# Earthquake

Earthquakes are a common occurrence in Turkey

and its neighboring country, Syria.

 Therefore, in order to efficiently mitigate

 the impact of earthquakes,

•it is essential to establish a comprehensive

earthquake information system and a fully

automated data system.

•This can be achieved by utilizing remote

 sensing and GIS technologies.

The government has already begun the

rapid construction of houses,

•but it is important to carefully consider

the relationship between social and

economic changes and land use.
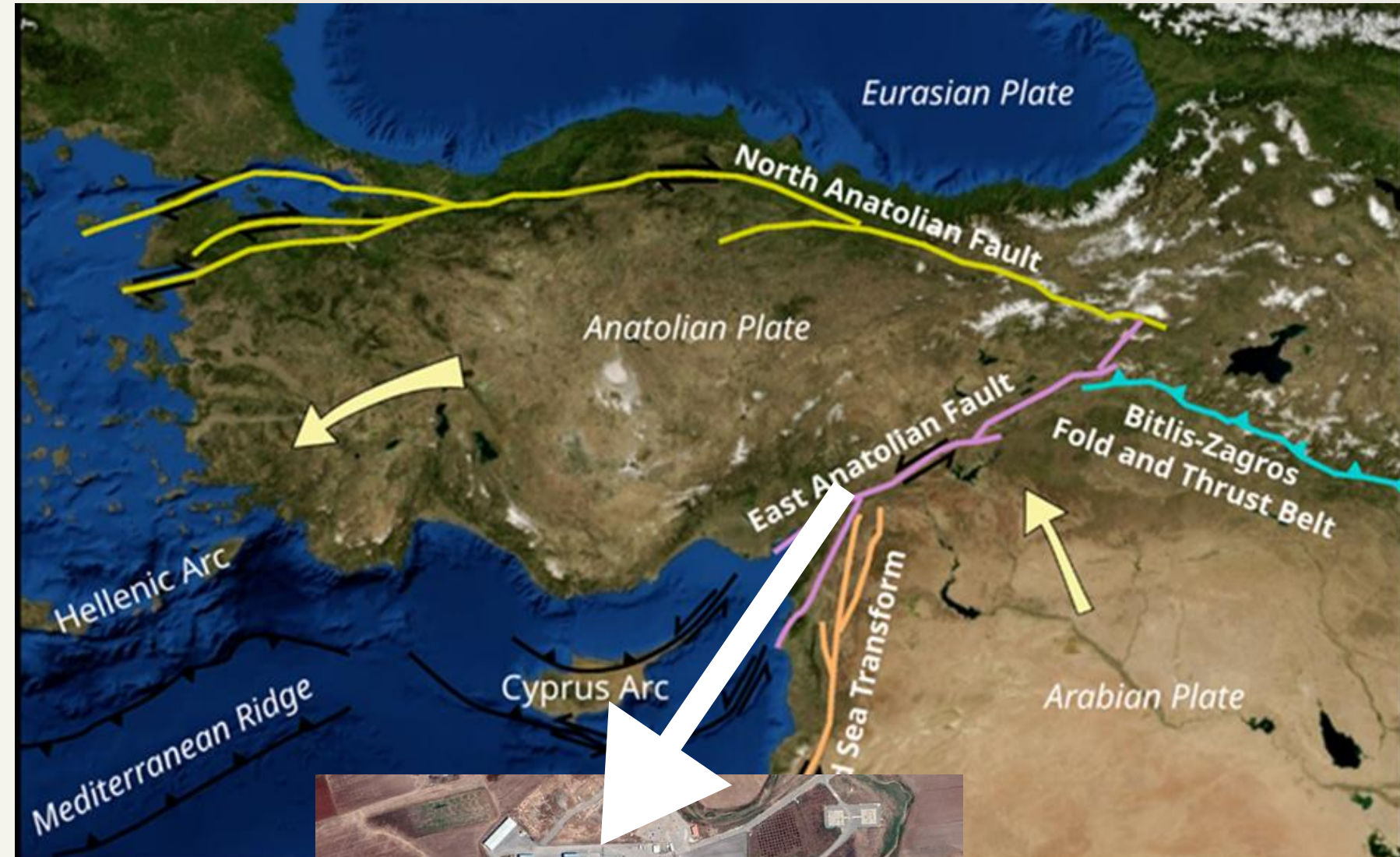
July, 2024
**Country: Turkey**
**Team : Esra Tunç Görmüş, Karadeniz Technical University, Department of Geomatics Engineering, Trabzon, Turkey, etunc@ktu.edu.tr**

- **Topic 1:** Monitoring landslides with persistent scatterer InSAR (PSInSAR) technique
- **Objectives:** Presenting solutions to the challenging validation problem, to show the effectiveness of PSInSAR method and to describe the remaining challenges in PS analysis of landslide applications in dam areas.
- **Team:**

  •Ing. Bülent Volkan Yazıcı, Artvin Çoruh University, Artvin/Turkey

  •Asst.Prof. Dr. Esra Tunç Görmüş, KTU, Trabzon/Turkey

- **Provide an illustration or map of relevance to you r top 1-2 topics**

  PS points in and around the landslide with displacement values in different colours, and reference points measured by terrestrial methods (with DEF prefixes



