Remote sensing applications promotion in the Georgian National Environmental Agency
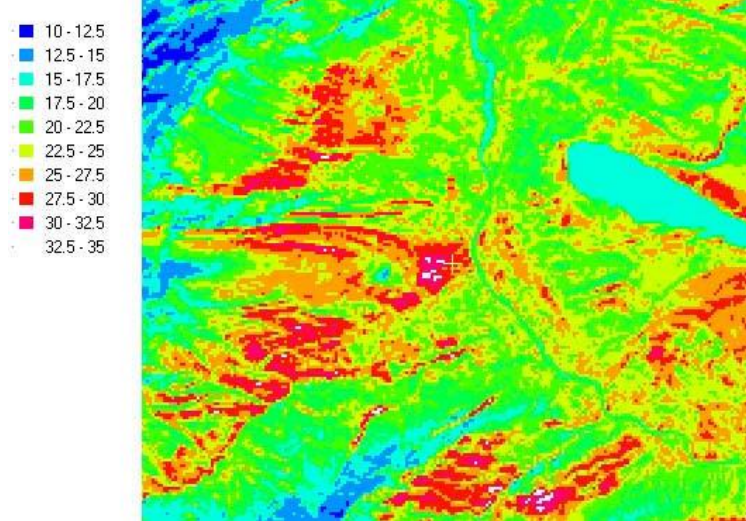
E.Nikolaeva

NATIONAL ENVIRONMENTAL AGENCY

Outline

1. About me

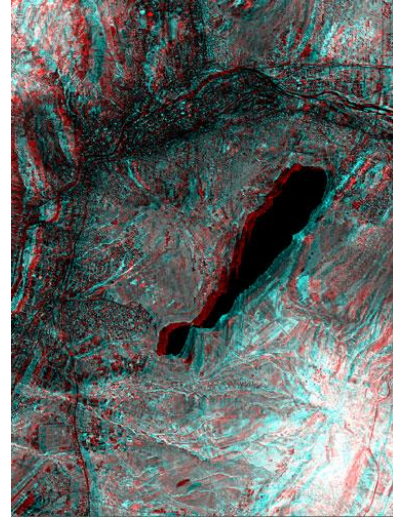2. National Environmental Agency (NEA)

3. Remote Sensing (RS) in NEA
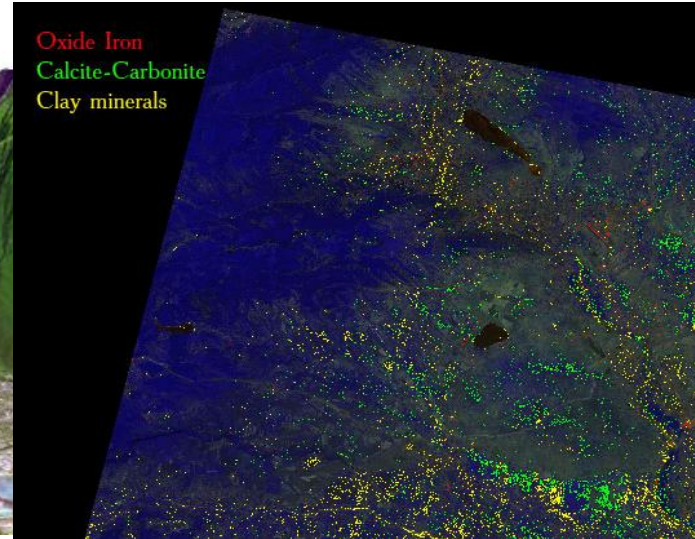
About me
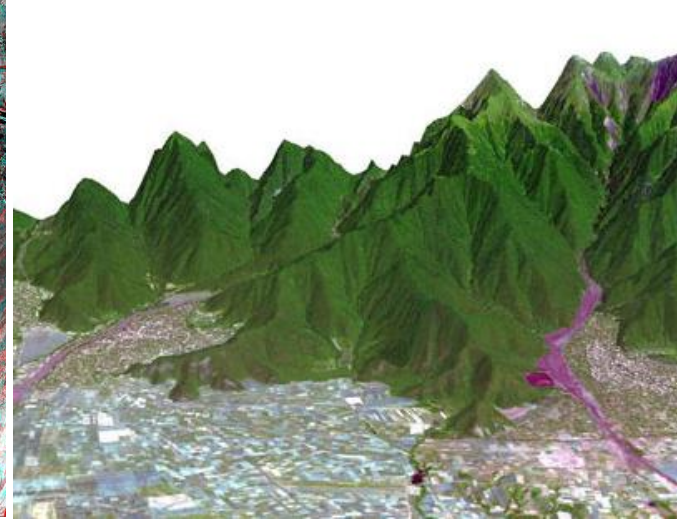
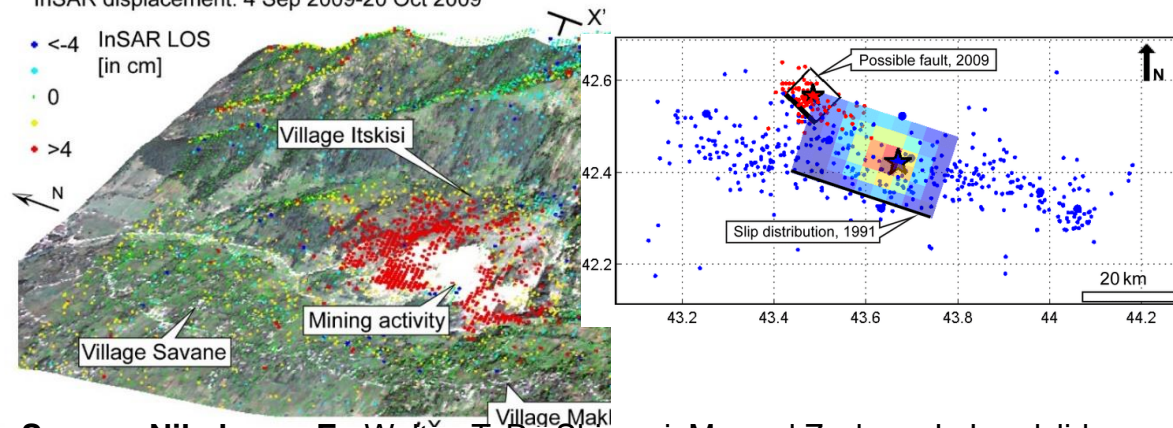**Brightness Temperature from ASTER**


Stereo from ASTER

3D from ASTER DEM

Source: Gamkrelidze I.P. , Tsamalashvili T**., Nikolaeva E.**, …, 2008, Tbilisi fault and seismic activity of Tbilisi environs (Georgia), Djanelidze Institute of Geology

Sclerophyll (square) – Coniferous (circle) – Wood-shrub (starts)

