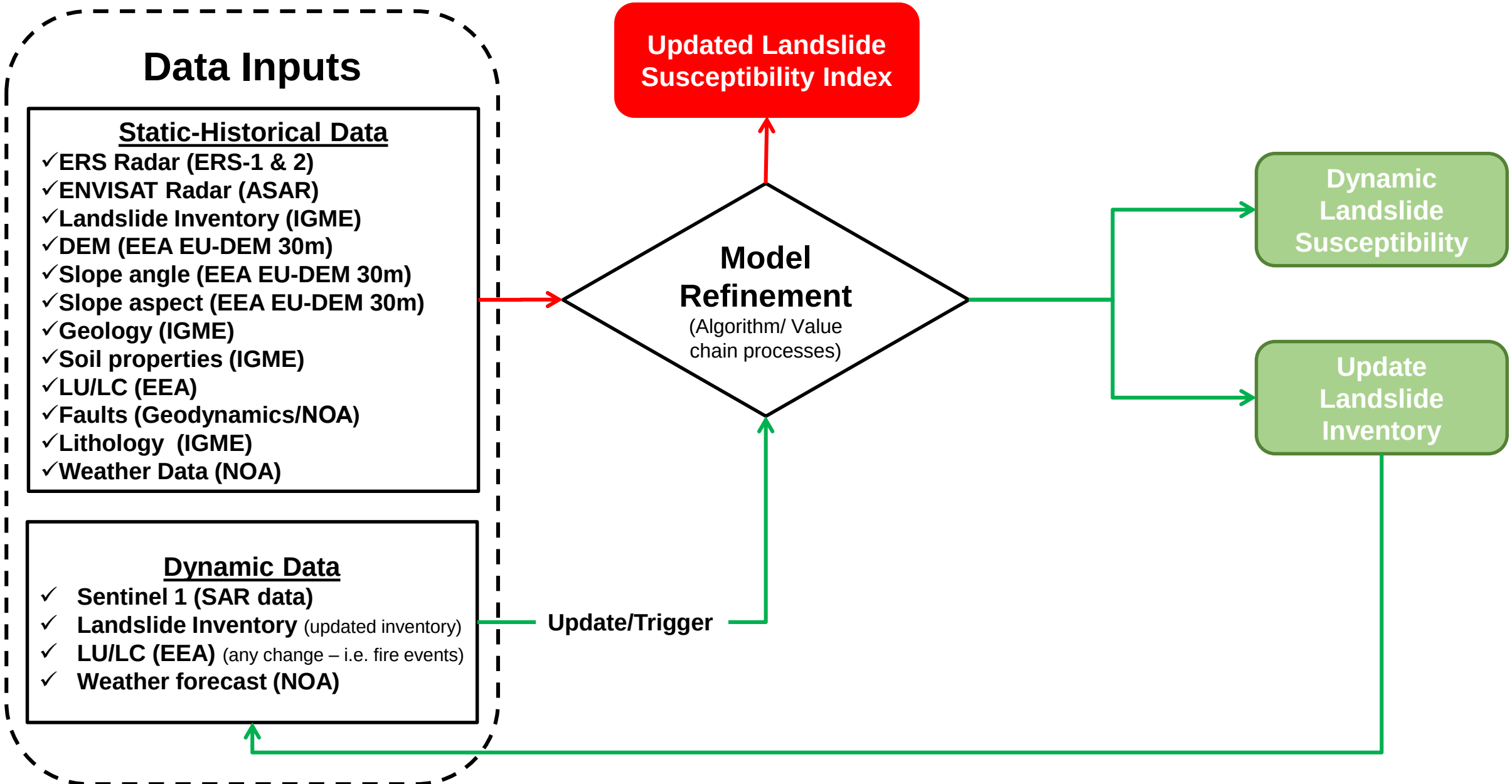
November 2014

Source:

January 2016

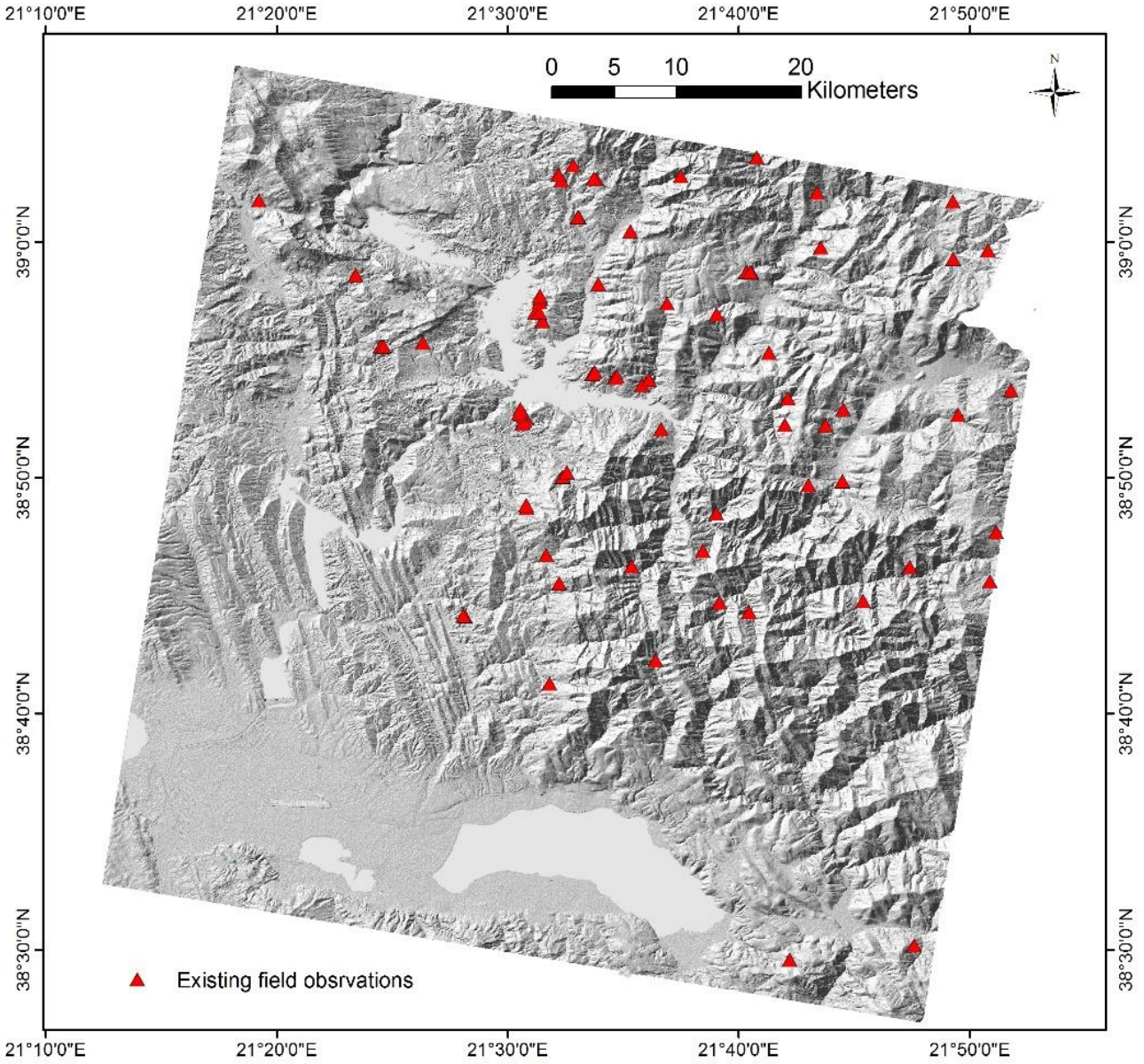
Source: epirusgate

Data inputs and outputs



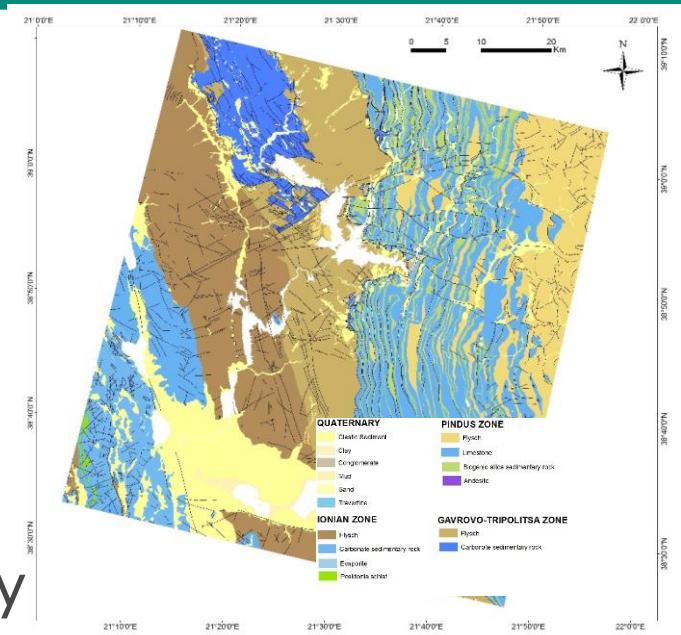
Data sources – Landslide inventory

- ✓ Pre-existing landslide field observations, generated by IGME-GR (Greek Geological Survey)

