

Anomaly hotSpots of Agricultural Production (ASAP)

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16 June 2023, Geneva, Switzerland

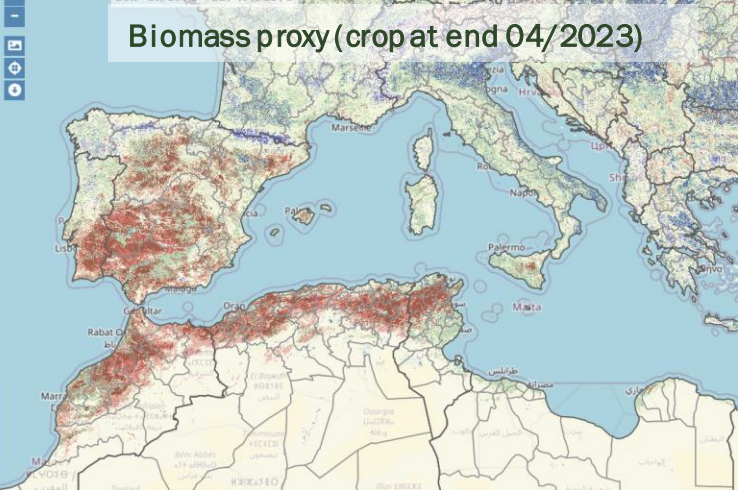
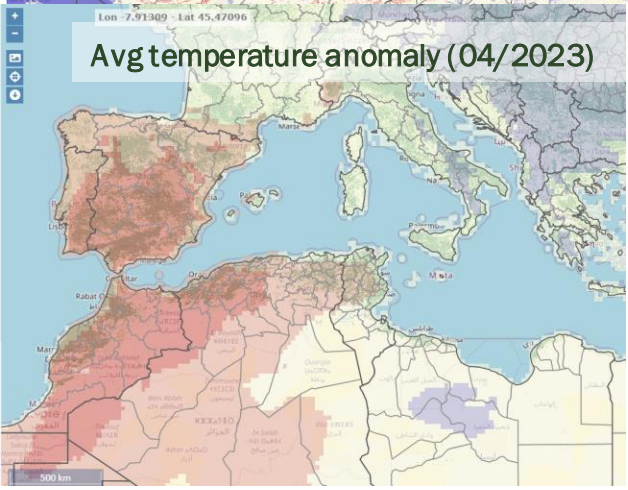
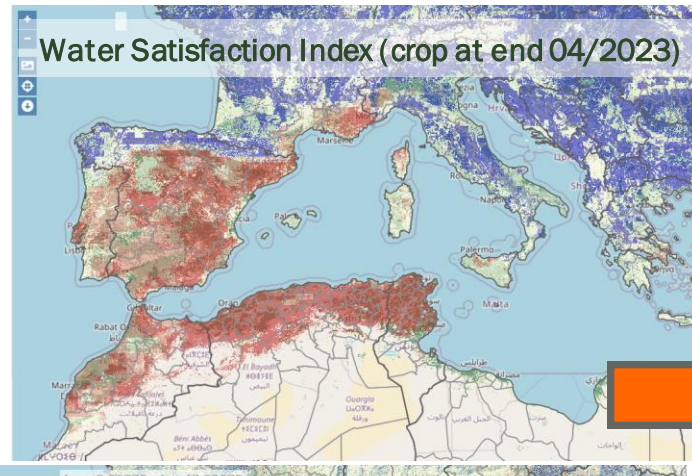
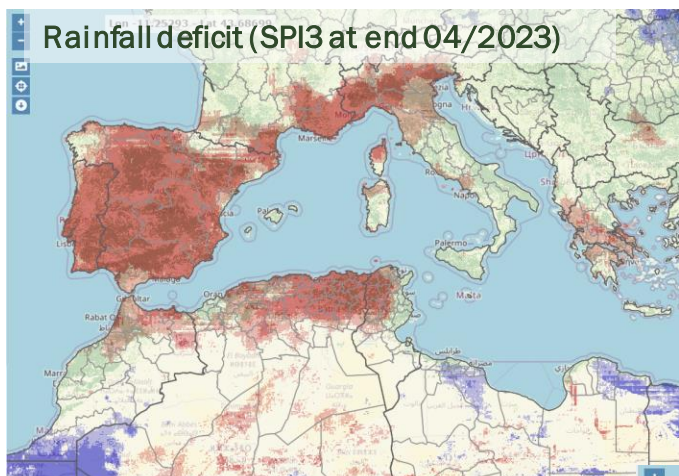
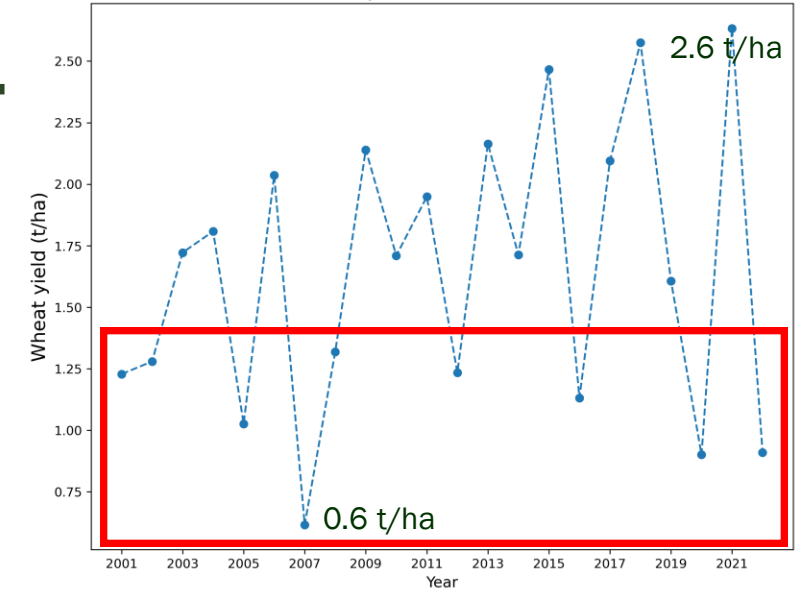
GEO Open Data Knowledge Workshop

ASAP, a global early warning system...

... to identify crop production deficits mainly due to drought using satellite and agro-meteo data

IP ON
IONS

Evolution of wheat yield for Morocco over 2001 - 2022



No. 82 – May 2023 www.cropmonitor.org **GOGLAM** Global Agriculture Monitoring

GEOGLAM E04EW

Overview:
In East Africa, conditions have improved for dry season cereals in Ethiopia due to enhanced rains. In the south, planting of main season cereals continues under mixed conditions due to ongoing dryness in some areas with improvement in central Kenya. Mixed rainfall conditions are forecast during May to September (See Regional Outlook Fig. 6). In West Africa, planting of main season cereals is underway in the south of the subregion while harvesting of second season rice is nearing completion in the north, and conditions are generally favourable except in conflict-affected areas. In the Middle East and North Africa, wheat crops continue to develop under mixed conditions, and crops are unlikely to recover from persistent dryness in parts of Morocco, Algeria, Tunisia, Syria, and Iraq. In Southern Africa, harvesting of main season cereals is nearing completion under mixed conditions due to persisting dryness as well as the impacts of Tropical Cyclone Freddy in February and March. In Central and South Asia, there has been an improvement in winter wheat crop development from the previous month due to improved precipitation amounts, except in Turkmenistan, Uzbekistan, and parts of Afghanistan where concern remains for continuing dry conditions. Planting of spring wheat is now underway under favourable conditions. In Southeast Asia, harvesting of dry-season rice is nearing completion in the north while planting of dry-season rice is underway in Indonesia. Overall conditions are favourable, and crops in South Viet Nam have recovered from previous flood water presence. In Central America and the Caribbean, planting of *Prinera* season cereals is underway, and there is some concern due to dry and hot conditions that are forecast to continue in the coming months (See Regional Outlook Fig. 15).

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GO GROUP ON EARTH OBSERVATIONS
The Crop Monitor is a part of GEOGLAM, a GEO global initiative.

2023 GLOBAL REPORT ON FOOD CRISES
JOINT ANALYSIS FOR BETTER DECISIONS

FSIN Food Security Information Network
Joint analysis for better decisions

ASAP information levels

ASAP - Anomaly Hotspots of Agricultural Production

Home **Country Assessments** Seasonal Forecast Warning Explorer High Resolution Viewer Download Info

European Commission > EU Science HUB > ASAP > Country Assessments

Tunisia 1.) Country Assessment

Assessments

May 2023

Hotspot

Assessment archive

2.) Warning Explorer

3.) High Resolution Viewer

Information level	Information provided	Targeted audience
Country Assessment	Monthly summary for 81 food insecure countries	Decision makers, policy analysts
GAUL 1 region with the Warning Explorer	Explore meteo & RS (low resolution) indicators & automatic warnings at region level every 10 days	Agricultural analysts
Field level with High Resolution Viewer	Explore field level with 10m Sentinel imagery	Agricultural analysts with RS knowledge

+ Seasonal Forecast of rainfall (monthly timestep for next 6 months) at continental level

Info level 1: Hotspot analysis

Global overview

European Commission

EN English

ASAP - Anomaly Hotspots of Agricultural Production

Home Country Assessments Seasonal Forecast Warning Explorer High Resolution Viewer Download Info

European Commission > EU Science HUB > ASAP > Home

ASAP hotspot assessment May 2023 (updated on 2023-06-06)

Global overview May 2023

Summary per large region (e.g. East Africa, Southern Africa...)

04/07/2023

Monthly Country assessment

Tunisia

Country News Country Map

Assessments

May 2023

Hotspot

Analyst's summary

Tunisia is experiencing high likelihood of crop failure in northern inland and central regions. According to the [May MARS bulletin](#), wheat and barley yield forecasts are below the 5 year average by 19 and 30% respectively. Dry and hot March and April conditions have further deteriorated crop conditions in the center and also in the northern part of the country (with the exception of Bizerte). At the end of April, water balance and vegetation conditions over agricultural areas appear as some of the worst in the whole North Africa region. National level crop yield is expected to be clearly below the 5 years average with lowest forecasts for Barley (-23% of the 5 year average).