Source: Nikolaeva, E., Walter, T. R., Shirzaei, M., and Zschau, J.: Landslide observation and volume estimation in central Georgia based on L-band InSAR, Nat. Hazards Earth Syst. Sci., 14, 675-688, doi:10.5194/nhess-14-675-2014, 2014.
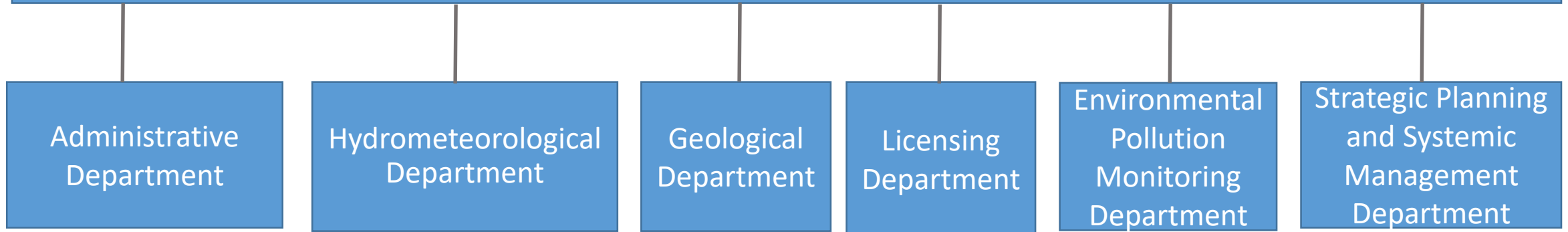
NEA
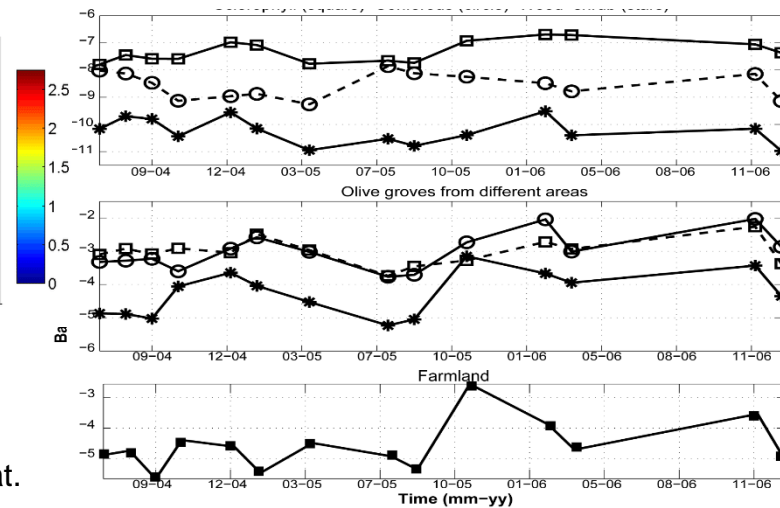
Georgian National Environmental Agency
is a legal entity of the public law under the Ministry of Environment and Natural Resources Protection of Georgia, which was set up as an Agency on June 31 of 2008. The Agency is independent from the public governance bodies, which implements its activities independently, but is subject to control from the state.

Administrative Department	Hydrometeorological Department	Geological Department	Licensing Department	Environmental Pollution Monitoring Department	Strategic Planning and Systemic Management Department

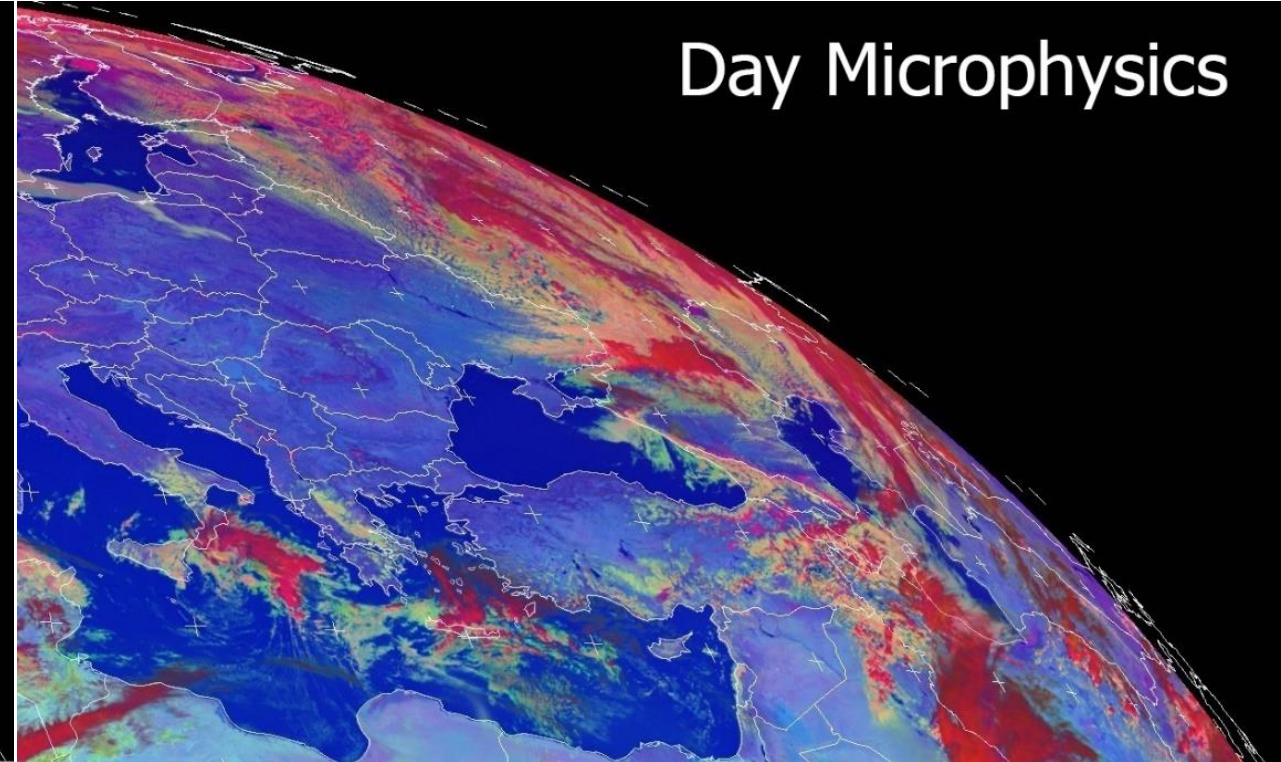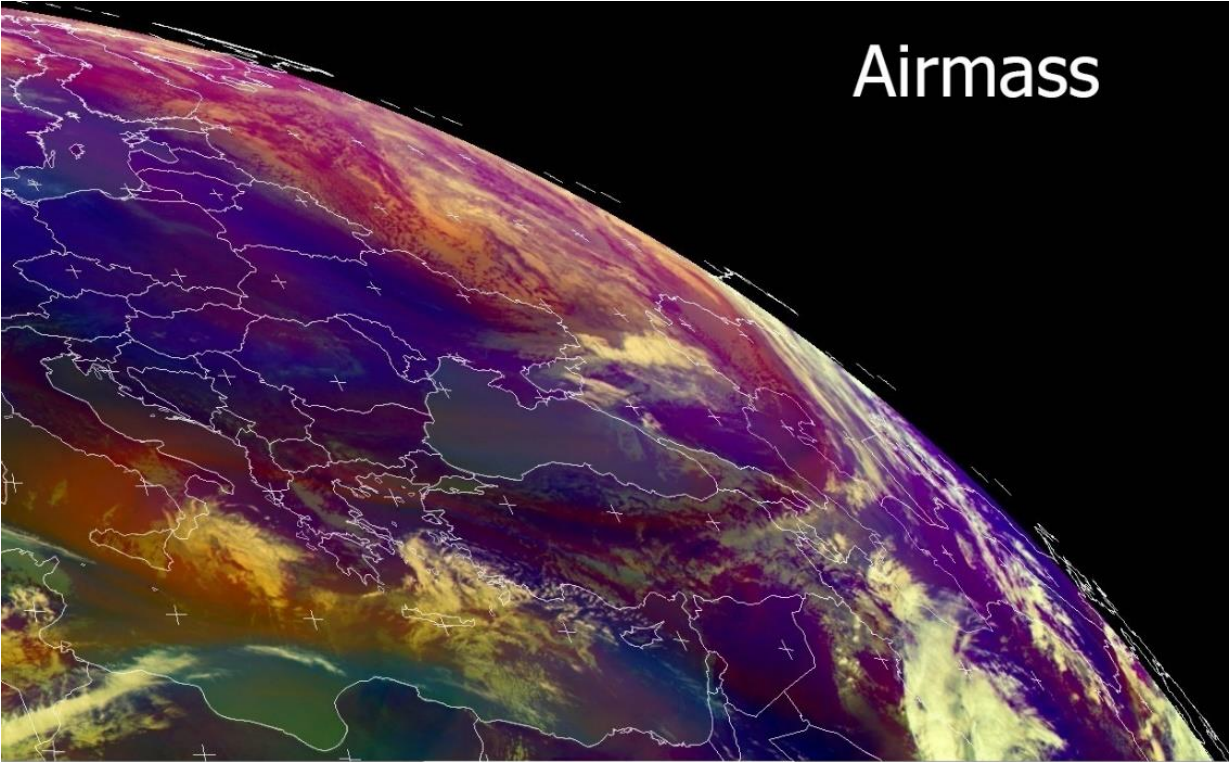Source: www.nea.gov.ge