2
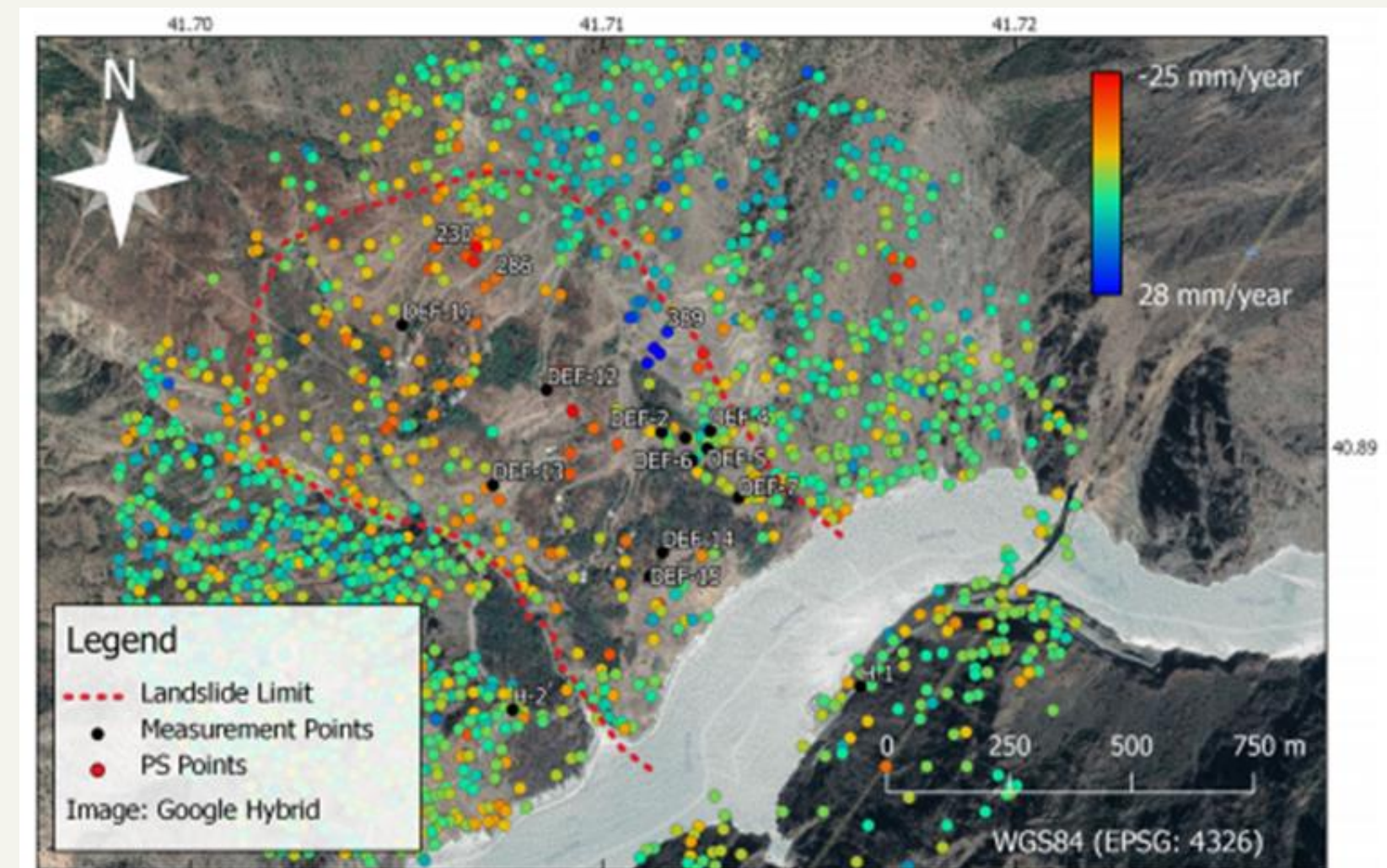
# Results/ Success stories / Good practices

- **Achieved**

A case study in Artvin Dam area in Turkey has been achieved by PSInSAR technique to show the efficiency for landslides mapping.

«Investigating persistent scatterer InSAR (PSInSAR) technique efficiency for landslides mapping: a case study in Artvin dam area, in Turkey»

https://doi.org/10.1080/10106049.2020.1818854

- **Future plans**

Theapplication area will be extended to other landslides prone areas in Turkey.

**3**

**Country: Turkey**
**Team :** Emine Tanır Kayıkçı, Karadeniz Technical University, Department of Geomatics Engineering, Trabzon, Turkey, etanir@ktu.edu.tr

**Topic 2:** Using Regional GNSS Networks to Strengthen Severe Weather Prediction
TUBITAK (The Scientific and Technological Research Council of Turkey) Research Project, 116Y186, 2017-2020.
Team:

**Project Manager:**
- Assoc.Prof. Dr. Emine Tanır Kayıkçı, Karadeniz Technical University (KTU, Trabzon/Turkey)

**Researchers:**
- Prof. Dr. Mualla Yalçınkaya (KTU, Trabzon/Turkey), Prof. Dr. Yasemin Şişman, Ondokuz Mayıs University (OMU, Samsun/Turkey)
- Dr. Mesut Demircan, Turkish State Meteorological Service (Ankara)
- Dr. Eray Köksal, Bülent Ecevit University (BEU, Zonguldak/Turkey)
- Ress.Asst. Selma Zengin Kazancı (KTU, Trabzon/Turkey)
- Lecturer Seldanur Çelik Tunce (Hitit University, Çorum/Turkey)
- Ress.Asst. Cansu Beşel (KTU, Trabzon/Turkey)

**Advisor:**
- Assoc. Prof. Dr. Vincenza Tornatore (Politecnico di Milano, Milano/Italy)

**Provide an illustration or map of relevance to you r top 1-2 topics**



Samsun network has been designed with
- **2** new constructed GNSS reference stations SAME ve SOMU,
- **7** TUSAGA-Aktif stations AMA1, FASA, RDIY, SAM1, SNIP, SSE1 ve VEZ1

10-20km apart from Samsun rawisonde station.