Assessment archive

Country Summary

Statistics

Warnings and indicator graphs

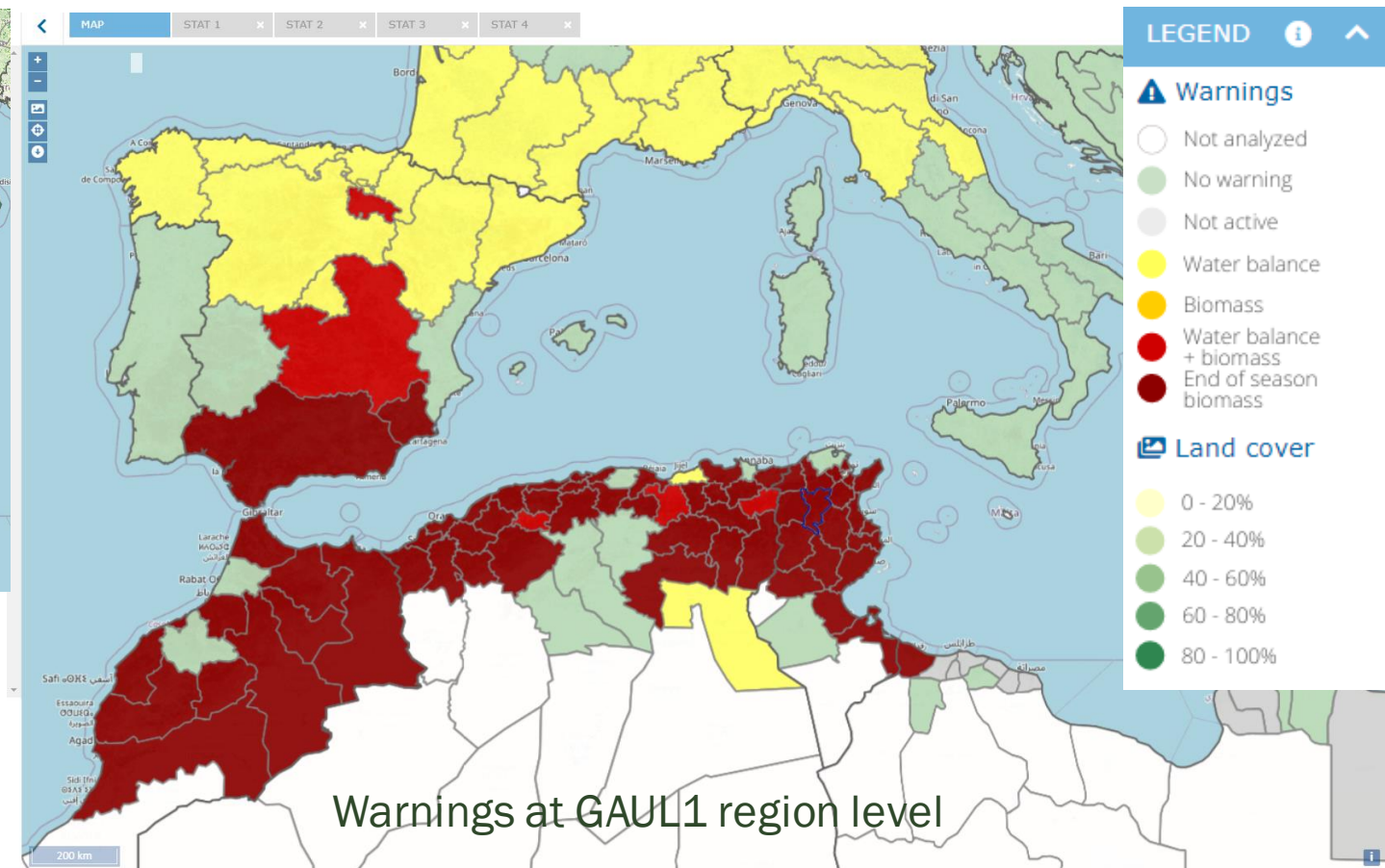
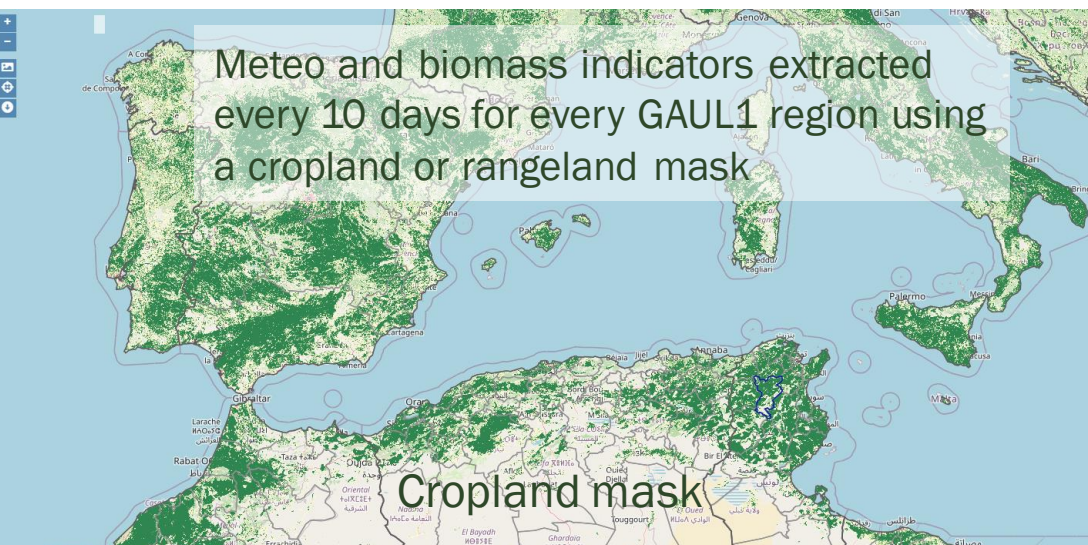
Date: 21-31/05/2023 (D15) Cover: Crop

Map of warnings (GAUL1 level)

Share of active area by zscore range per indicator

Info level 2: Warning Explorer

- Every 10 days, ASAP assigns warnings automatically to GAUL1 regions using indicators of biomass or water deficit (low resolution data - 1 km to 0.25 deg, non crop specific, mean phenology)



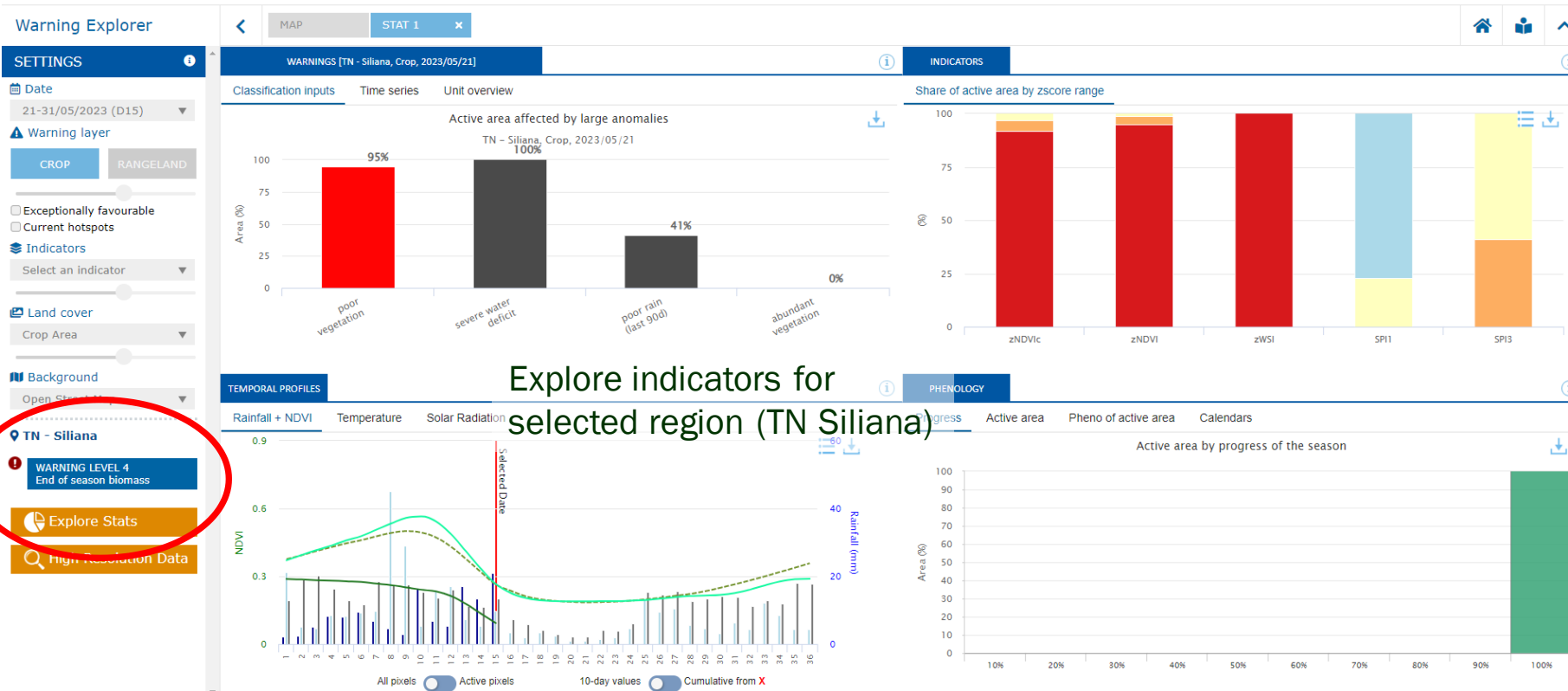
Classification rule	Indicator with CAF>25%	Phenological phase	
		Expansion, maturation	Senescence
<i>Water deficit possibly evolving into poor growth</i>			
Meteo-based	zWSI	1	-
	SPI3	-	-
	zWSI SPI3	1+	-
<i>Evidence of poor growth</i>			
NDVI-based	zNDVIc	2	4
<i>Poor growth & negative prospects</i>			
Meteo & NDVI	zWSI zNDVIc	3	4
	SPI3 zNDVIc	3	4
	zWSI SPI3 zNDVIc	3+	4

Info level 2: Warning Explorer

- Analyst can explore meteo & biomass indicators (for cropland or rangeland) of GAUL 1 regions to decide if the country should be classified as hotspot

ASAP - Anomaly Hotspots of Agricultural Production

European Commission > EU Science HUB > ASAP > Warning Explorer

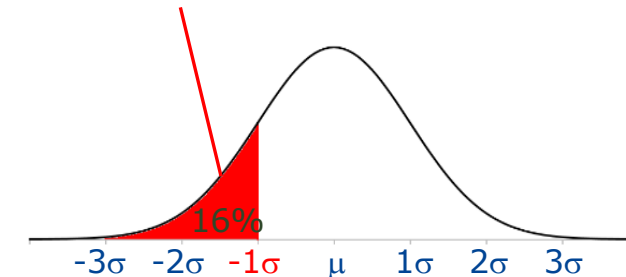


Warnings based on z-score

$$zX_t = \frac{X_t - \bar{X}_t}{\sigma_{X_t}}$$

with t time of observation
X: biomass proxy, water satisfaction index, 3-month rainfall