RS in NEA
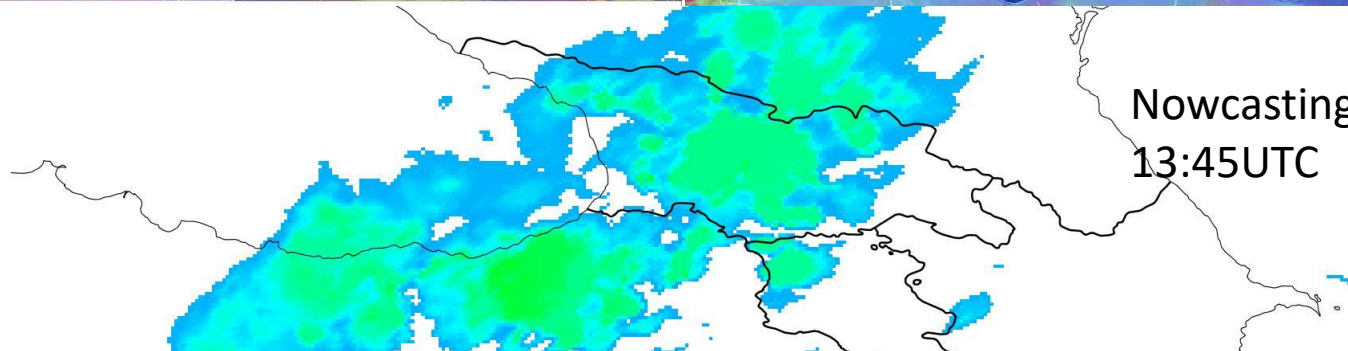
- Meteorology

Airmass

Day Microphysics

EUMETSAT
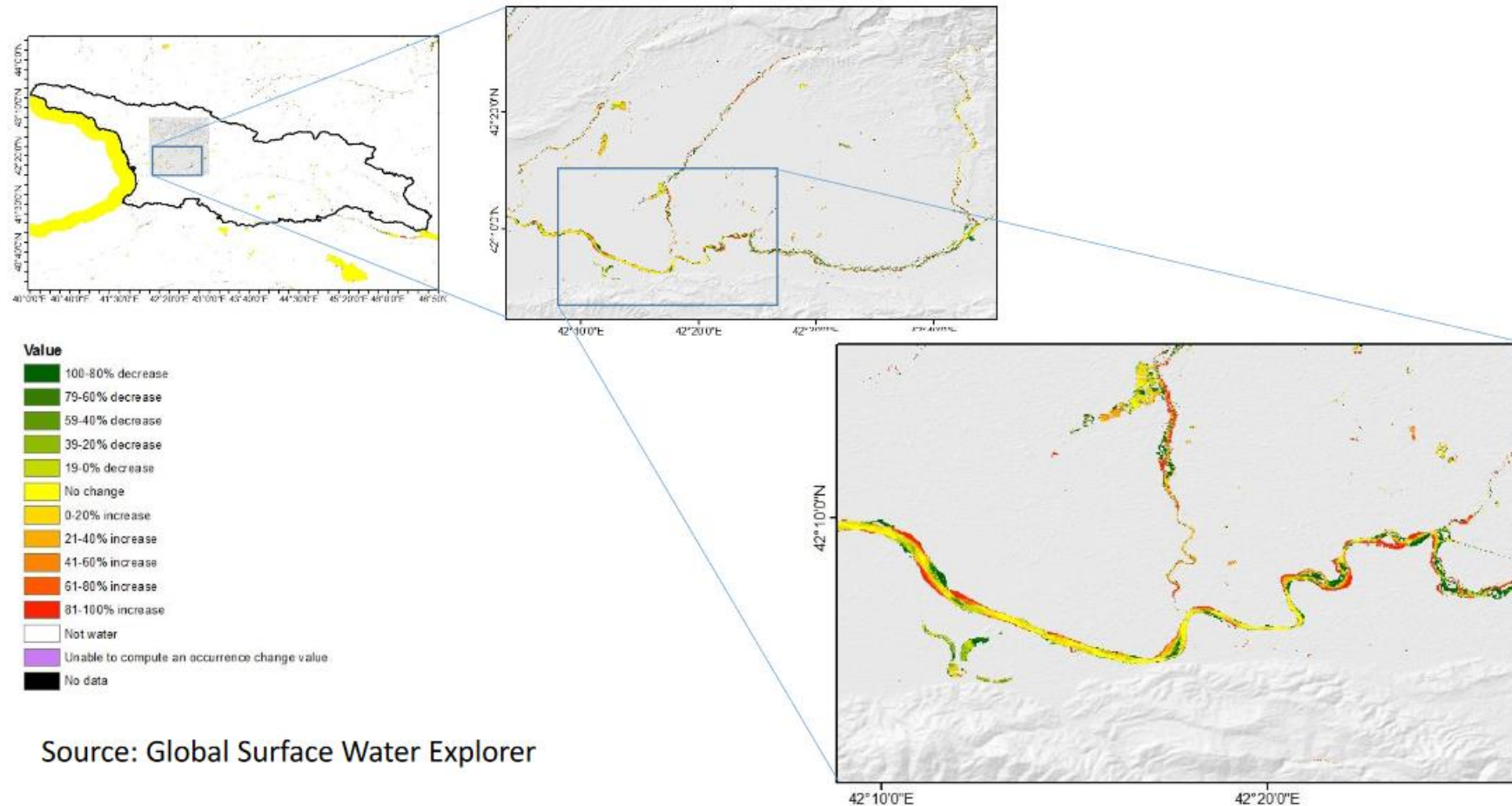
Meteosat 0deg Microphysics, 2017-03-28 11:00:00 UTC