Trabzon network has been designed with
- **2** new GNSS reference stations TRAB ve MACK (new),
- **8** TUSAGA-Aktif stations ARTV, BAYB, ERZ2, GIRS, GUMU, RHIY, RZE1, TRBN

**Tasks:**
to determine water vapor distribution derived by GNSS Meteorology and GNSS Tomography from a network with new constructed GNSS stations in two cities Samsun and Trabzon of Black Sea Region, TUSAGA-Aktif GNSS stations and IGS/EUREF GNSS stations.

**4**

## Results/ Success stories / Good practices

**Achieved**
- Comparison GNSS meteorology and GNSS tomography derived water vapour distributions with independent techniques such as rawisonde and numerical weather models (NWM).

- Evaluation possible contribution of GNSS tomography to prediction of hydrological hazards and taking precautions.

**Future plans**
- Determination near real time water vapor for near real time observations by modified version of GNSS tomography software developed by ourselves.

**Topic 3:**

Investigation of Sea Level Change on the Black Sea Coasts with GNSS-IR Technique

Collaboration Project between the General Directorate of Mapping and Karadeniz Technical University, (2020-2023)
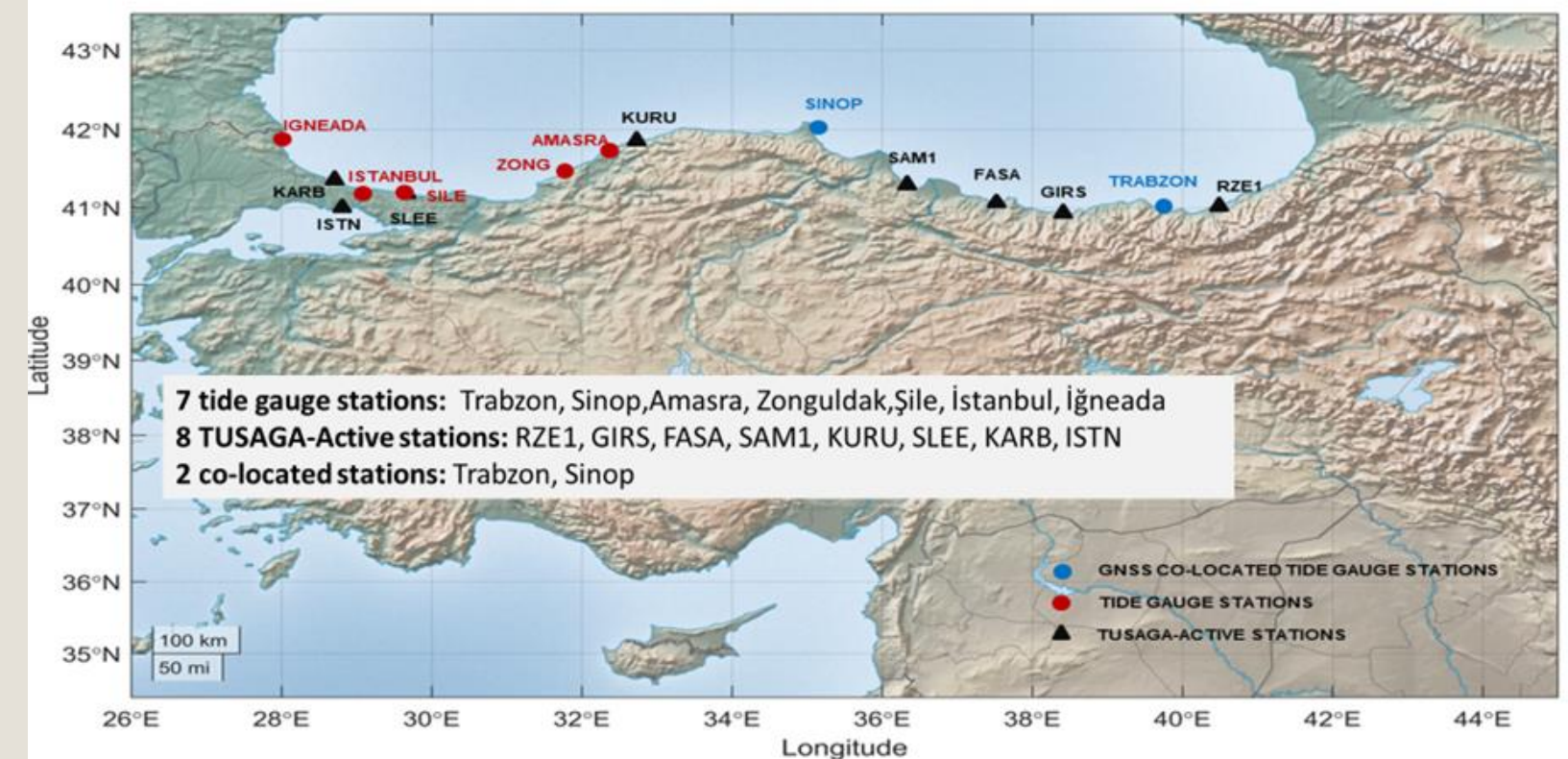
**Team:**