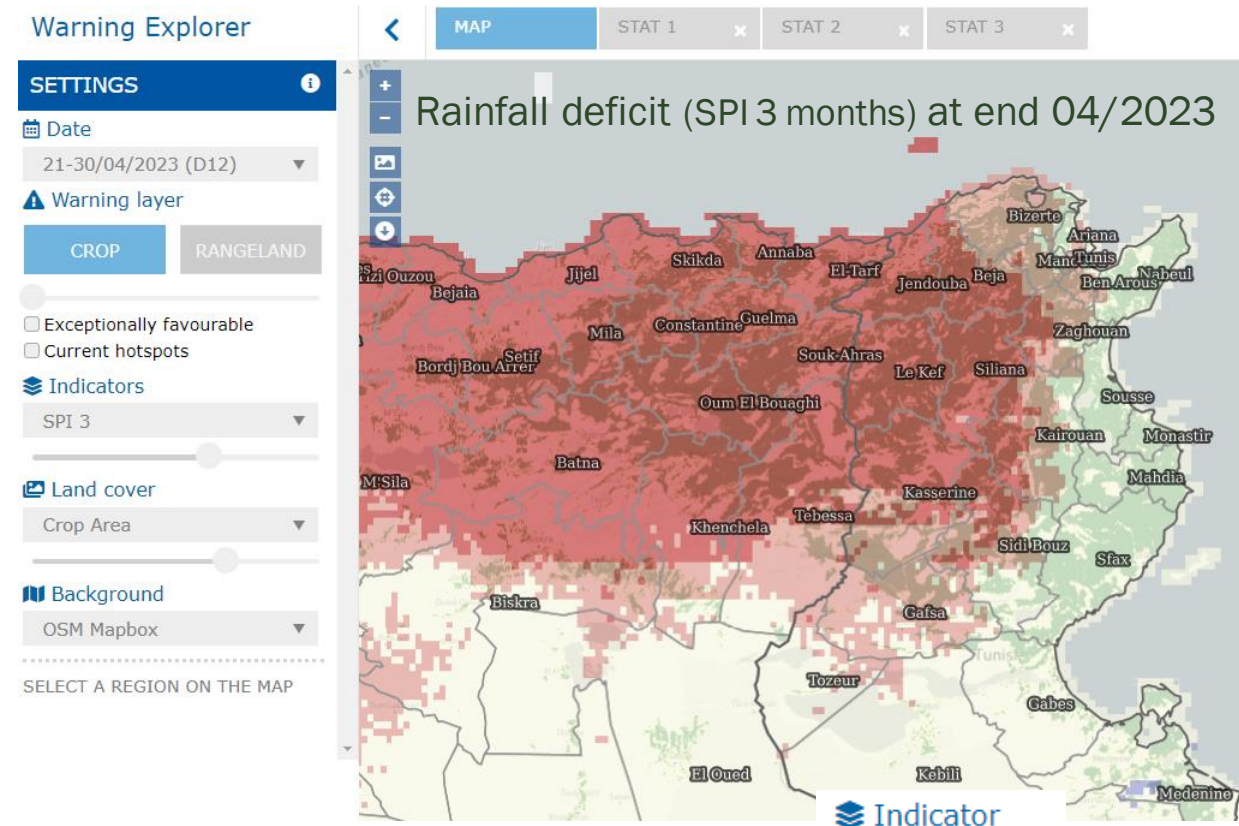
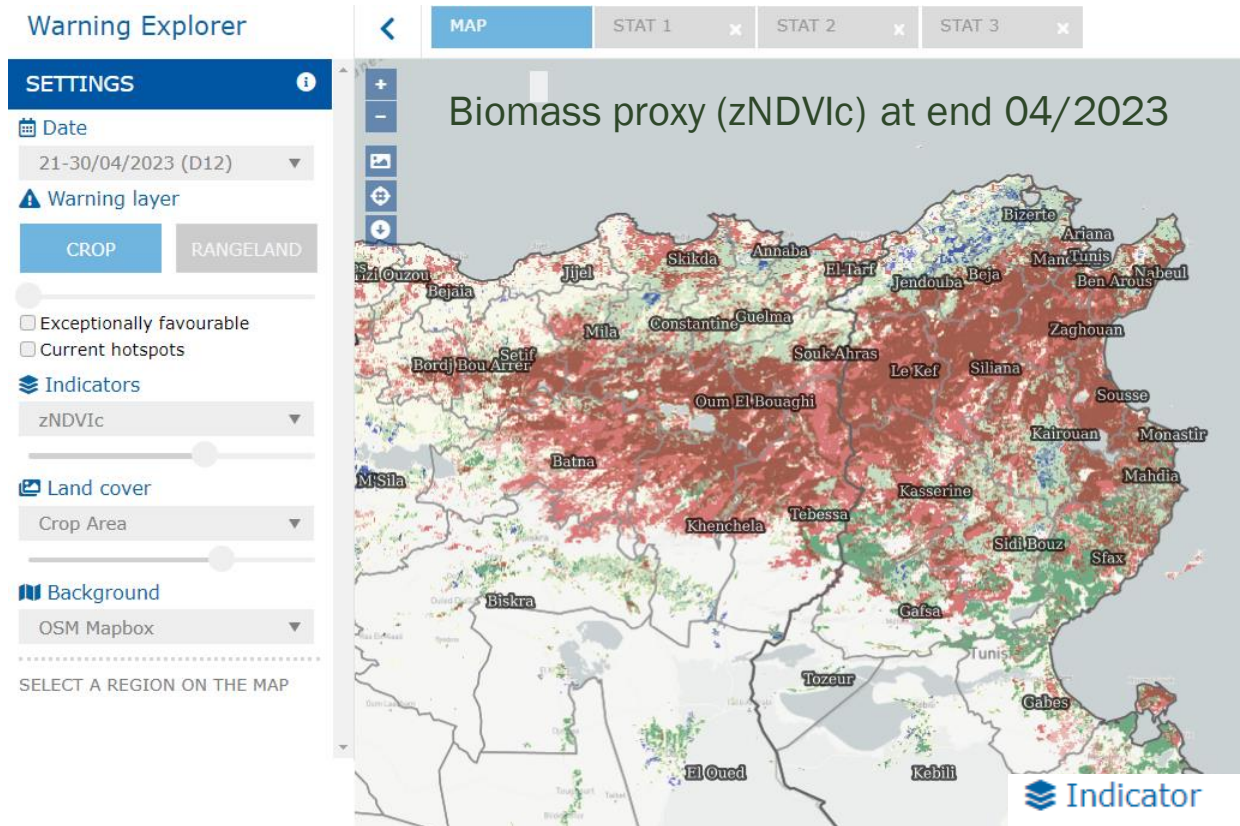
Pixel **critical** if $zX_t < -1$



Warning assigned if critical cropland (or rangeland) area >25% of (active) cropland area

Info level 2: Warning Explorer

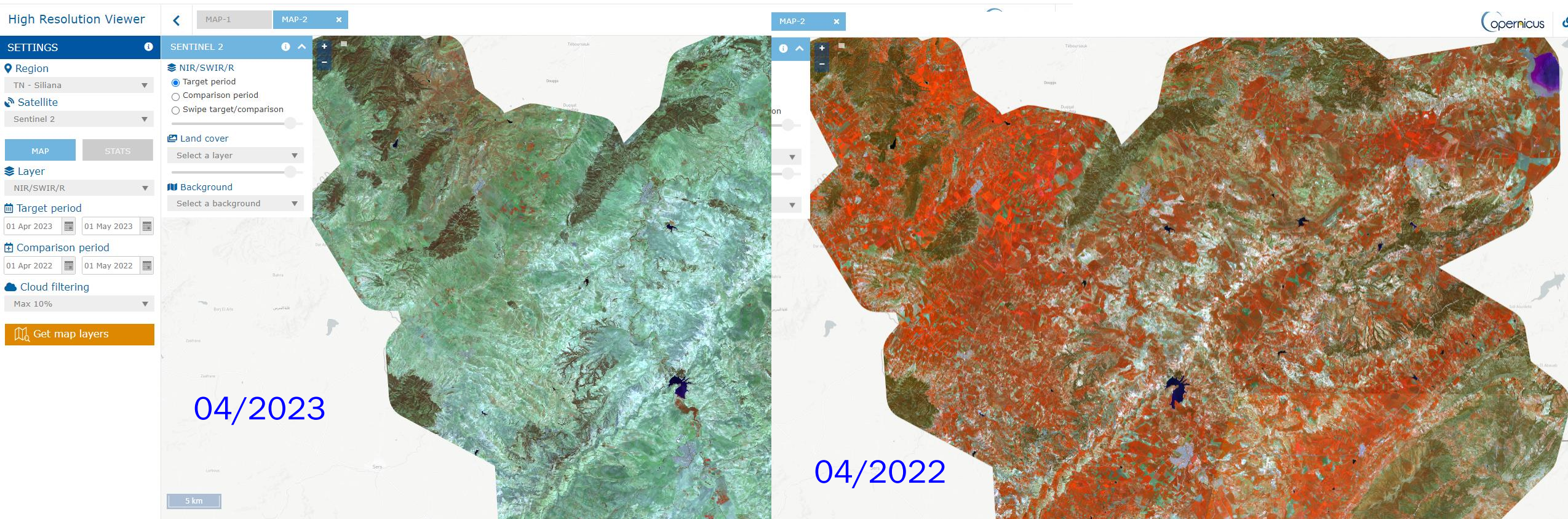
■ Analysis of maps of the various indicators



Info level 3: High Resolution Viewer

Possibility to zoom in to field level (10 m resolution) anywhere on the globe (data on the cloud)

Allows detecting poor biomass, flooding, burning, clearing, snow presence etc...