Nowcasting
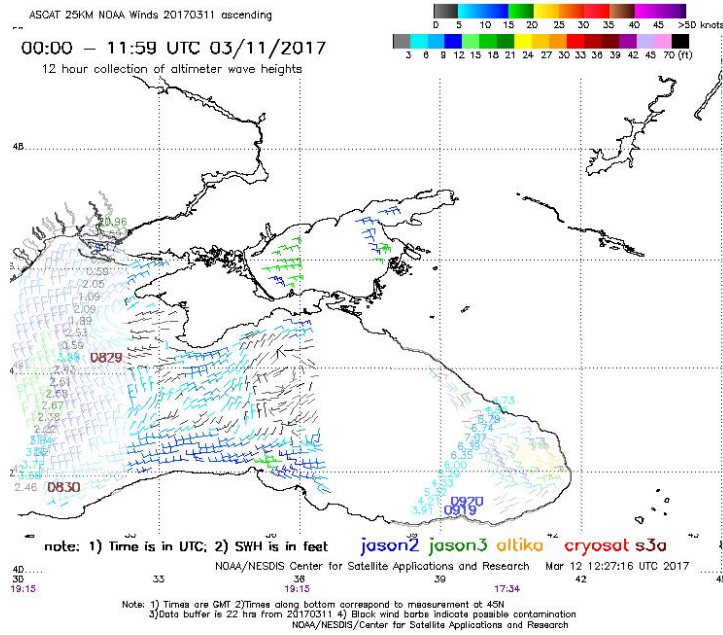13:45UTC

RS in NEA

- Water resources change

Water Occurrence Change Intensity map (1984-1999 & 2000-2015) based on satellite Landsat imagery (30m resolution)
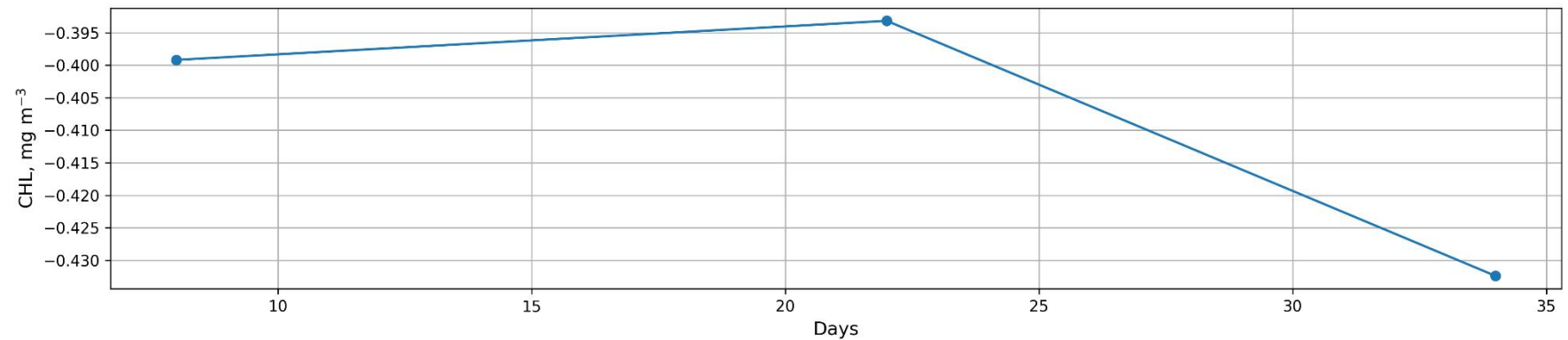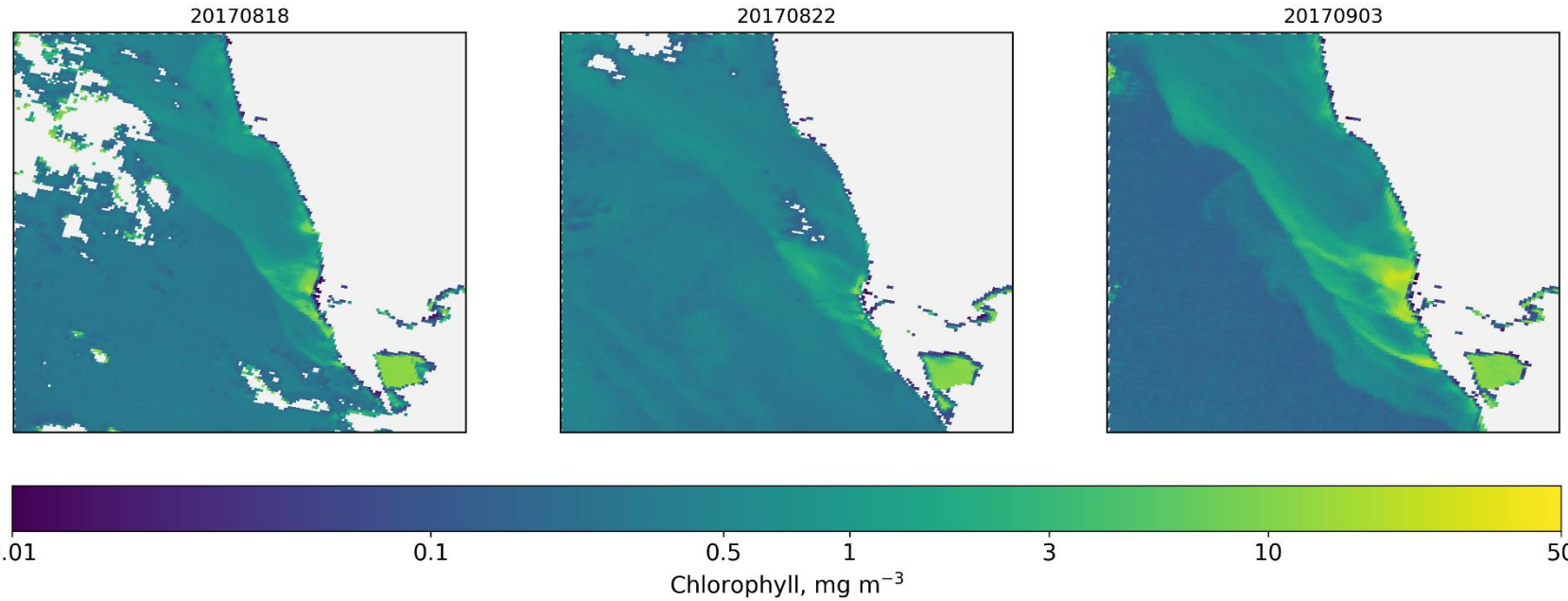

Value
- 100-80% decrease
- 79-60% decrease
- 59-40% decrease
- 39-20% decrease
- 19-0% decrease
- No change
- 0-20% increase
- 21-40% increase
- 41-60% increase
- 61-80% increase
- 81-100% increase
- Not water
- Unable to compute an occurrence change value
- No data

Source: Global Surface Water Explorer

RS in NEA
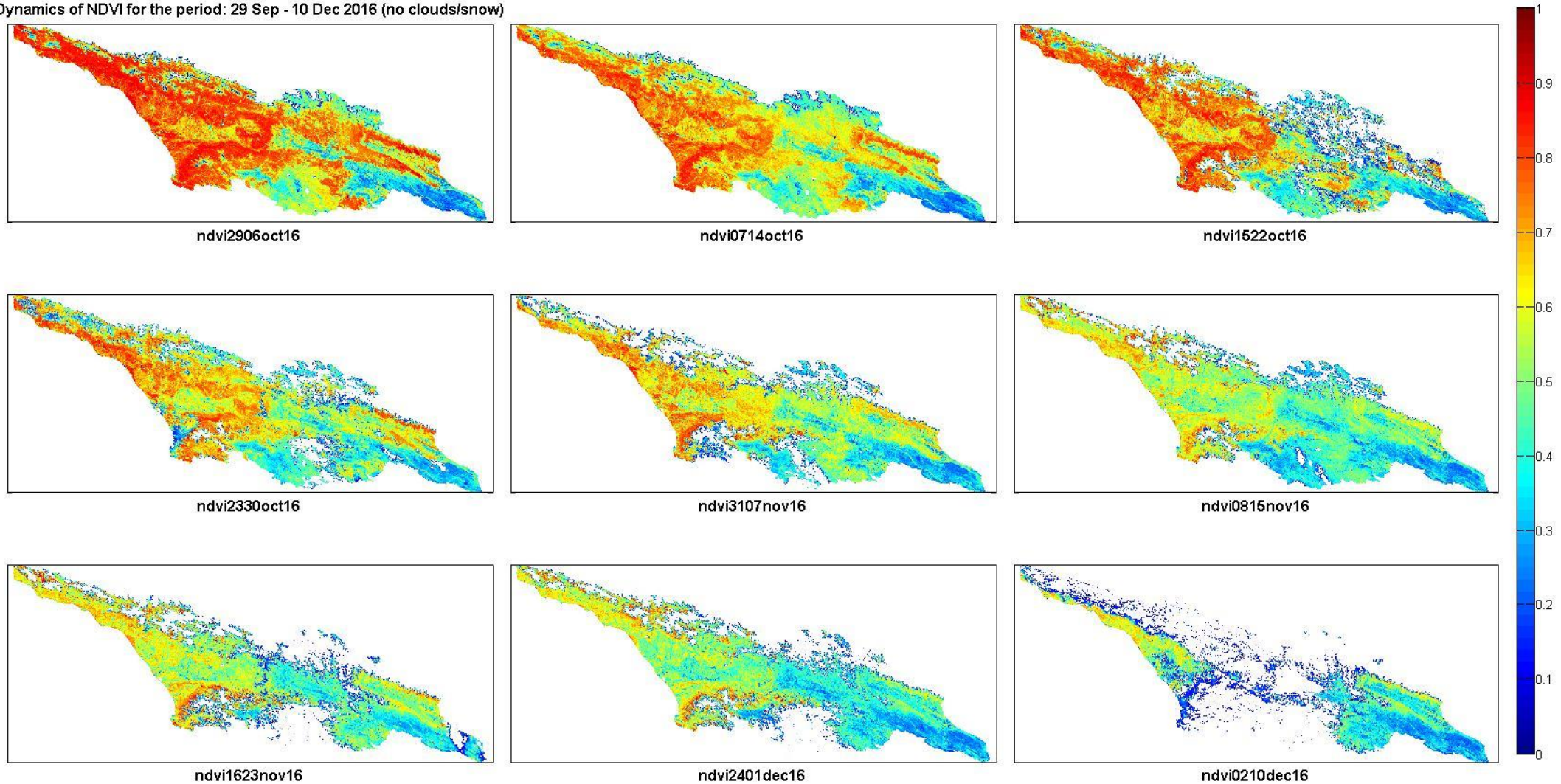
- ## Black Sea monitoring

OLCI [Chl a] mg m^{-3}

RS in NEA

- Agro-meteorology: short-term monitoring of NDVI (MODIS data)