- Assoc.Prof. Dr. Emine Tanır Kayıkçı, Karadeniz Technical University (KTU, Trabzon/Turkey)
- Ress.Asst. Cansu Beşel (KTU, Trabzon/Turkey)
- Dr. Erdinç Sezen (General Directorate of Mapping, Ankara/Turkey)
- Ing. İbrahim H. Keskin (General Directorate of Mapping, Ankara/Turkey)

**Provide an illustration or map of relevance to your top 1-2 topics**

Task:

Observe the sea level changes Black Sea Cost of Turkish coasts by using two sources of sea level observations include tide gauges and GNSS interferometric reflectometry (GNSS-IR).



7 **tide gauge stations:** Trabzon, Sinop, Amasra, Zonguldak, Şile, İstanbul, İğneada
8 **TUSAGA-Active stations:** RZE1, GIRS, FASA, SAM1, KURU, SLEE, KARB, ISTN
2 **co-located stations:** Trabzon, Sinop

GNSS CO-LOCATED TIDE GAUGE STATIONS
TIDE GAUGE STATIONS
TUSAGA-ACTIVE STATIONS

## Results/ Success stories / Good practices

**Achieved**

This **research Project** is the first research project which will pioneer the monitoring of the **sea level** change with the **GNSS-IR technique in Turkey.**

- tide gauge records, TUSAGA-Active data, and TUDES co-located GNSS data are used.
- sea level changes are determined using GNSS-IR.

**Future plans**
- the advantages of this technique are investigated to other techniques in coastal areas.
- the principles and procedures of cooperation are determined to obtain precise sea level observations.

**Topic 4:**

Determination of Sea Level Variations in Turkish Mediterranean Coast Using GNSS Reflectometry

Accepted to be published in Survey Review, SCI-Indexed Journal, (May 2021)

**Team:**

•Assoc.Prof. Dr. Emine Tanır Kayıkçı, Karadeniz Technical University (KTU, Trabzon/Turkey)

•Ress.Asst. Cansu Beşel(KTU, Trabzon/Turkey)

**Provide an illustration or map of relevance to you r top 1-2 topics**

**Task:**

Observe the sea level changes in Turkish Mediterranean coasts by using tide gauges and GNSS interferometric reflectometry (GNSS-IR).

**Country: Turkey**
**Team :** Emine Tanır Kayıkçı, Karadeniz Technical University, Department of Geomatics Engineering, Trabzon, Turkey, etanir@ktu.edu.tr

## Topic 5:

Determination of Sea Level Variations in Turkish Mediterranean Coast Using GNSS Reflectometry

Online Published in Survey Review, SCI-Indexed Journal, (https://doi.org/10.1080/00396265.2020.1816314)

## Team:

•Assoc.Prof. Dr. Emine Tanır Kayıkçı, Karadeniz Technical University (KTU, Trabzon/Turkey)

•Ress.Asst. Ahmet Yavuzdoğan (Gümüşhane University, Gümüşhane/Turkey)

## Provide an illustration or map of relevance to you r top 1-2 topics

**Task:**

•Modelling sea level anomaly time series with complex dependency structures with Archimedean copulas was investigated.