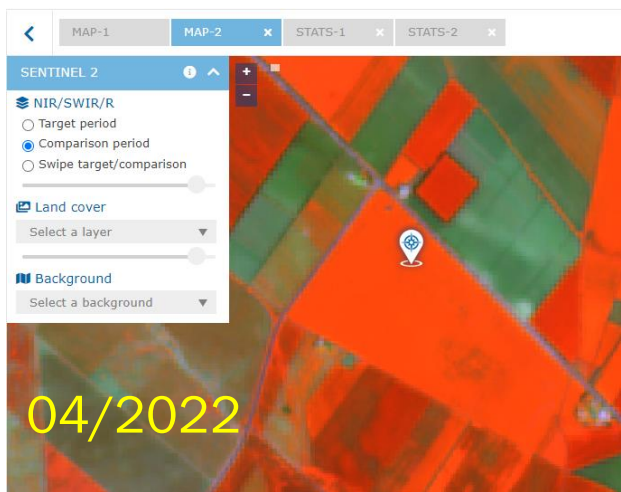
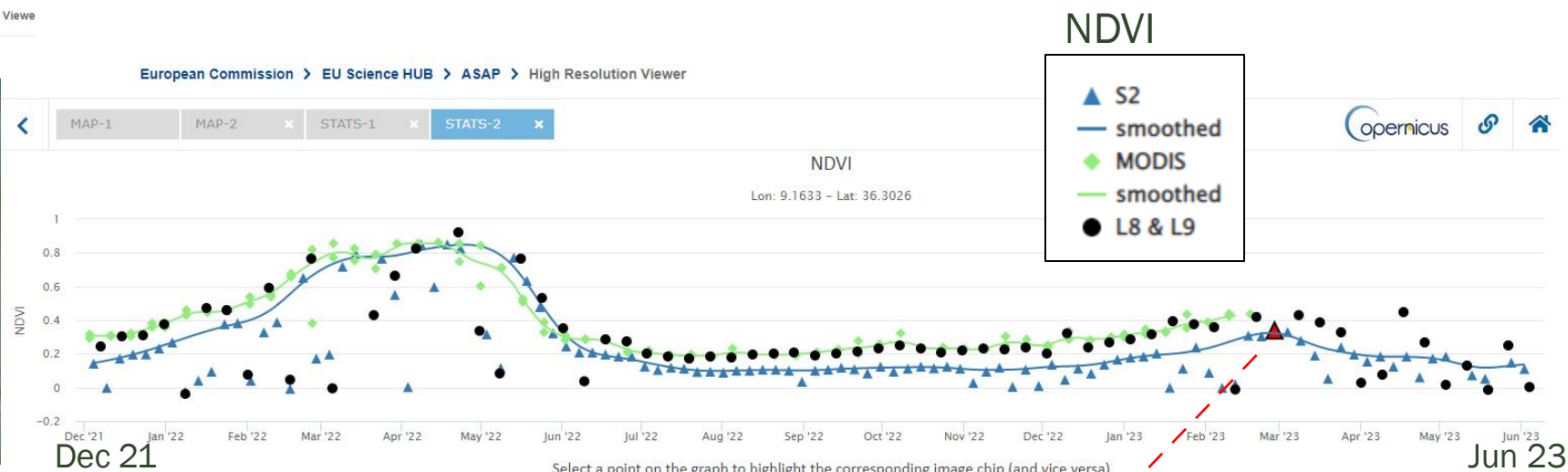
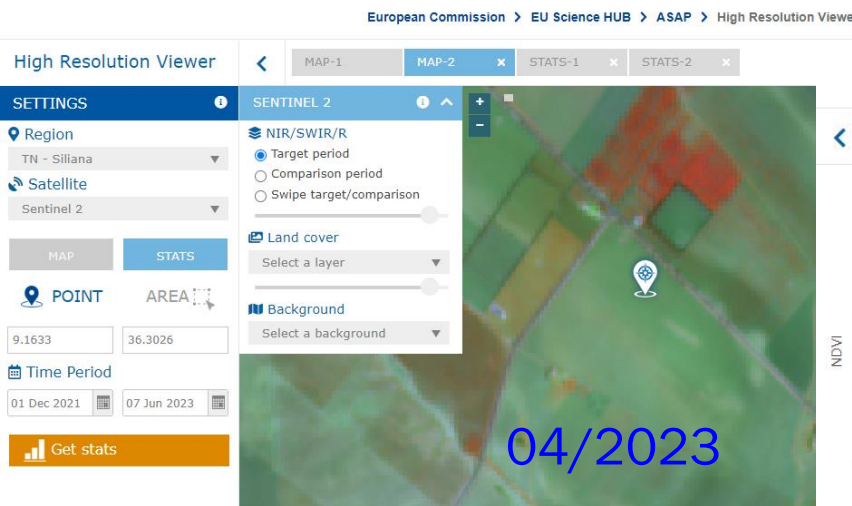


Field level monitoring for any point on Earth with revisit frequency of 5, 8 or 12 days (S2, Landsat 8&9, S1 resp.)

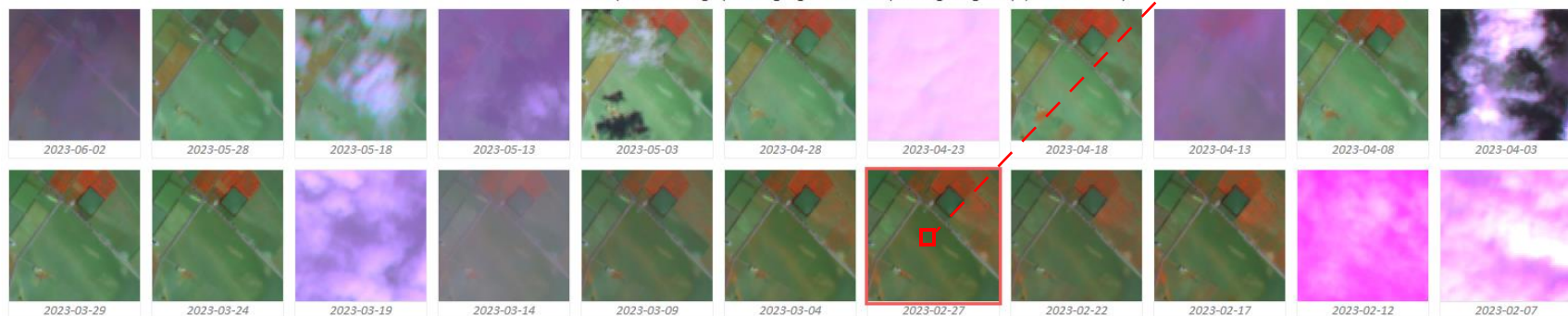
Powered by Google
Earth Engine

Info level 3: High Resolution Viewer

And to obtain the S2, L8 & MODIS NDVI time profile of a point (40m x 40m)



04/07/2023

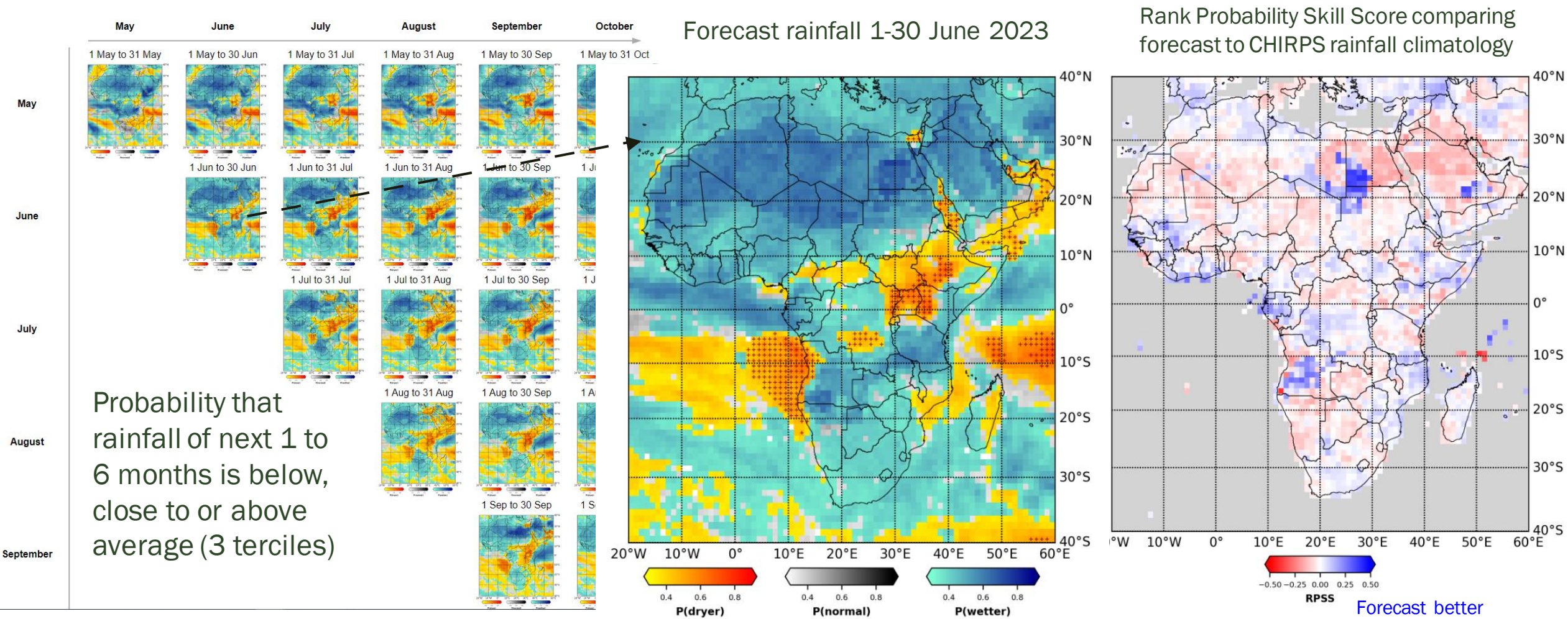


Field level monitoring (crop specific)

Mainly for agriculture analysts with basic remote sensing knowledge

Seasonal rainfall forecast

Rainfall forecast for the next 6 months from 6 models from Copernicus Climate Change Service (C3S)



Data for download

- **Indicators** (NDVI, Rainfall, zNDVIC, SPI-3, Mean air temperature, WSI, global radiation) at **GAUL1 level**; GAUL2 level for 26 countries subject of food security (IPC) analysis.
- **Warnings & reference data** (GAUL limits, cropland / rangeland masks, mean ASAP phenology)



Data Download

This section makes available data sets used or generated by the ASAP system for download. In addition to the data which can be downloaded from this page, background information on the ASAP system and methodologies used, are available for download here: [About ASAP](#) page. For access to other data sets which are part of the ASAP system, or for additional information on the data listed below, please [contact us](#). When using data downloaded from this web page, please refer to the source or to other sources possibly indicated in the data description.

- HOTSPOTS AND WARNINGS
- REFERENCE DATA
- INDICATOR STATISTICS

ASAP calculates every 10 days average values of all key indicators for each ASAP Gaul 1 unit. These data are used by the ASAP warning classification and can be downloaded with the tool below. You can select a country, an indicator and the land use (crop or rangeland) to get a csv with the complete time series of the 10-day values. This file can be imported directly into the CST tool, in order to use ASAP indicators for yield forecasting. A selected set of countries is also available at Gaul 2 level. In the sub section "Reference Data - Administrative Boundaries" you can download the administrative boundaries as shapefile. You can plot values of indicator on a map by joining the csv files downloaded before with the shapefile of the spatial units (key fields: asap1_is and asap2_id).

Level: ⓘ

Country: ⓘ

Variable: ⓘ

Class: ⓘ

DOWNLOAD

GAUL 1 level

INDICATOR STATISTICS

ASAP calculates every 10 days average values of all key indicators be downloaded with the tool below. You can select a country, an inc 10-day values. This file can be imported directly into the CST tool available at Gaul 2 level. In the sub section "Reference Data - Administrative Boundaries" you can download the administrative boundaries as shapefile. You can plot values of indicator on a map by joining the csv files downloaded