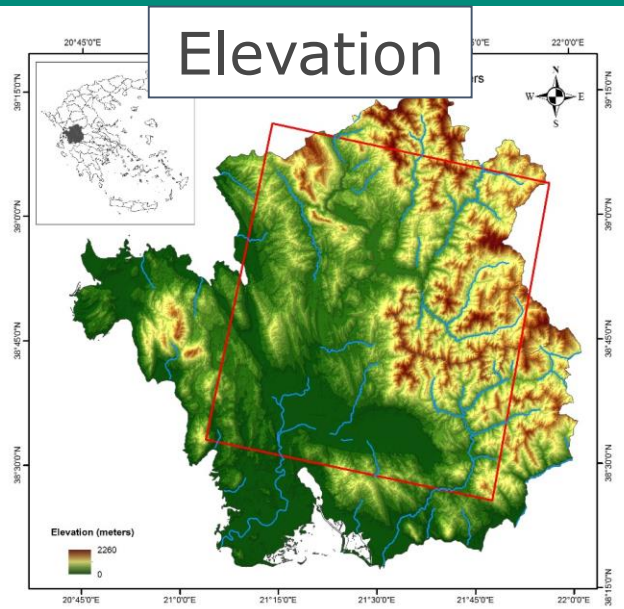


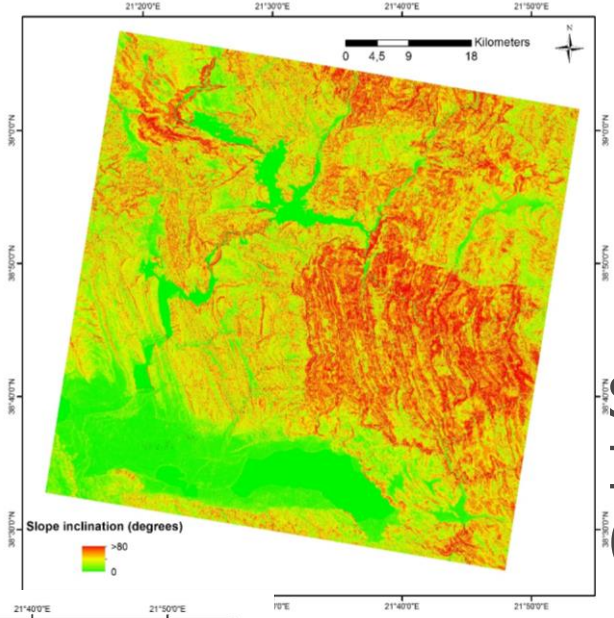
Data sources – Thematic maps of the environmental predisposing factors