•Offering a novel approach to the prediction of sea level anomalies in the Black Sea, multi-mission (gridded) satellite altimetry data were used as distributed by the Copernicus Marine Environment Monitoring Service (CMEMS)
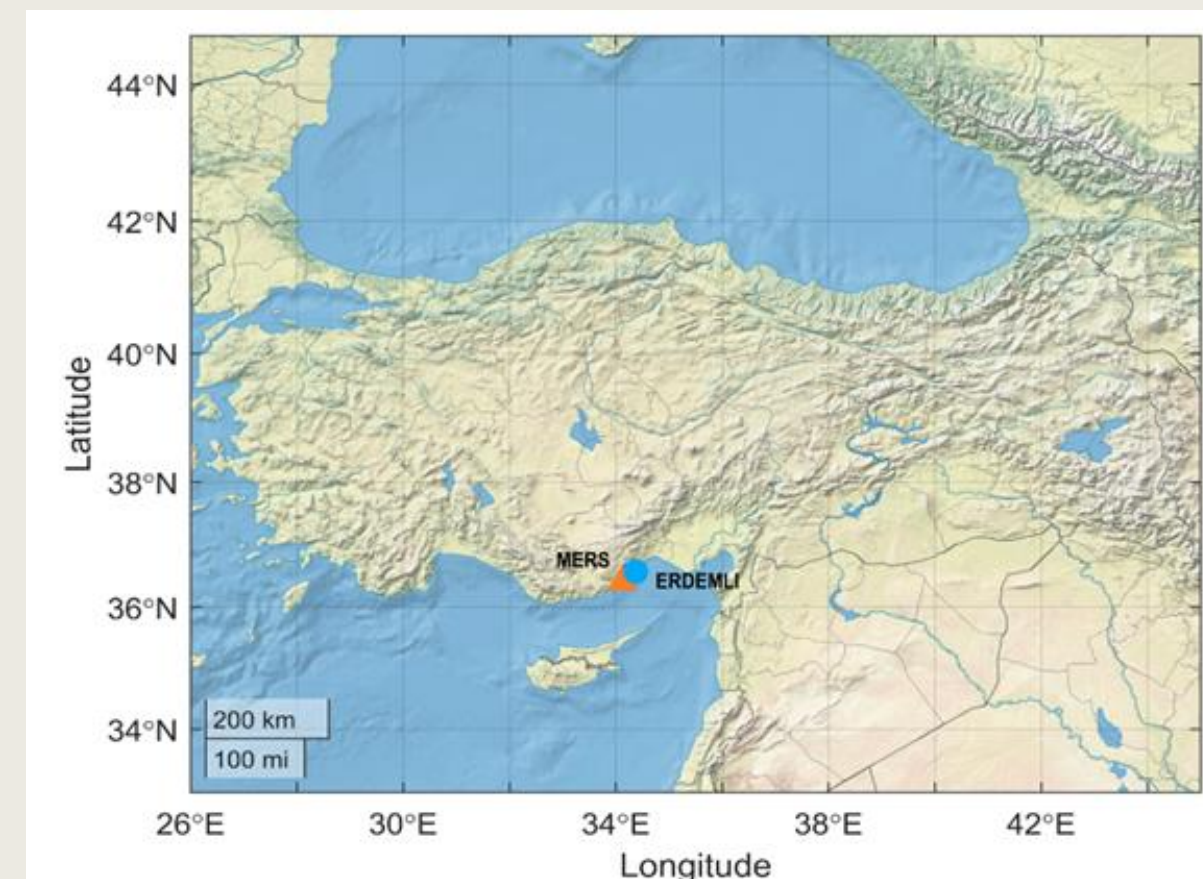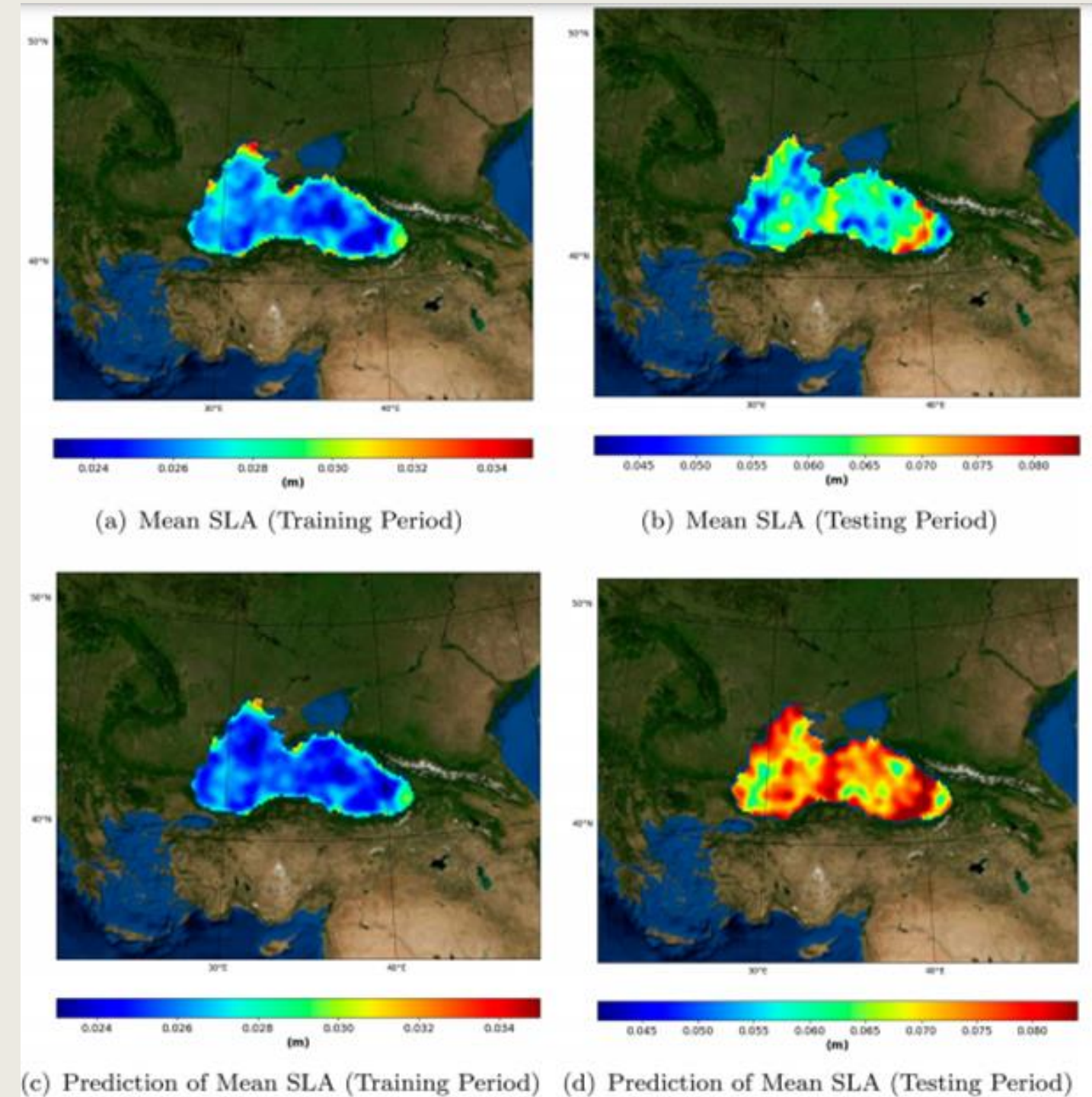
## Results/ Success stories / Good practices