GAUL 2 level

Level: ⓘ

Country: ⓘ

Variable: ⓘ

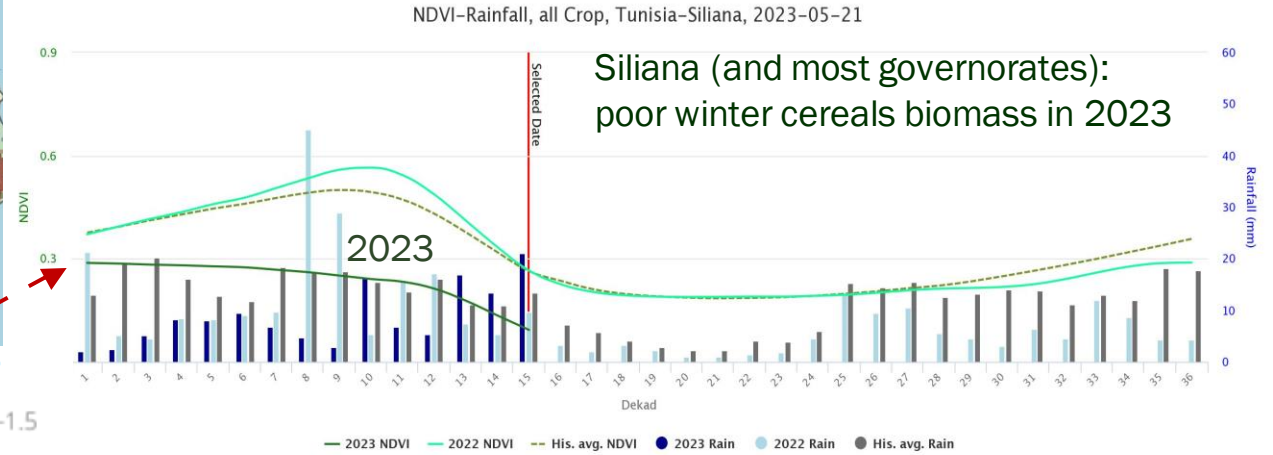
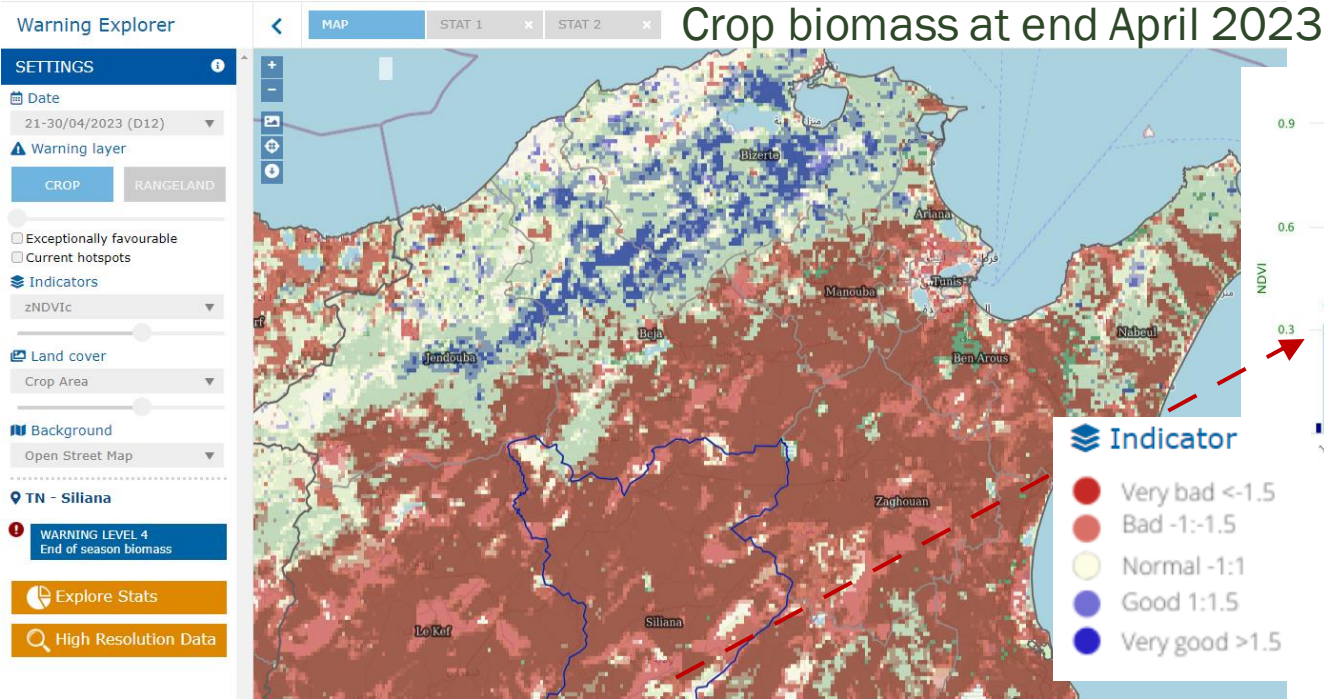
Class: ⓘ

Software

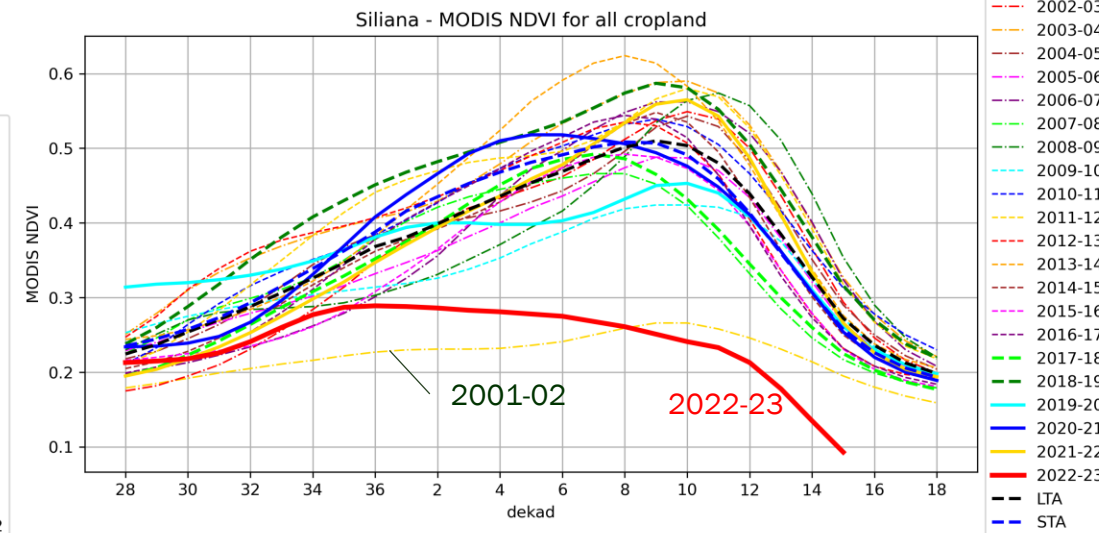
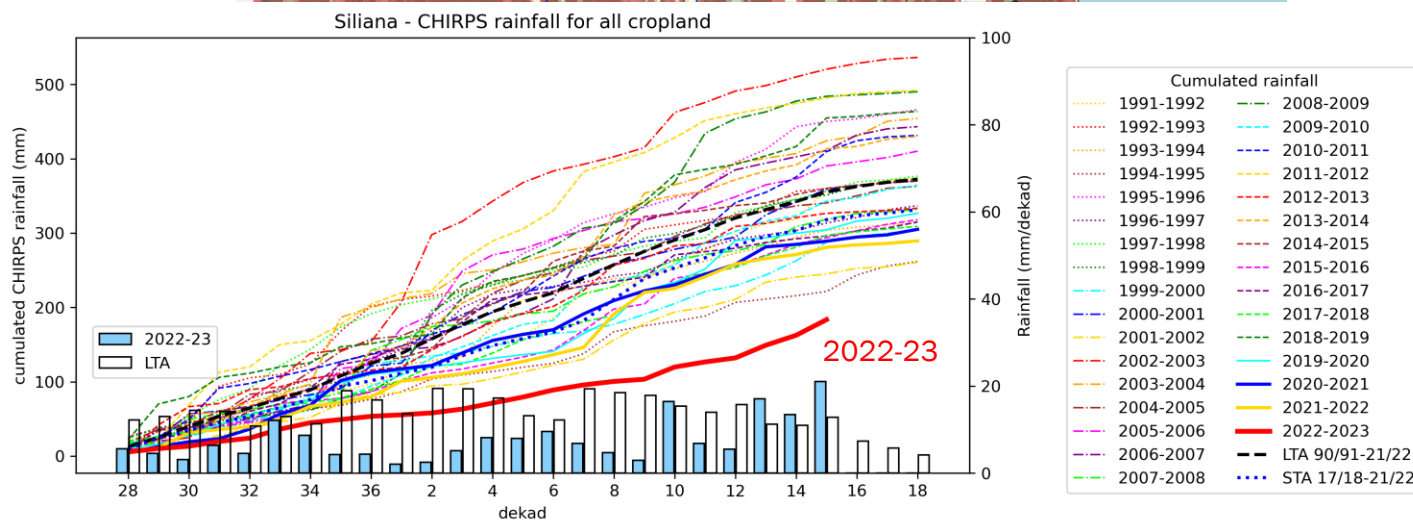
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Tunisia 2023: analysis with ASAP Warning Explorer



2023 driest [Oct-May] season since 1991-1992



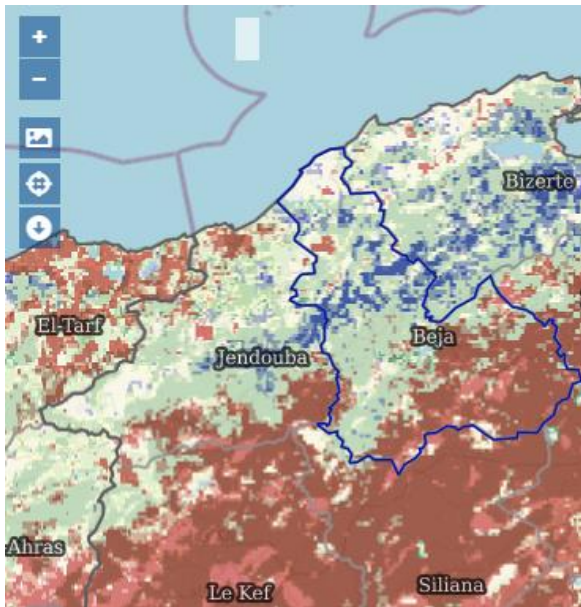
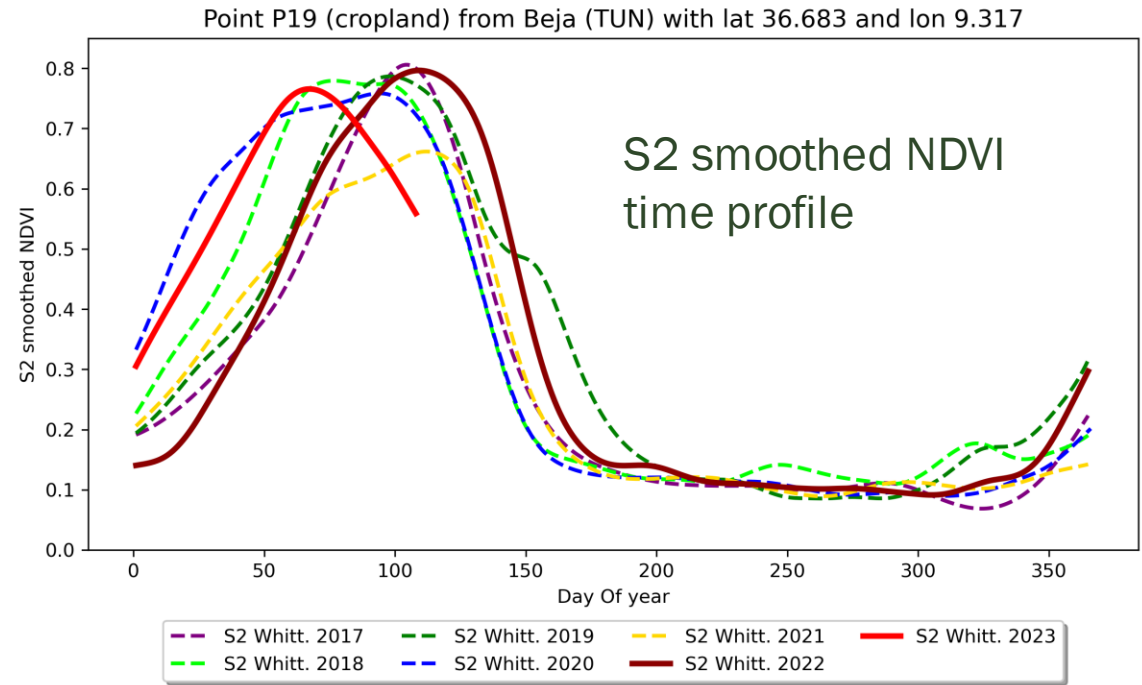
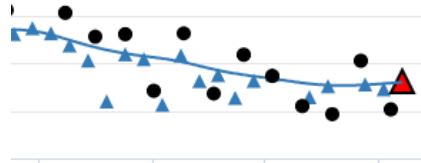
Zoom in to field level