Dynamics of NDVI for the period: 29 Sep - 10 Dec 2016 (no clouds/snow)

ndvi2906oct16   ndvi0714oct16   ndvi1522oct16

ndvi2330oct16   ndvi3107nov16   ndvi0815nov16
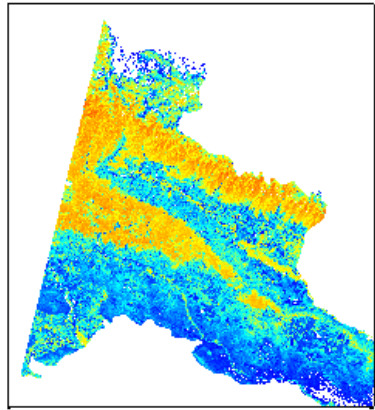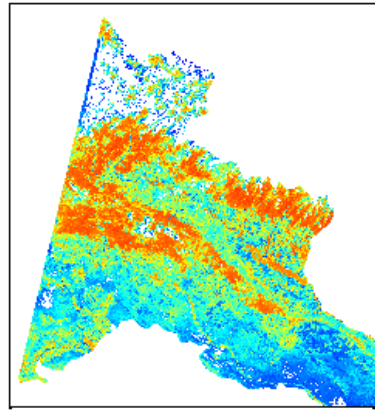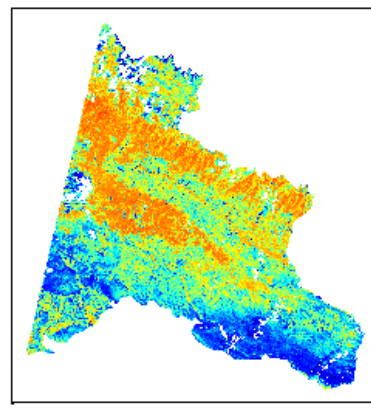
ndvi1623nov16   ndvi2401dec16   ndvi0210dec16

RS in NEA

- Agro-meteorology: long-term monitoring of NDVI (Landsat data)
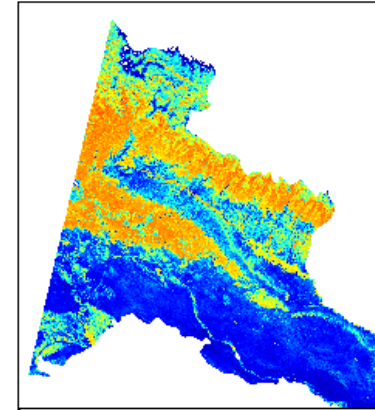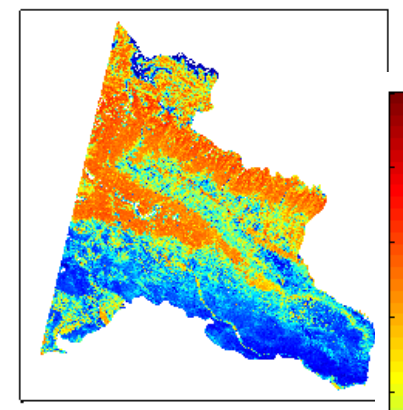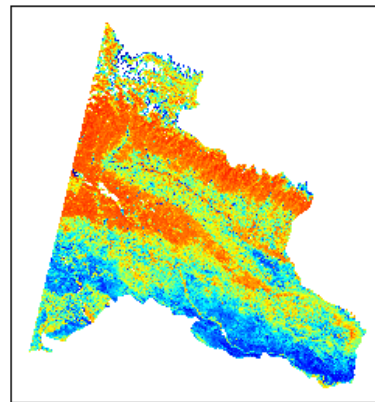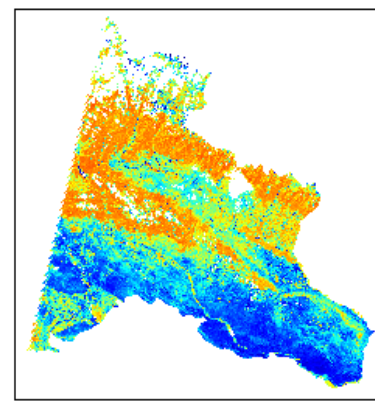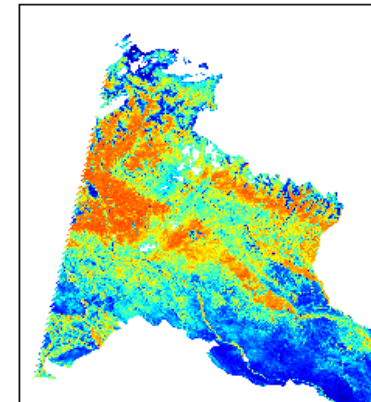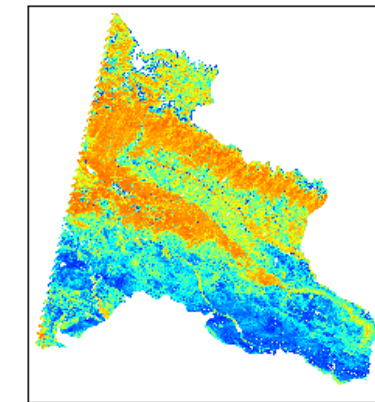
RS in NEA