**Achieved**
- Thetemporal dependencies of the sea level anomaly time series in the Black Sea are modelled with Archimedean copulas.
- Simulated data and observed data were compared to assess the performance of the copula-based prediction model.
- Ssalto/DUACS multi-mission altimeter product was used as the dataset (http://www.marine.copernicus.eu). DUACS provide along-track (L3) and gridded (L4) sea level products of two different types: near-real-time and delayed-time products.
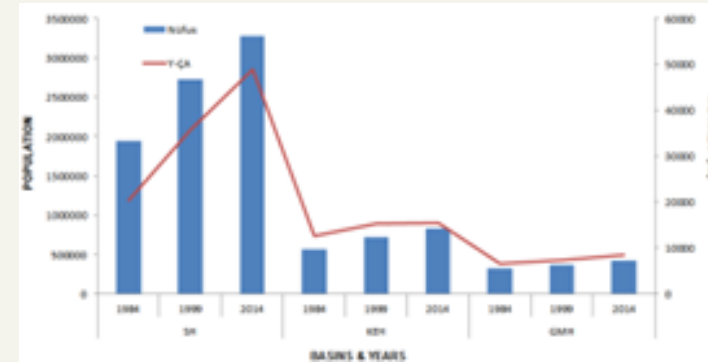
**Future plans**



(a) Mean SLA (Training Period) (b) Mean SLA (Testing Period)

(c) Prediction of Mean SLA (Training Period) (d) Prediction of Mean SLA (Testing Period)

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**Team :** Melis INALPULAT, Canakkale Onsekiz Mart University, Department of Agricultural Structures and Irrigation Canakkale, Turkey, melisinalpulat@gmail.com

## Topic 1:

Agricultural Land (AL) Change in North-West Anatolia Part of Turkey

Objectives: The main objectives of the study were determination the relations between district-level agricultural land and population relations, and forecasting the future status in terms of distribution of the Als and Landscape Metrics within three basins

## Team:

- Dr. Melis INALPULAT, Canakkale Onsekiz Mart University, Department of Agricultural Structures and Irrigation, Canakkale, Turkey
- Levent GENC, Canakkale Onsekiz Mart University, Department of Urban and Regional Planning, Canakkale, Turkey

## Provide an illustration or map of relevance to you r top 1-2 topics

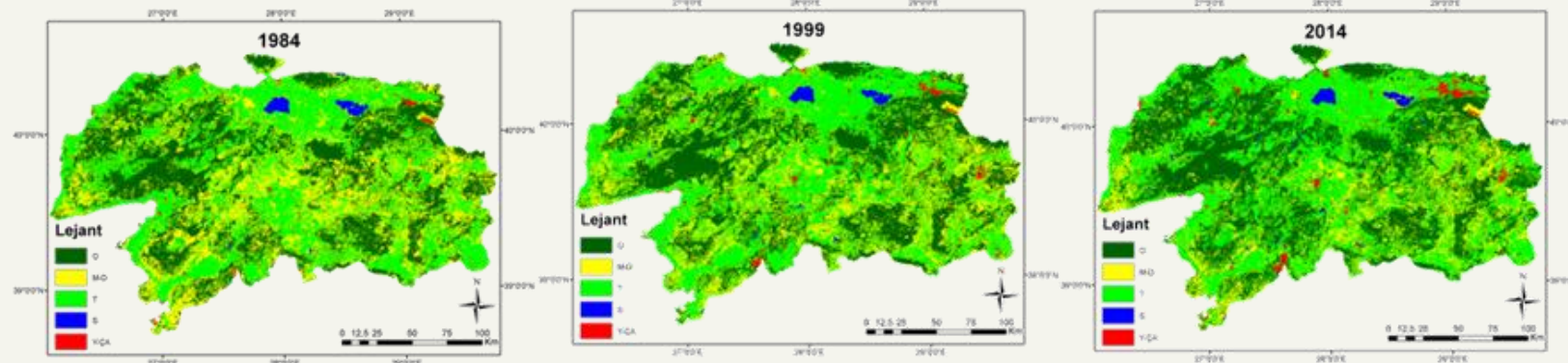## Results/ Success stories / Good practices