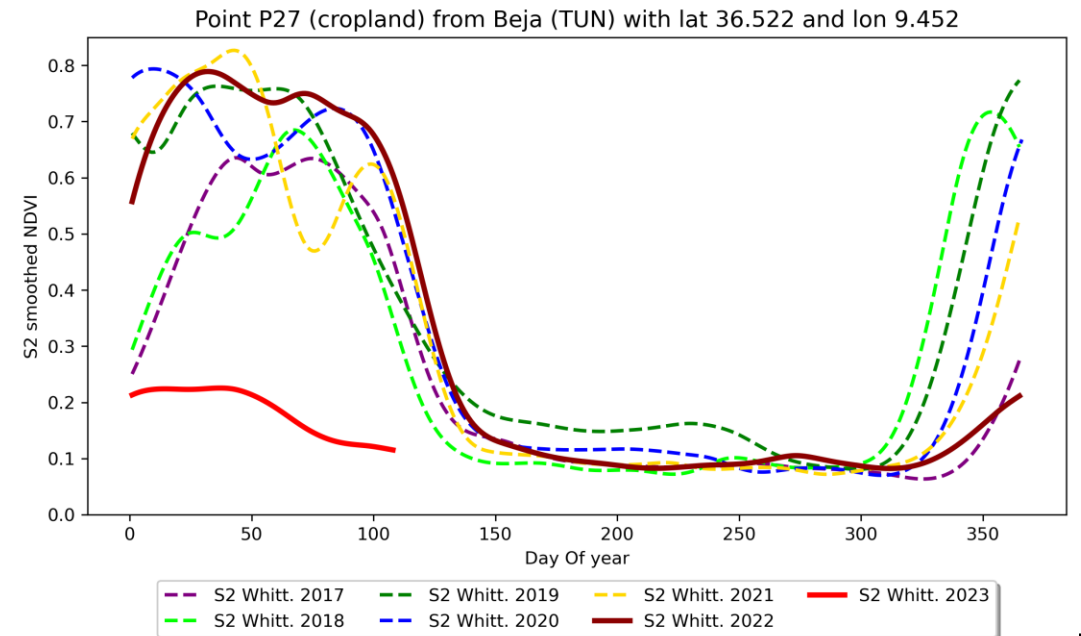
Download S2 raw & smoothed NDVI values (csv file)



- ▲ S2
- smoothed
- ◆ MODIS
- smoothed
- L8 & L9

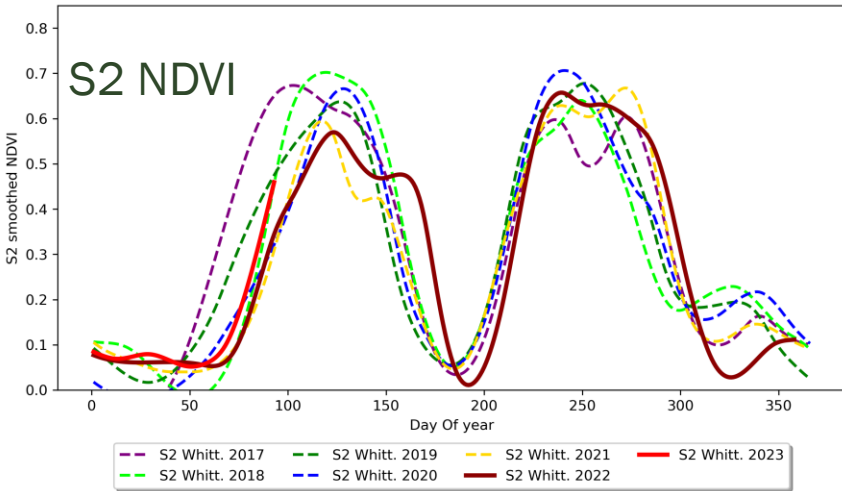


04/07/2023

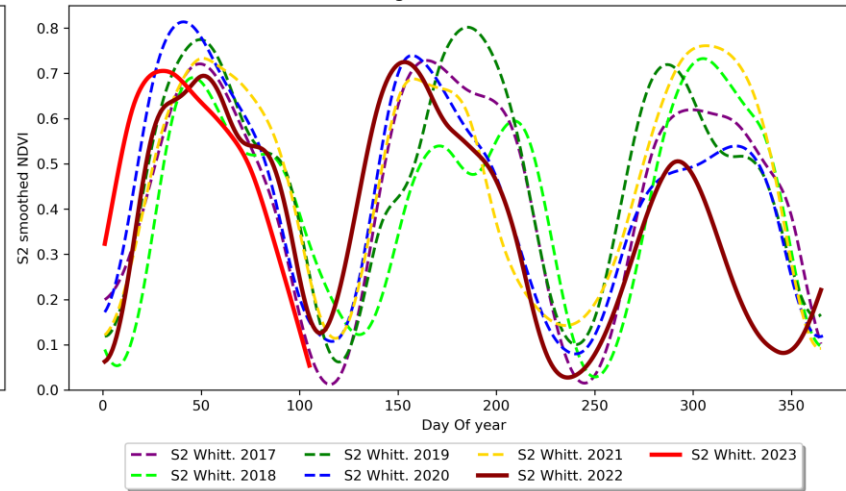


Rice seasons with S2 NDVI profiles

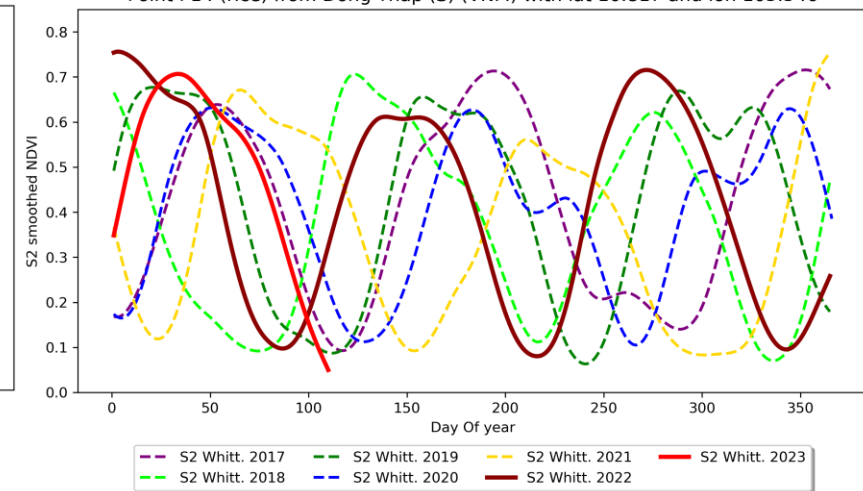
Point P1 (rice) from Thai Binh (N) (VNM) with lat 20.517 and lon 106.375



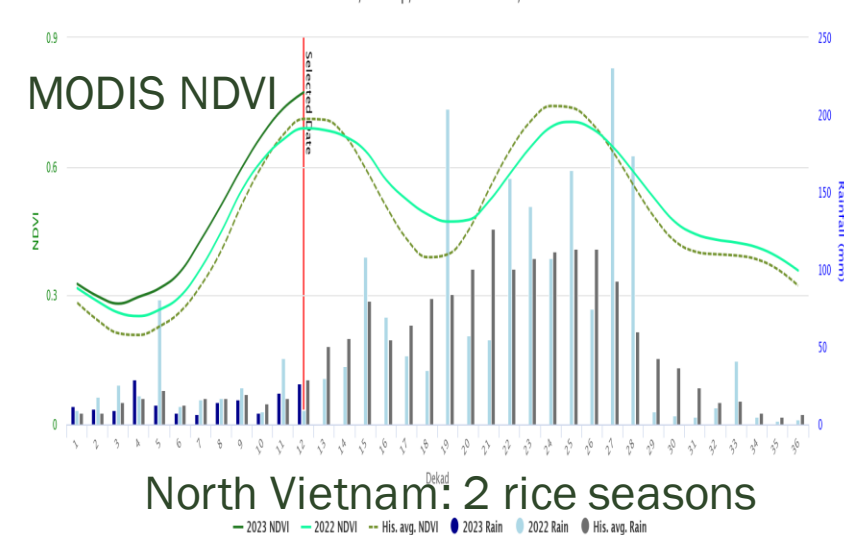
Point P11 (rice) from An Giang (S) (VNM) with lat 10.333 and lon 105.178



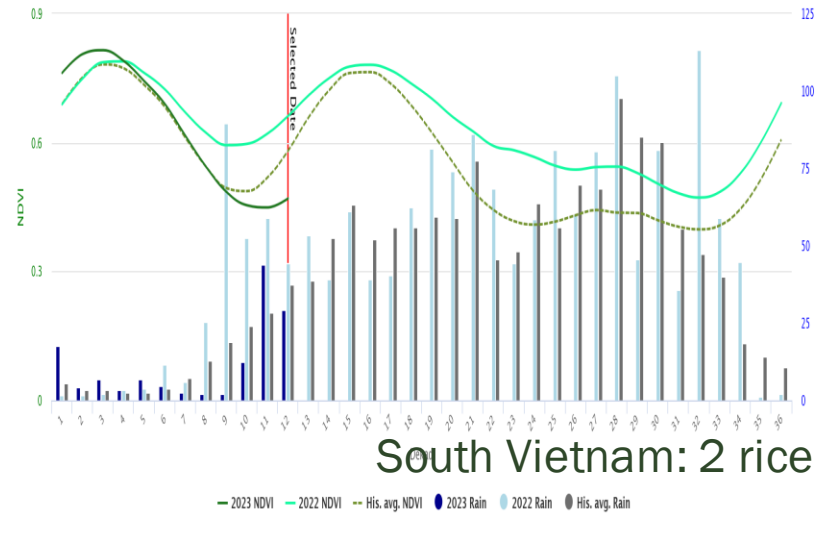
Point P14 (rice) from Dong Thap (S) (VNM) with lat 10.817 and lon 105.546