Geology



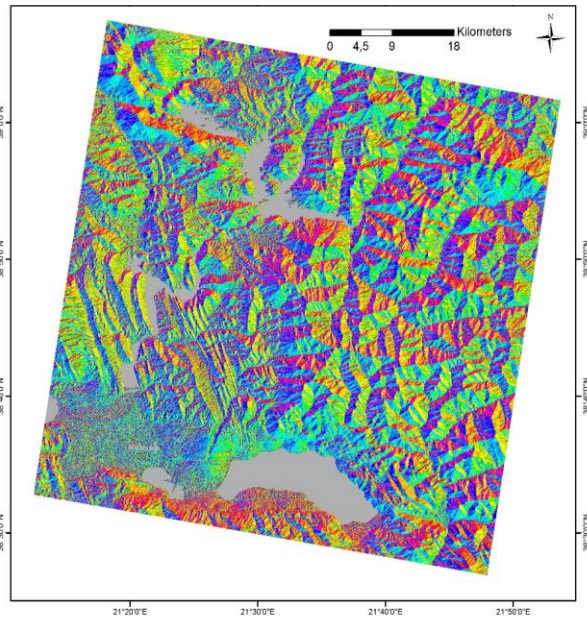
Elevation

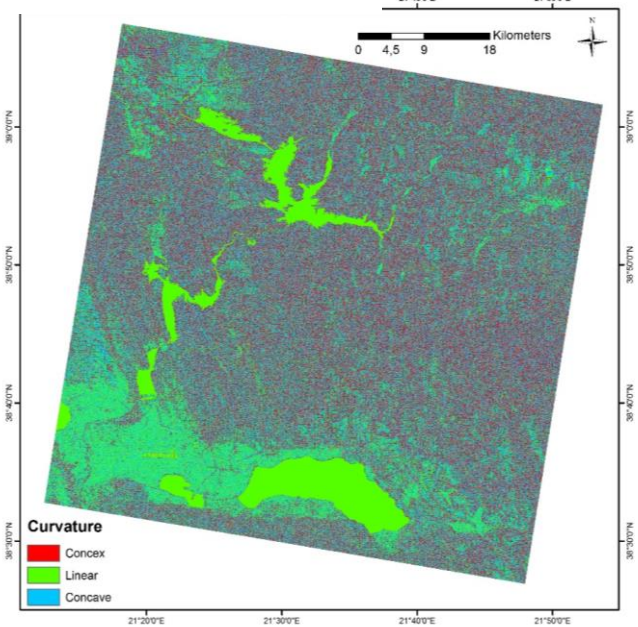




Slope Inclination (degrees)