**Achieved**



- Visual manifestation of historical change
- Potential future statuses were displayed
- Hotspots were determined
- More land fragmentation and lower patch sizes were
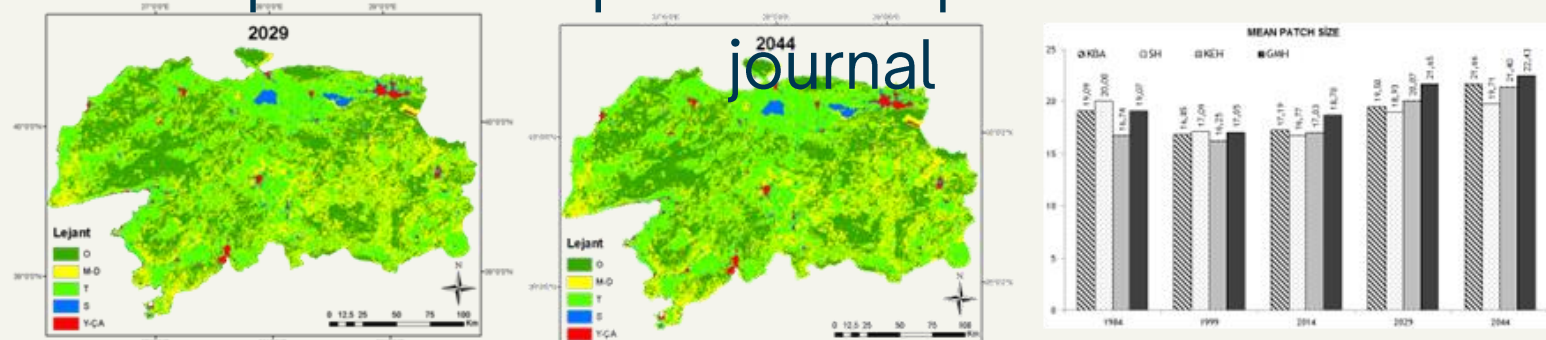
expected to eventuate in the Susurluk basin.



- Paper is accepted to be published in SCI-E journal



**Future plans**

- The changes in the determined hotspots are monitoring more precisely in ongoing studies especially in the frames of forest cover change and urbanization point of view

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**Country: Turkey**
**Team :** Melis INALPULAT, Canakkale Onsekiz Mart University, Department of Agricultural Structures and Irrigation Canakkale, Turkey, melisinalpulat@gmail.com

Topic 1The 1915 Çanakkale Bridge is a suspension bridge located between the districts of Lapseki and Gelibolu in Çanakkale. It is the first bridge over the Çanakkale Strait and the fifth suspension bridge in the Marmara Region. The bridge, which is part of the Malkara-Çanakkale Highway, was opened on March 18, 2022. Wikipedia

Address: Çanakkale Strait, 17000 Gelibolu/Çanakkale

Crosses: Çanakkale Strait

Total length: 4,608 m

Opening date: March 18, 2022

Location: Çanakkale

Height above water: 70 m

Team:

Levent GENC, Canakkale Onsekiz Mart University, Department of Urban and Regional Planning, Canakkale, Turkey

Assist. Prof. Dr. Sait Can YUCEBAS, Canakkale Onsekiz Mart University, Department of Computer Engineering, Canakkale Turkey

Dr. Melis INALPULAT, Canakkale Onsekiz Mart University, Department of Agricultural Structures and Irrigation, Canakkale, Turkey

Eda ASCI (Ms. Student), Canakkale Onsekiz Mart University, Geographic Information Technologies Canakkale, Turkey

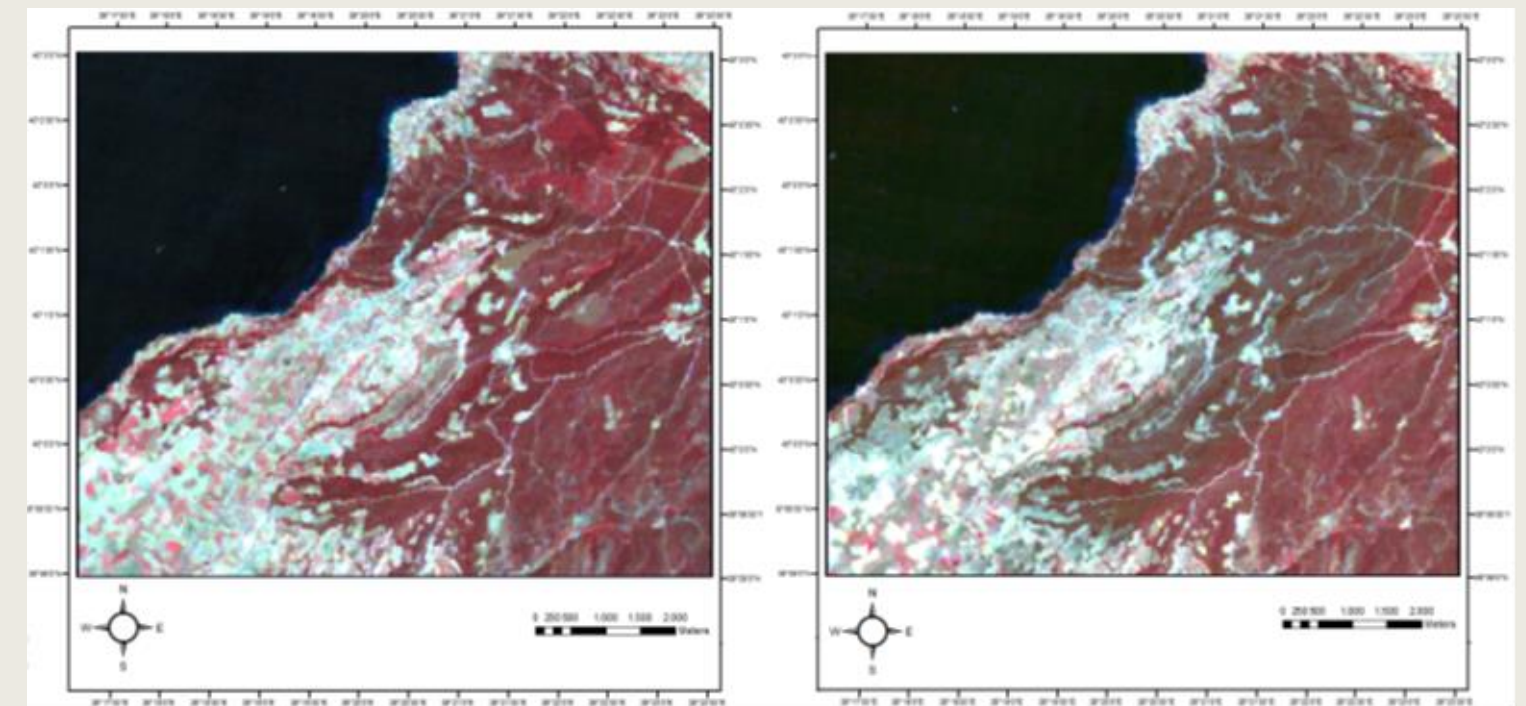**Provide an illustration or map of relevance to you r top 1-2 topics**