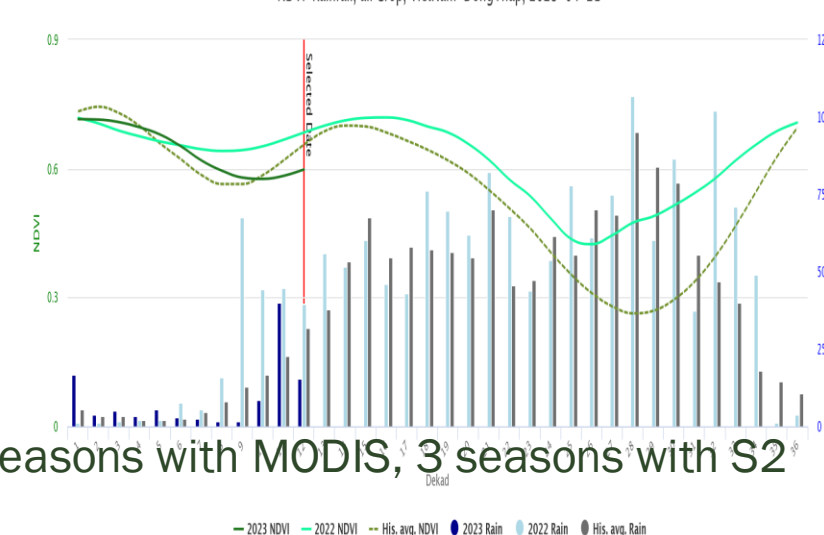
NDVI-Rainfall, all Crop, VietNam-ThaiBinh, 2023-04-21



NDVI-Rainfall, all Crop, VietNam-AnGiang, 2023-04-21



NDVI-Rainfall, all Crop, VietNam-DongThap, 2023-04-21



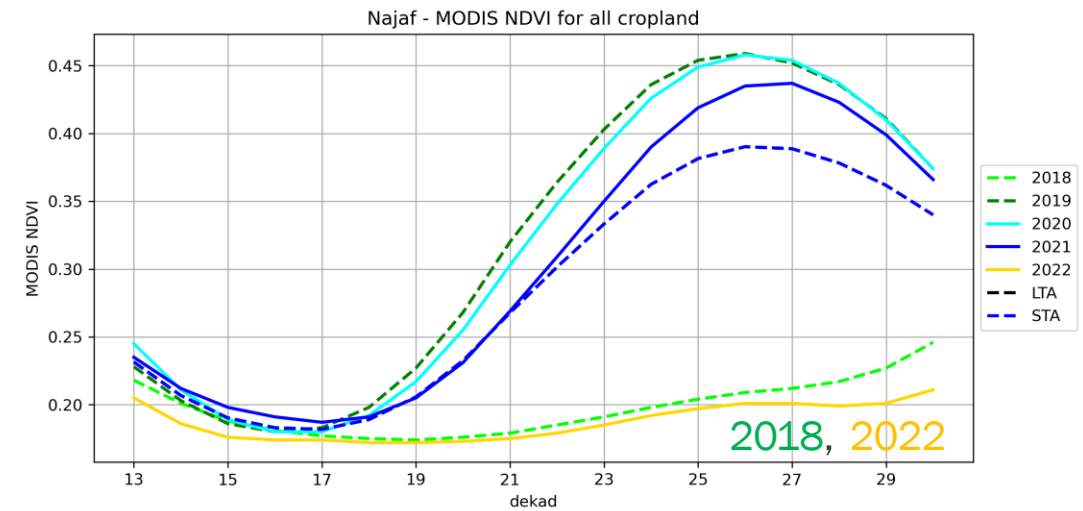
South Vietnam: 2 rice seasons with MODIS, 3 seasons with S2

North Vietnam: 2 rice seasons

Biomass anomaly

- Iraq Najaf: very low NDVI in 2022 and 2018 due to ban on summer crops (rice)

cf. <https://english.alarabiya.net/features/2018/07/05/Iraq-bans-farming-summer-crops-as-water-crisis-grows-dire>



SETTINGS

Region: IQ - Najaf

Satellite: Sentinel 2

MAP | STATS

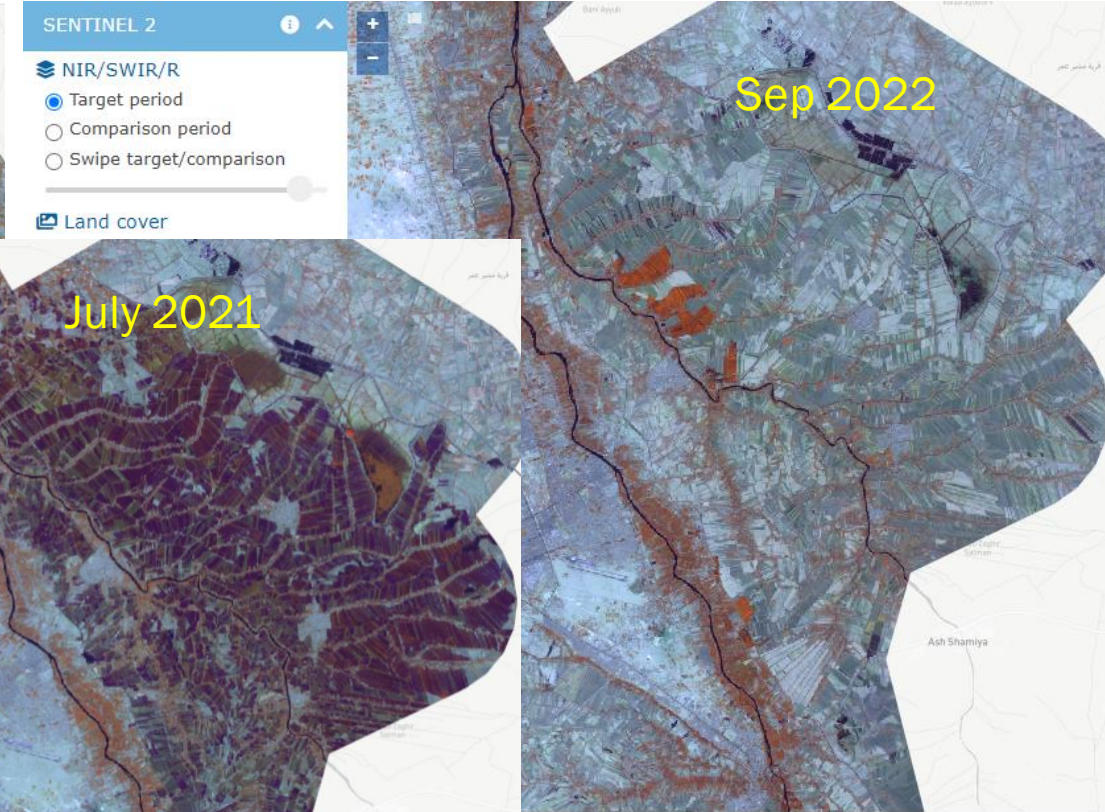
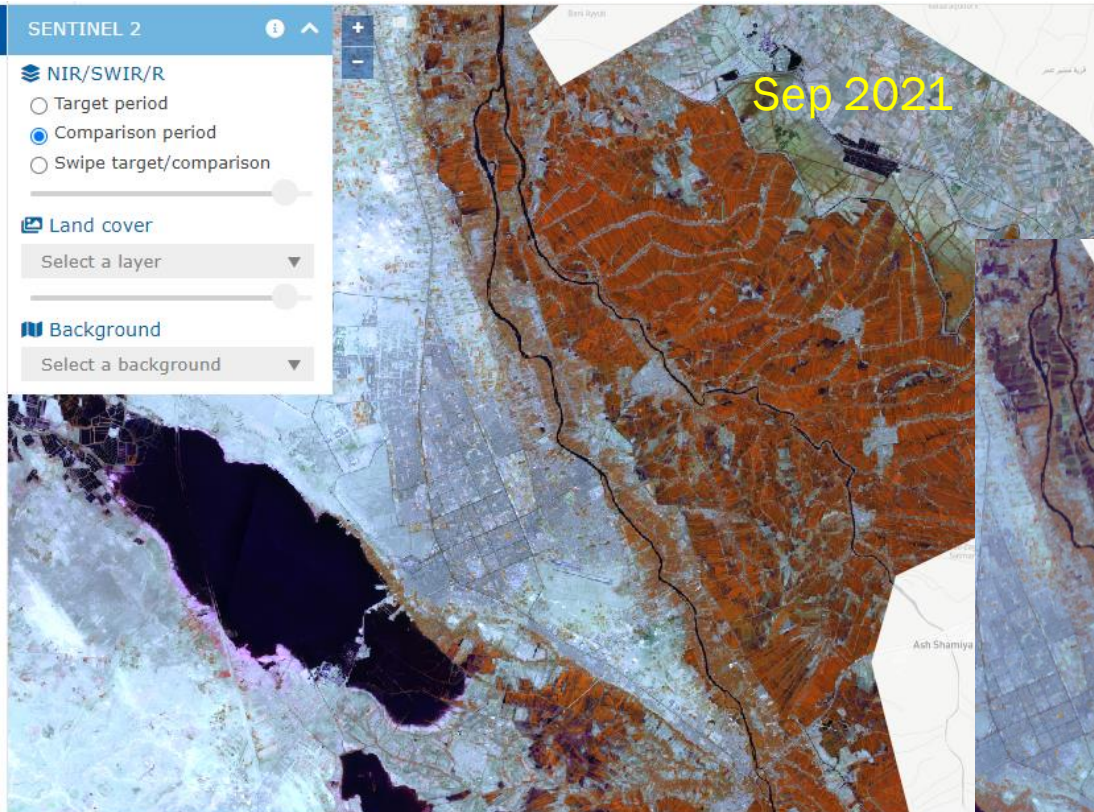
Layer: NIR/SWIR/R