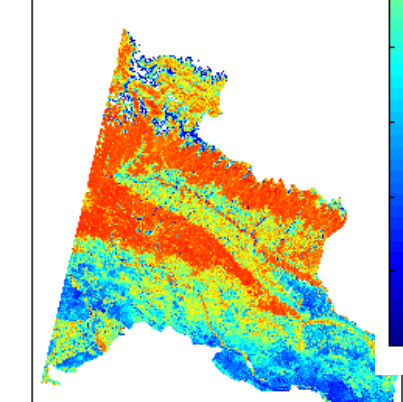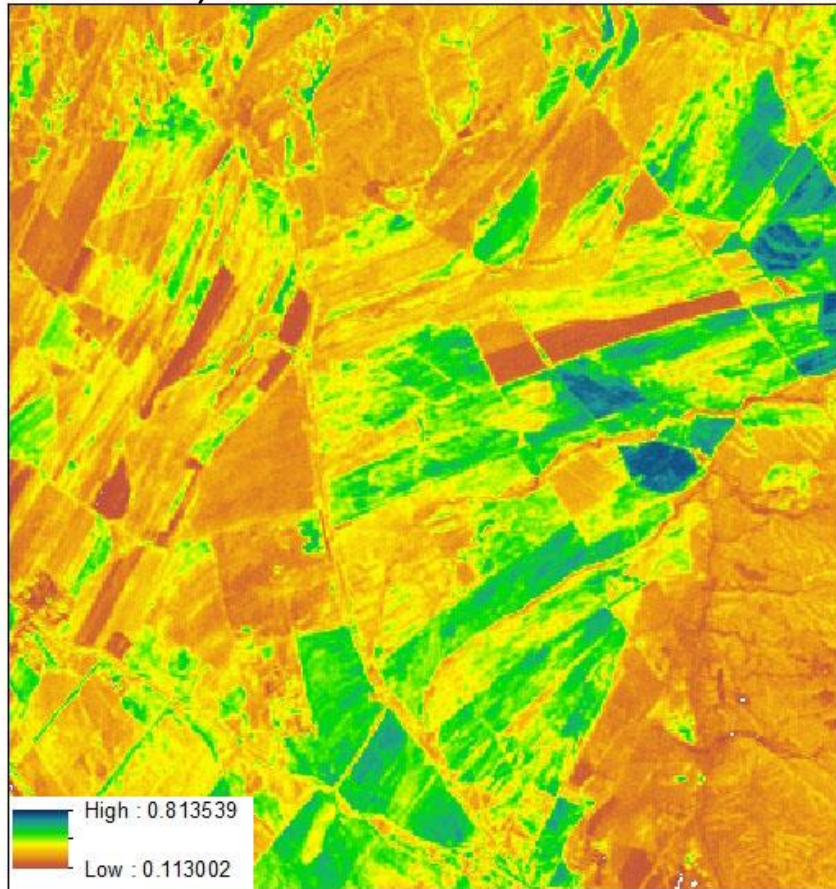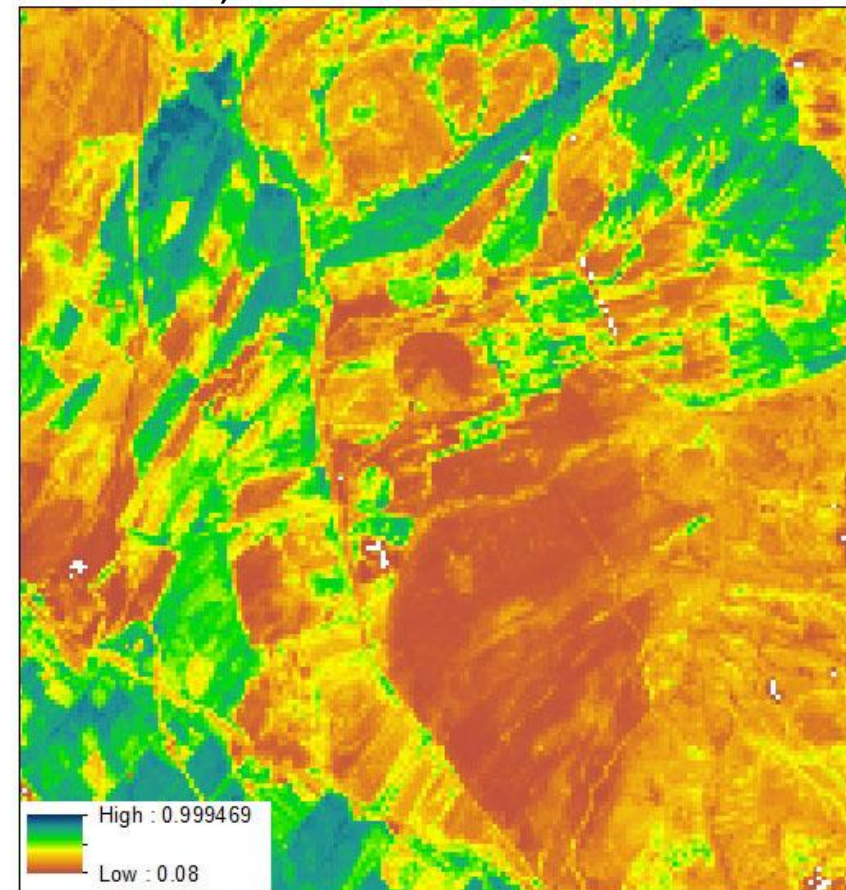- LULC changes: integration and combination of optical remote sensing data from different satellites: Landsat 5,7,8, Sentinel 2

Landsat 5, 1984.07.17

High : 0.813539
Low : 0.113002

Sentinel 2, 2016.06.26
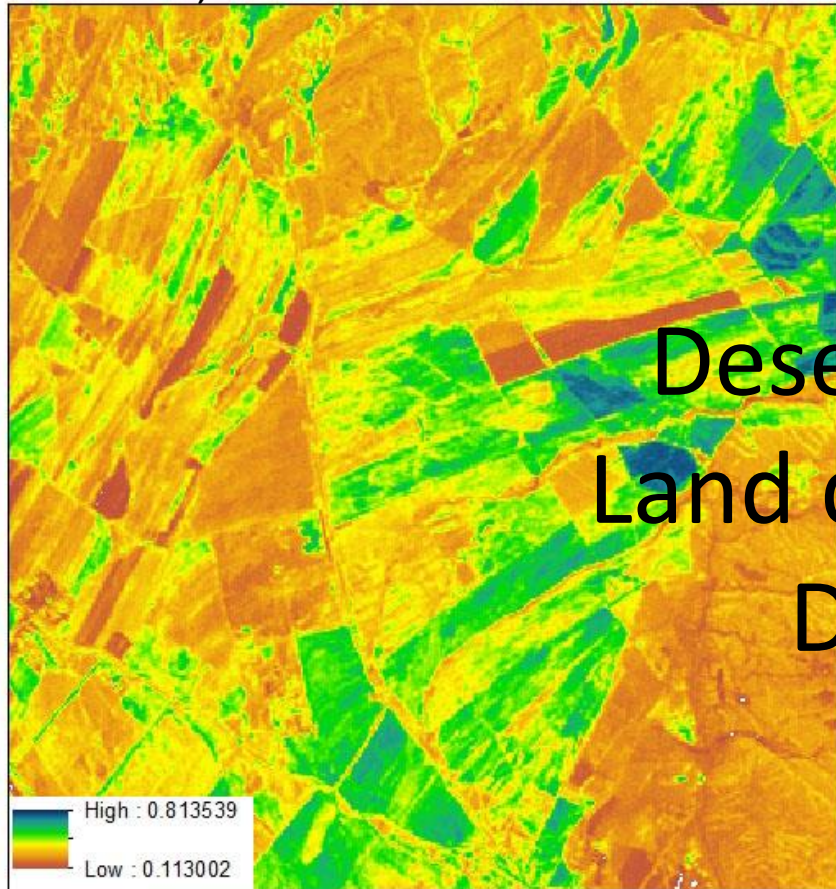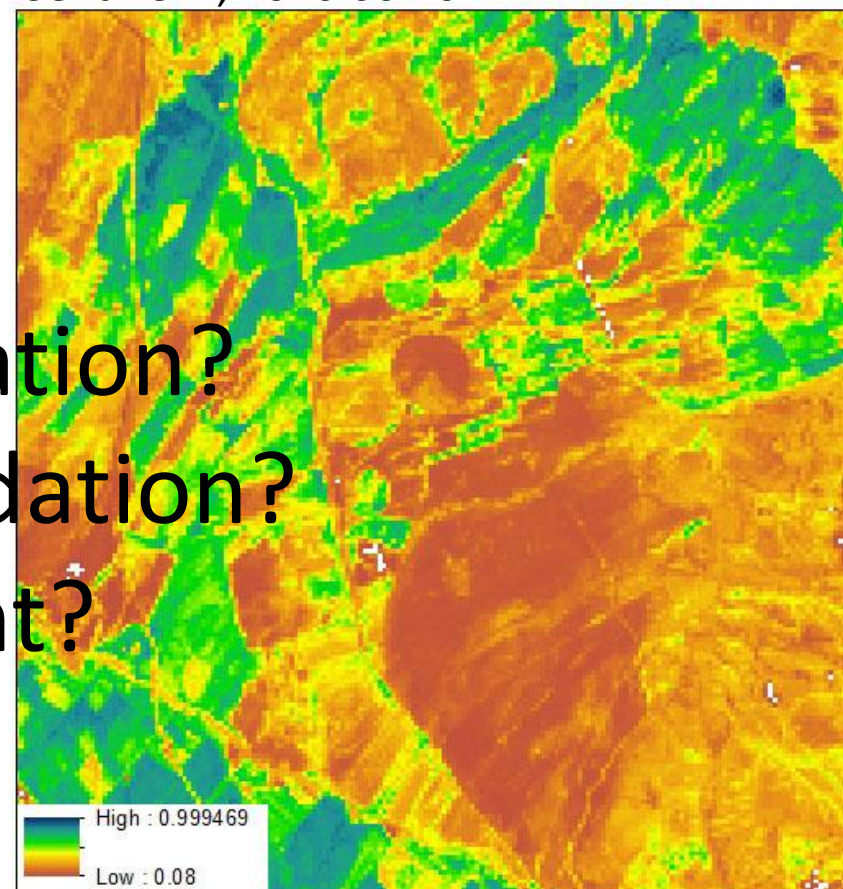