**Objectives:**

In the past 10 years, a large number of fires have occurred in Turkey,
especially starting in the summer months, and every day is seen as a potential suitable day for a fire to break out.

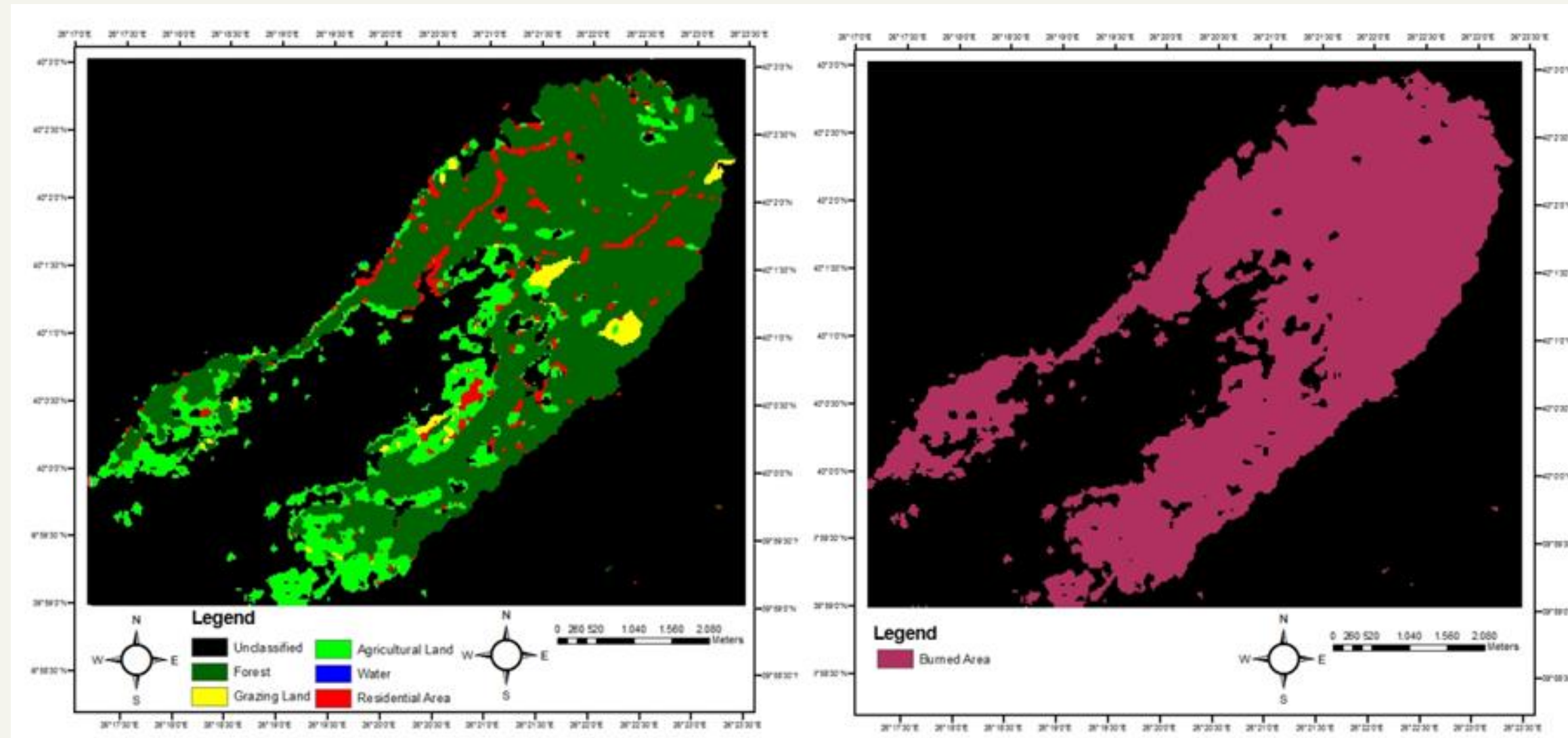**Provide an illustration or map of relevance to you r top 1-2 topics**

**Results/ Success stories / Good practices**

**Achieved**
- Pre-Post Fire status and burnt area of (ha) different LULC types within the fire zone
- Survey studies are conducted for rehabilitated

**Agriculture-Irrigation-Immigrate**

- Due to the climate crisis and regional applications, decreases in agricultural production have begun.
- There is a shortage of local workers to work in agricultural production throughout Turkey.
- Therefore, there is a need for projects to evaluate the advantages and disadvantages of migrants working in agricultural production in terms of socio-economic and land use