Target period: 01 Sep 2022 - 30 Sep 2022

Comparison period: 01 Sep 2021 - 30 Sep 2021

Cloud filtering: Max 10%

Get map layers



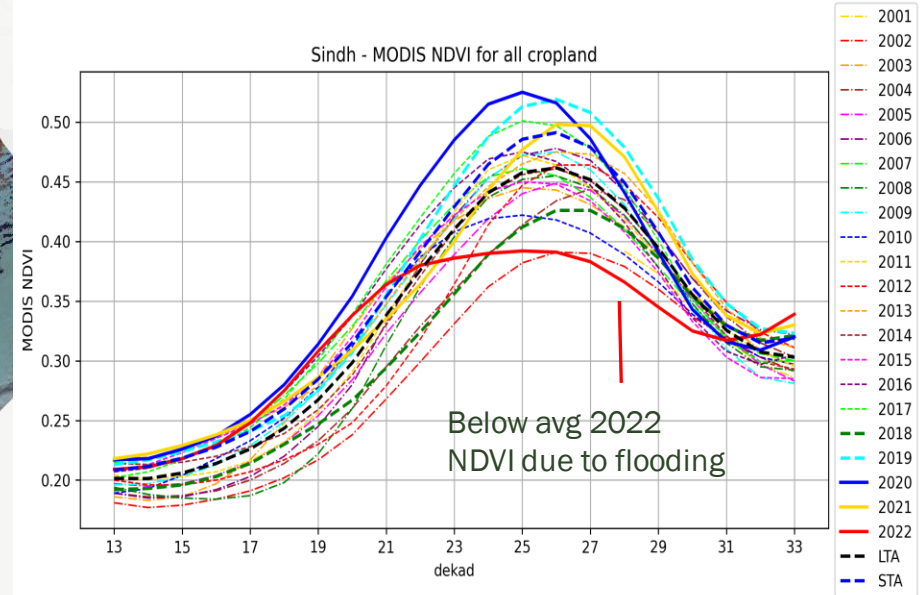
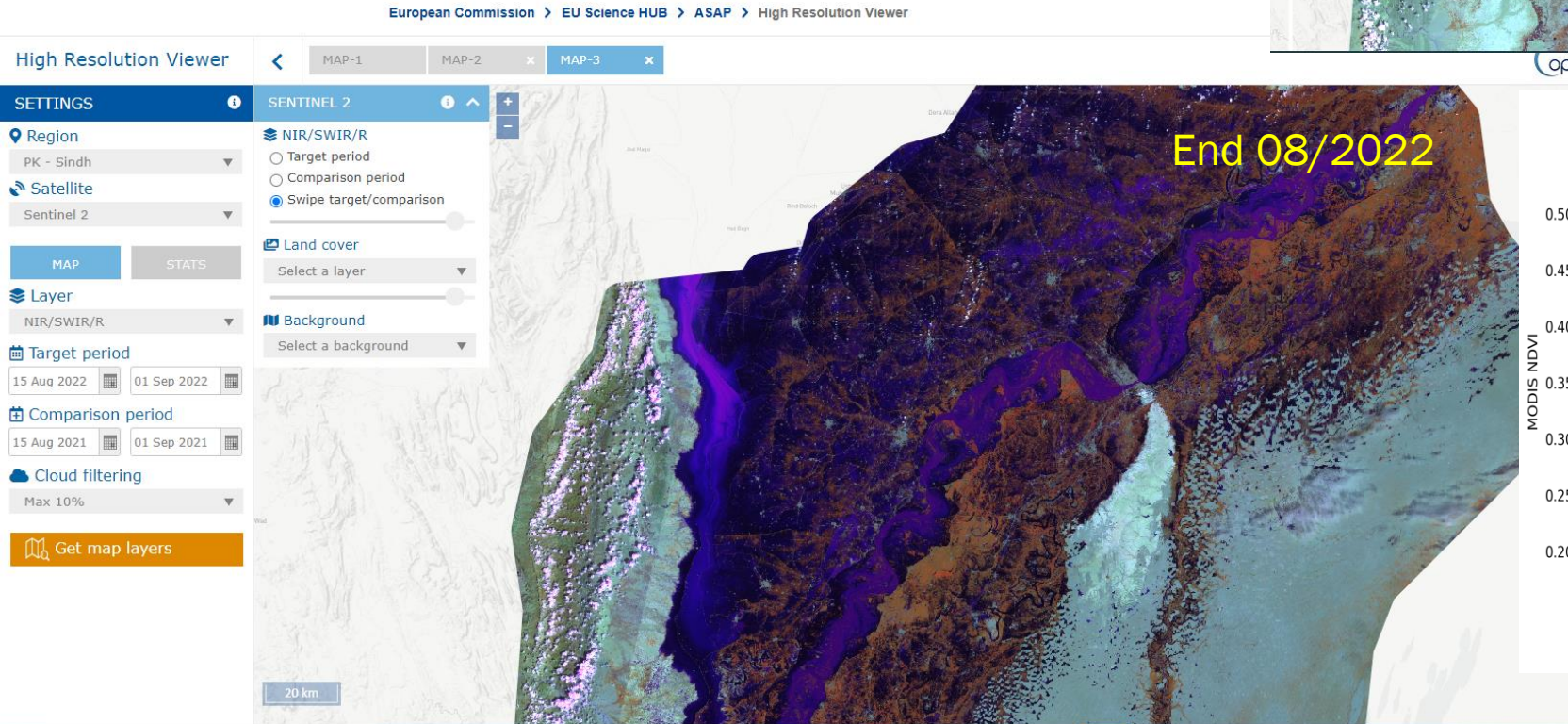
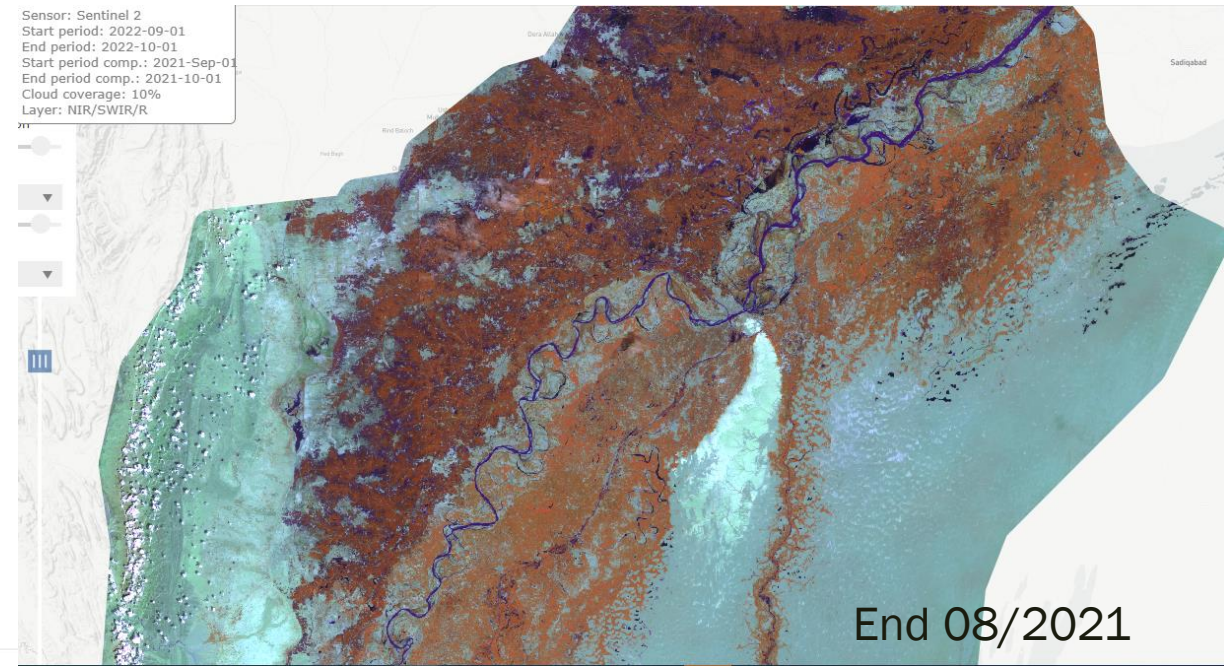
<https://mars.jrc.ec.europa.eu/asap/s/087660a8>

Flood extent assessment

Pakistan Sindh: summer-autumn 2022

<https://mars.jrc.ec.europa.eu/asap/s/760bee82>

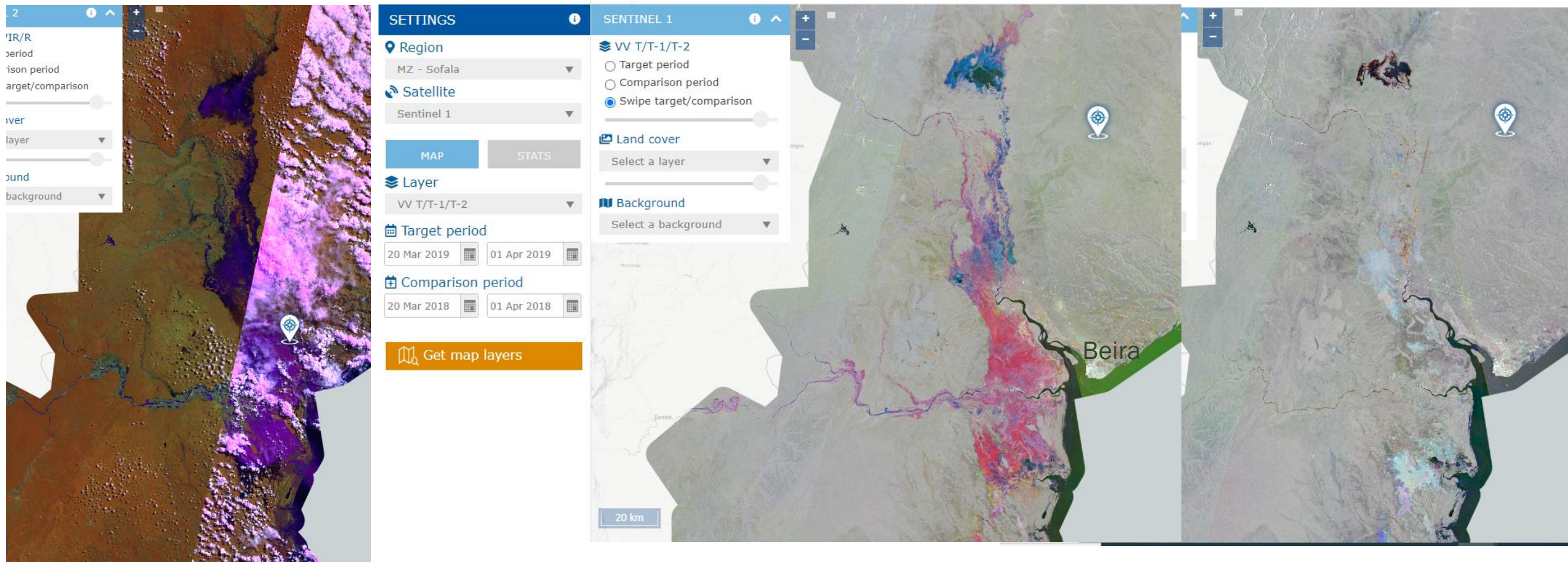
Floods detected if large and water remains for >1 week



Flood extent assessment with SAR

Mozambique: Idai tropical storm in 03/2019

Interest of SAR S1 data for floods occurring during the rainy (cloudy) season



S1 data: VV Sigma0 at end March/mid March/early March in R/G/B
<https://mars.jrc.ec.europa.eu/asap/s/63edae1d>

Take home message

- **Open access to a global online Early Warning System**
- Easy **access to EO data**, in particular high resolution **S2, S1, Landsat data**, on the cloud; open access to indicator and reference data
- Growing users community and collaboration with partners (FAO, WB, USDA, ICPAC, OSS etc...) including limited adaptations for regional centres (ICPAC: <https://agriculturehotspots.icpac.net/>, OSS: <http://guetcrop.oss-online.org/>)
- New data (e.g. soil moisture, fAPAR) and functionalities depending on results of ongoing research projects e.g. yield forecasting based on FAOSTAT country level data with Machine Learning (with Univ. of Valencia)
- -> We are OPEN to collaborations with (food insecure) countries on yield forecasting at GAUL1 region level using ASAP indicators and countries yield stats

CONTACT DETAILS

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