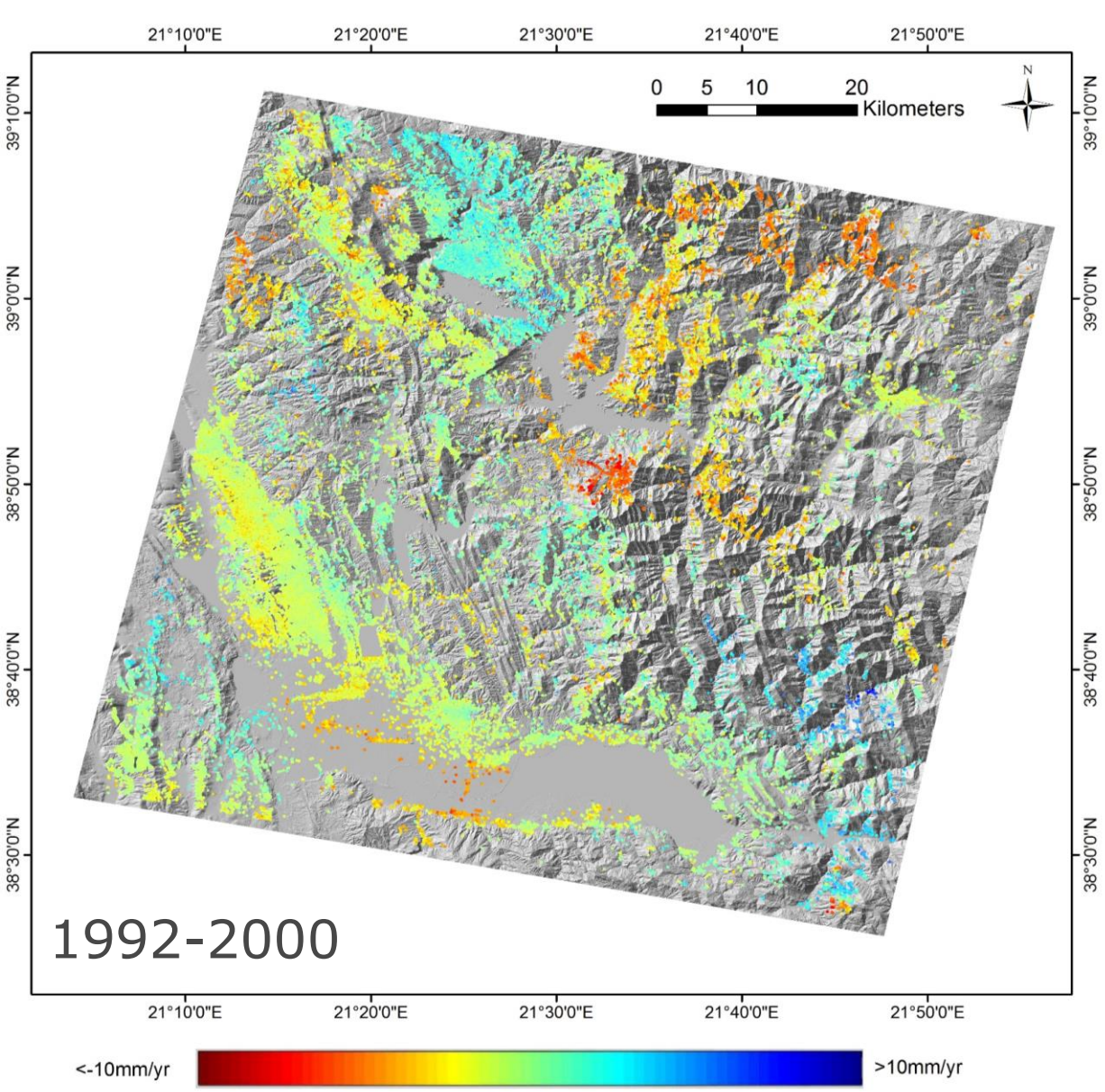
Slope Aspect

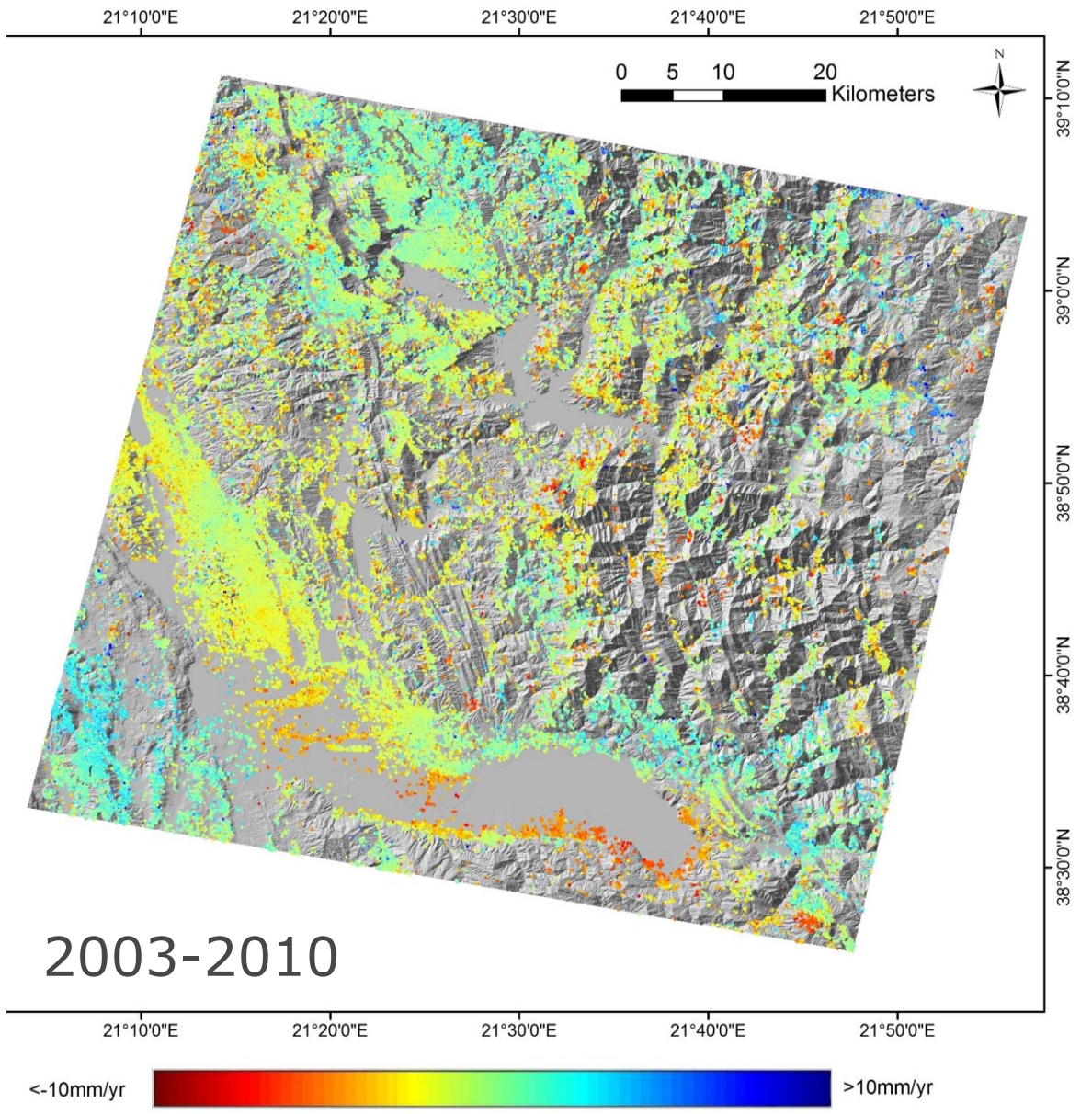




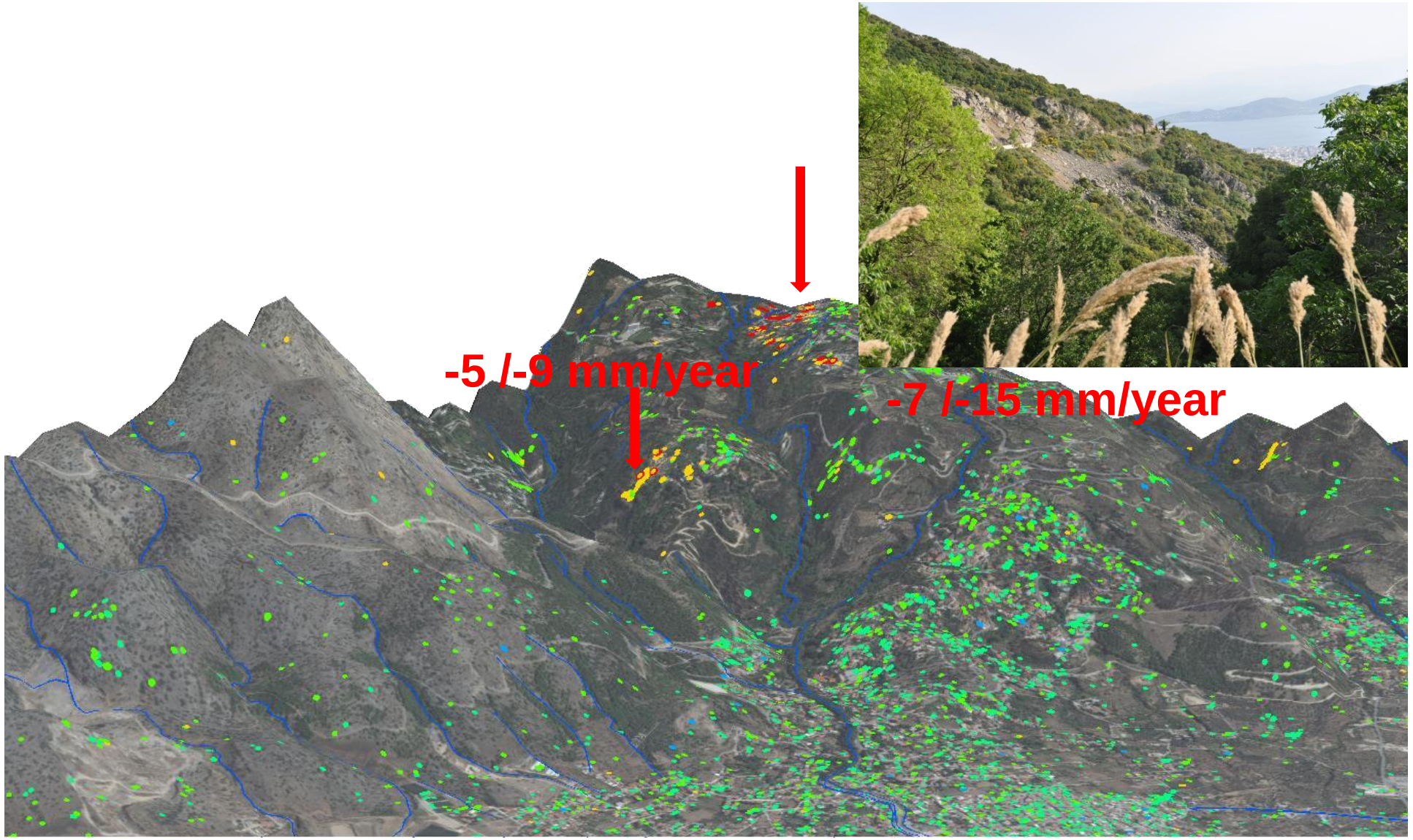
Curvature

Analysis results - Radar Data_Mean temporal velocities



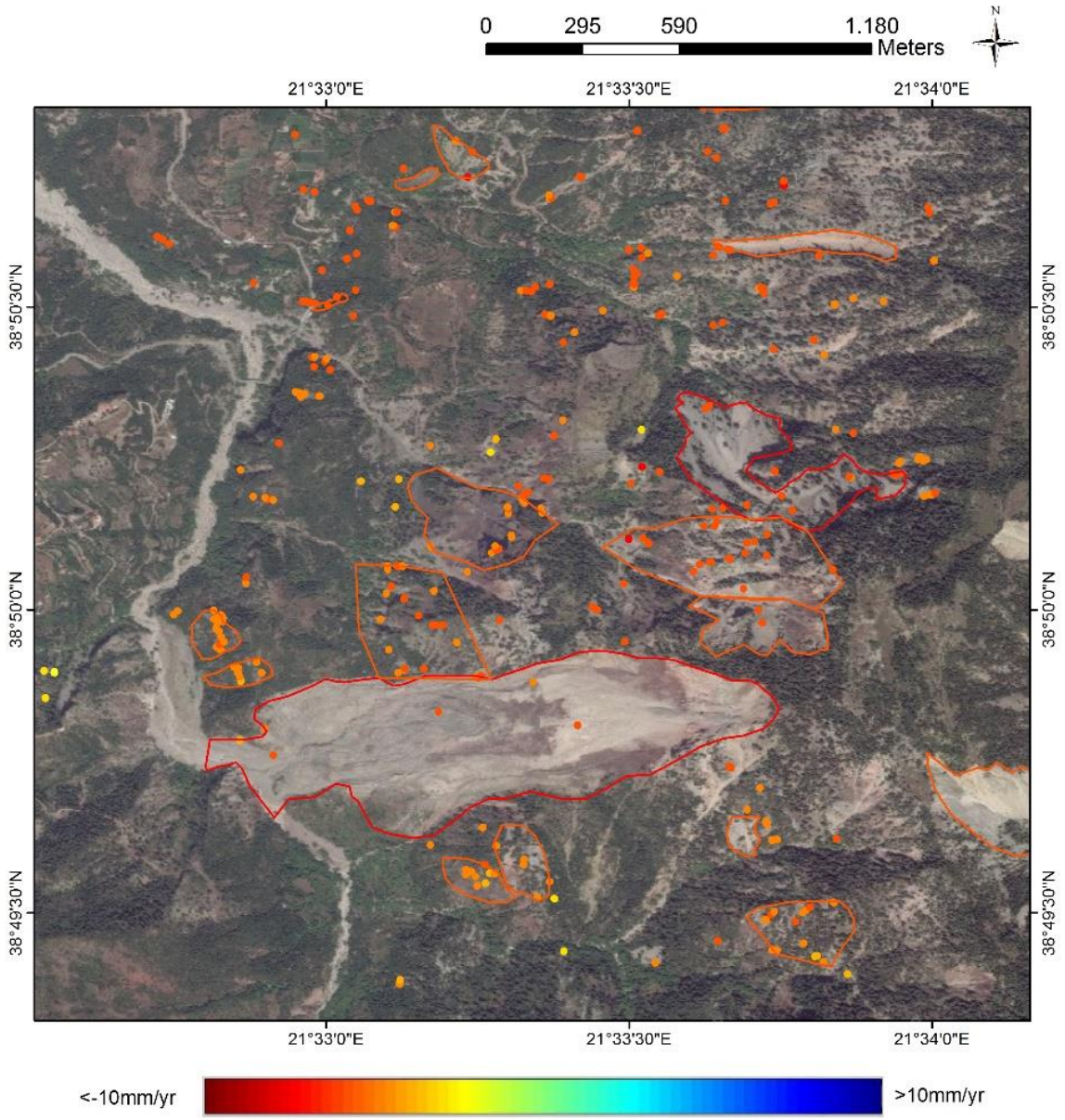