High : 0.999469
Low : 0.08

RS in NEA

- Change of LULC: integration and combination of optical remote sensing data from different satellites: Landsat 5,7,8, Sentinel 2
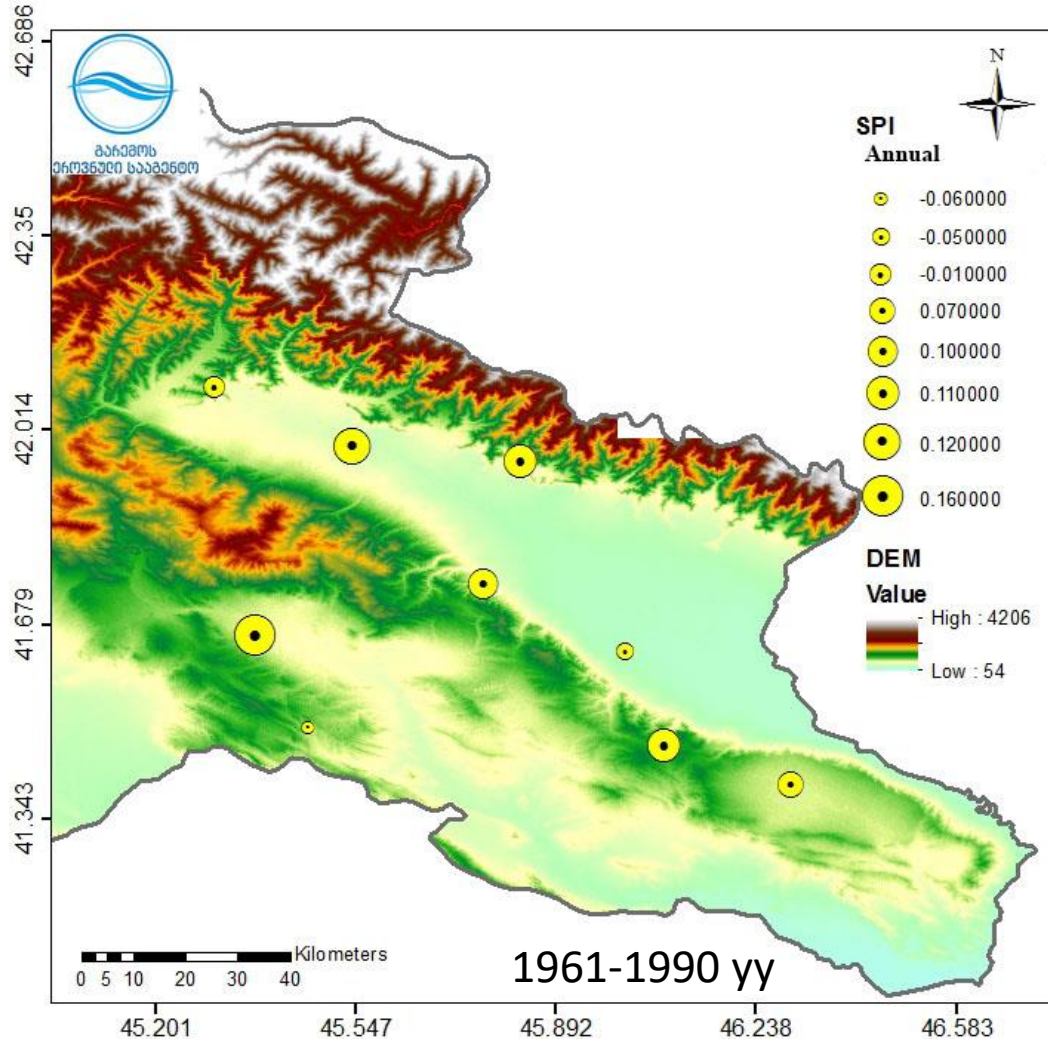
Landsat 5, 1984.07.17

Sentinel 2, 2016.06.26

Desertification?
Land degradation?
Drought?

High : 0.813539
Low : 0.113002

High : 0.999469
Low : 0.08

RS in NEA

- Drought Indices: Standardized Precipitation Index (SPI)

1961-1990 yy

SPI shows the actual precipitation compared to the probability of precipitation for various time frames.
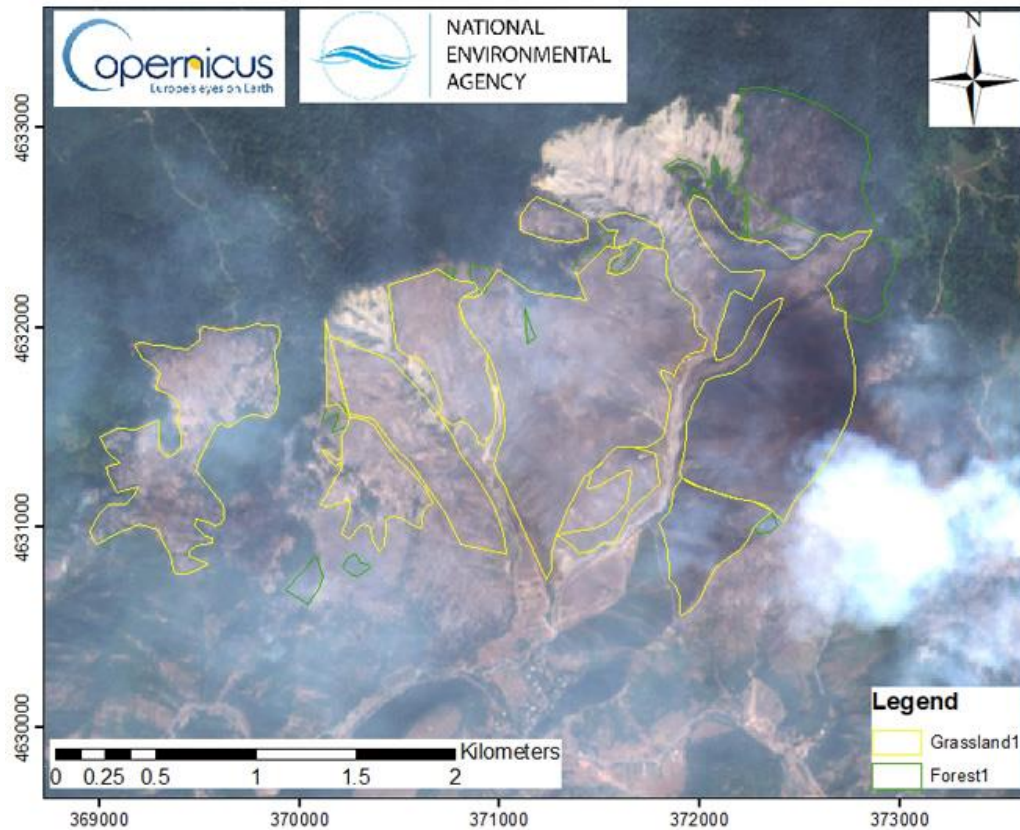
Next step:

-**Palmer Drought Severity Index (PDSI)** is a measurement of dryness based on recent precipitation and temperature.

RS in NEA

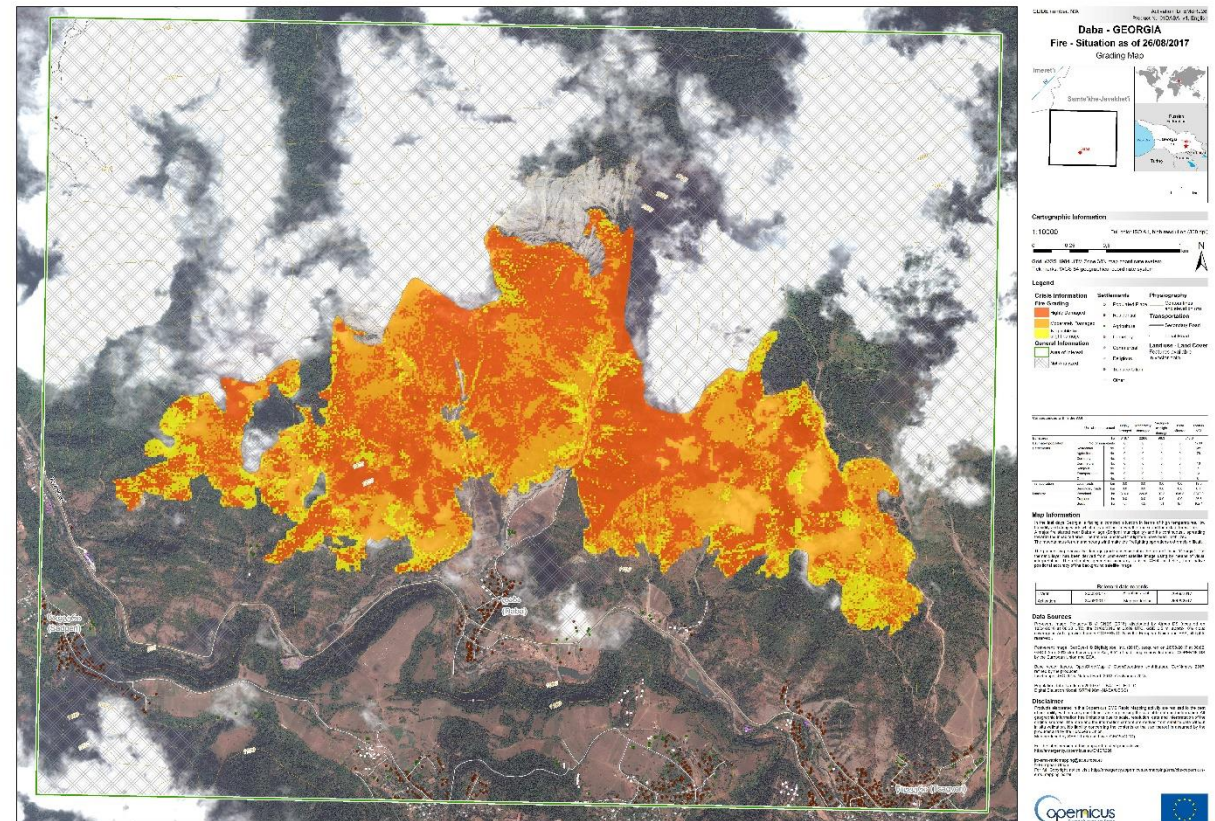- LULC changes: estimation of burned area

Rough estimation of burned area in Borjomi using Sentinel-2 images

Data used:
- Background image: Sentinel-2, 23 Aug 2017 (source: Copernicus)

Sum area of grassland: 351 ha
Sum area of forest: ~63.3 ha
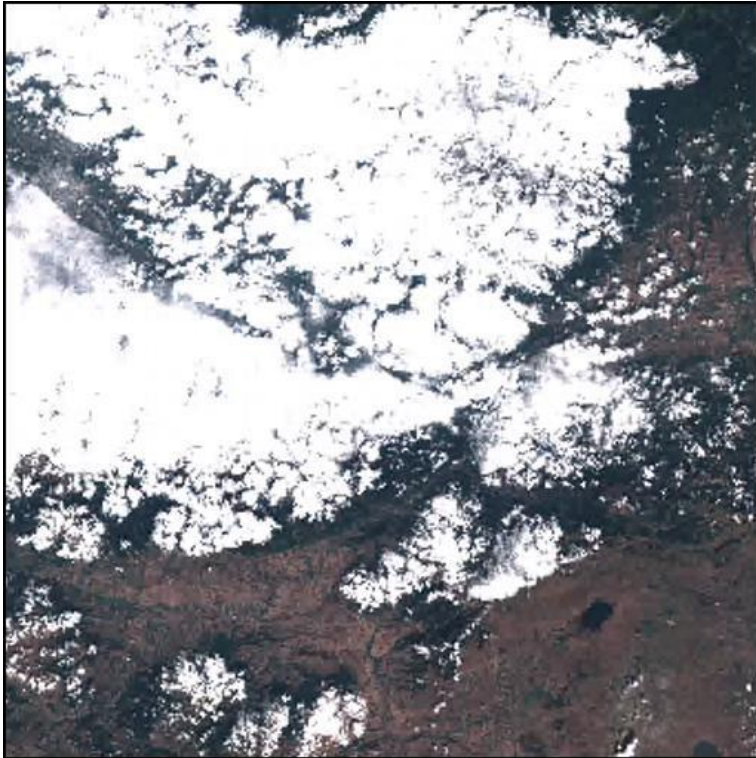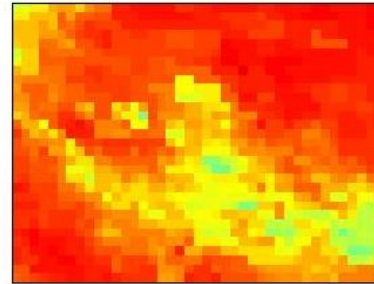

Activation of Copernicus Emergency Management Service

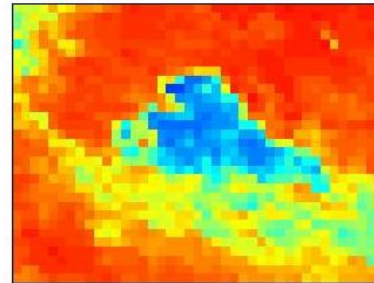# RS in NEA

- Estimation of burned area

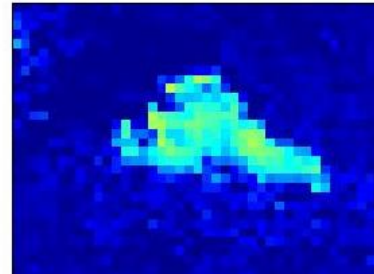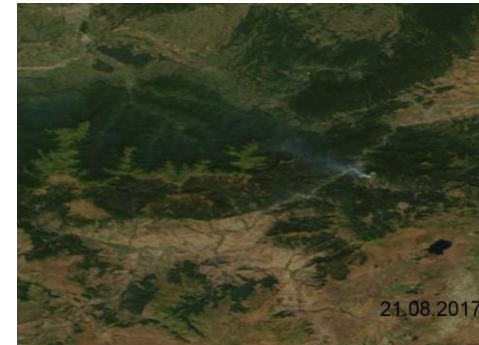Sentinel 2, 2017.09.02

MODIS data

NDVI: 13-20 Aug 2017

NDVI: 21-28 Aug 2017

Sentinel 3

21.08.2017
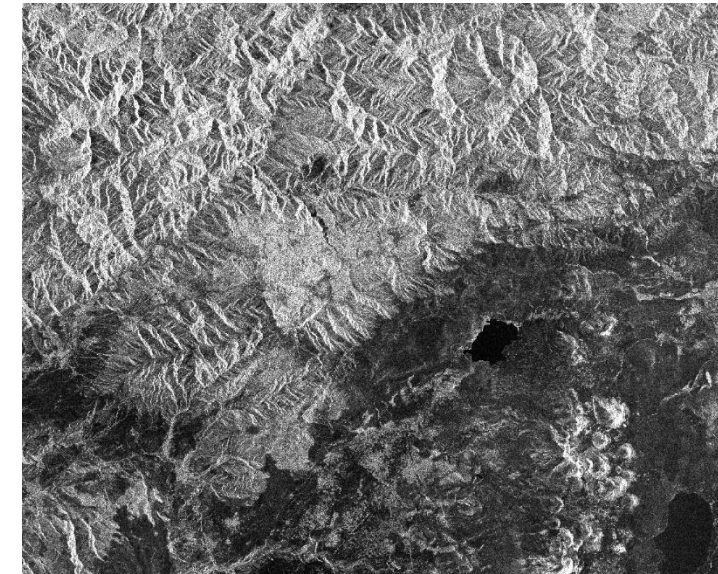

22.08.2017

23.08.2017

Sentinel 1, 2017.08.31

NATIONAL ENVIRONMENTAL AGENCY

elenanikolaeva@hotmail.com
Mobile: +995 593 530519

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Thank you!