Analysis results – Landslides



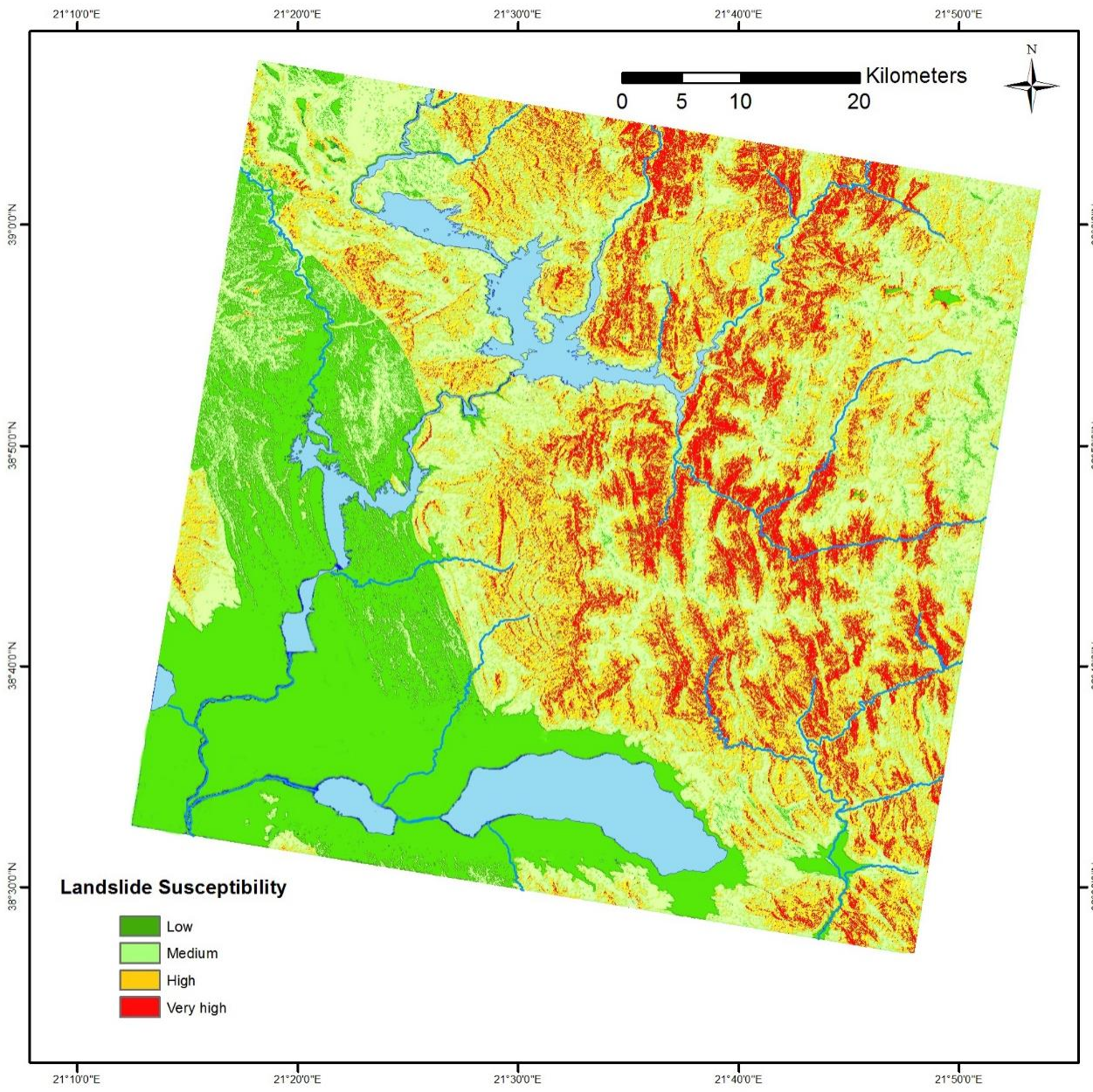
Analysis results – Landslides

- ✓ Confirmation of existing landslides
- ✓ New detections (not recorded by the competent authority, but detected by satellite means and visual interpretation)



Analysis results – Susceptibility

- ✓ Landslide susceptibility statistical assessment



6. Impact

DRR Pilot Impact:

1.Remote Sensing Community:

- ✓ *Dynamic Sentinel-1 processing*
- ✓ *Big data processing*
- ✓ *Regional ground velocities mapping*

2. Domain expert:

- ✓ *Update Landslide inventory*
- ✓ *Identification of remote landslides*
- ✓ *Early warning*

NEXTGEOSS
Contributing to the Vision of GEO

Thank you for your attention