



The LifeWatch ERIC Biodiversity & Ecosystem eScience Conference

Seville
22-24/05/23



Threats and challenges to biodiversity and ecosystem conservation from an eScience perspective



Upscaling phenology, water and CO₂ fluxes with remote sensing for the validation of Earth Observation products
R. Díaz-Delgado, P. Gómez & D. García

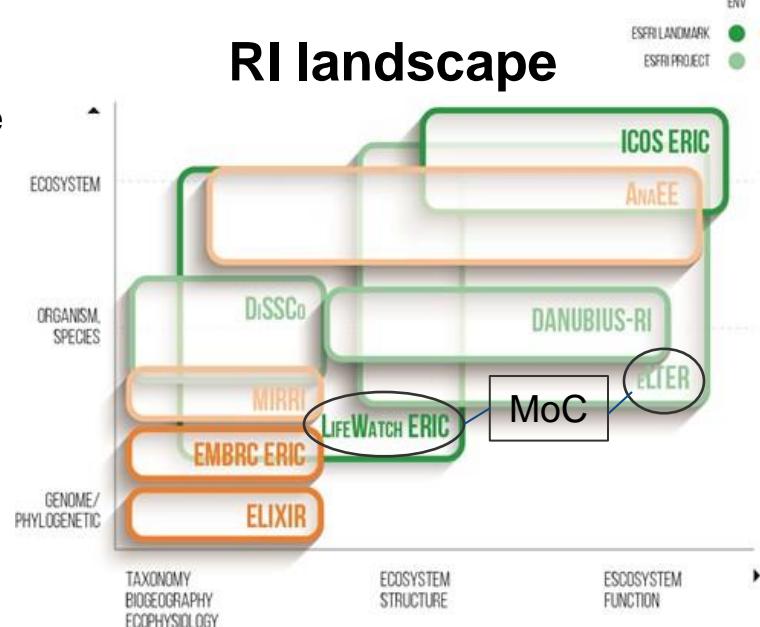
SUstainability for Mediterranean Hotspots in Andalusia integrating SUMHAL LifeWatch ERIC

Sustainability for Mediterranean Hotspots integrating LifeWatch ERIC

WP6. Protocols and indicators to monitor and assess land condition at multiple scales. A pilot **CO-LOCATION** exercise

Task 6.2. Monitoring program at Doñana LTSE platform

Task 6.3. Integration into Virtual Research Environments

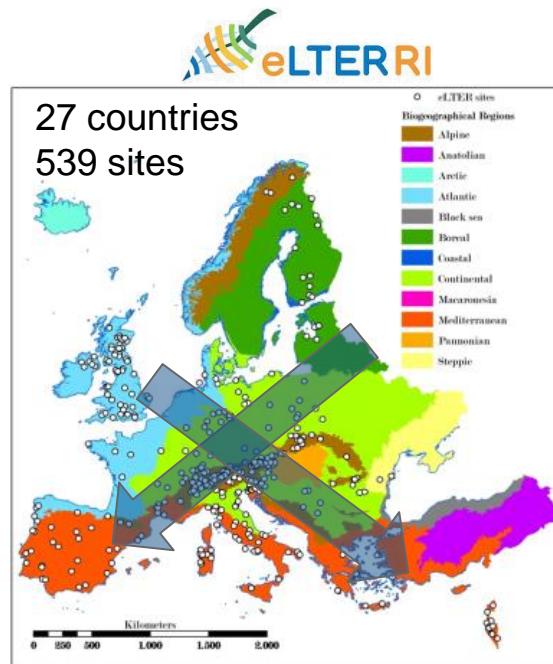


Site-based networks and infrastructures on LTER



<https://wwwilternetwork>

39 countries
759 sites



<https://elter-ri.eu/>



<https://wwwilternetwork>

39 countries
759 sites

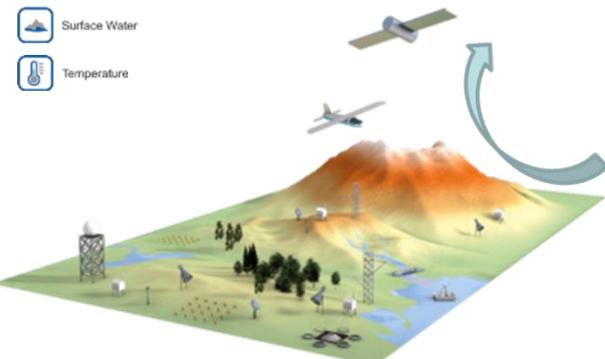
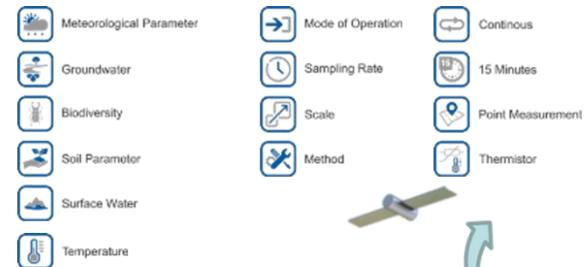


<https://lter-spain.csic.es/>

13 sites (including National Parks)

Doñana in the eLTER RI as a supersite for cal/val

Multi-scale SOV (WP 3&4)



Doñana LT(S)ER Platform



- Protected area (and equipment)
- Research facilities (overnight, labs, assistance)
- Flat topography (↓ overcast effects on images)
- Low cloud cover (<60 days a year)
- Contrasting radiometric signatures (sand dunes vs. bare open waters)
- Terrestrial and aquatic ecosystems
- Long term monitoring program

Proximal sensing



PhenoCam

AN ECOSYSTEM PHENOLOGY
CAMERA NETWORK

EO cal/val networks



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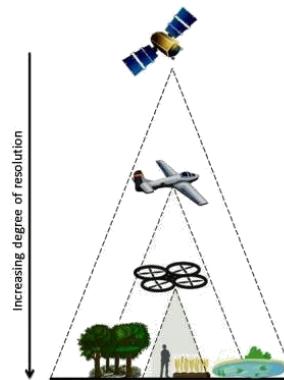
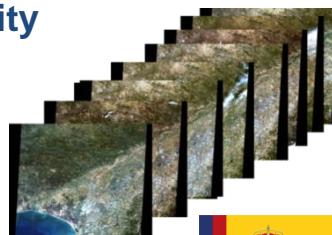
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Remote sensing for Long-Term Ecological Research (LTER)

Pros

- Global and **multi-scale vision**
- **Historical** satellite images
- Consistent **time series**
- Large sample size (pixel=sampling unit)
- Data from different spectral regions
- RS products of **biophysical variables** (LAI, GPP...)
- Services and products easily accessible
- **Sinopticity**



Cons (requirements)

- Sensor calibration (cal)
- **Validation** (val) & (up-)scaling
- Data Processing (big data)
- Cloud cover (Optical domain)
- Storage & distribution
- **Integration** of different data sources

Doñana Long-term monitoring at landscape scale



LTER focused on:

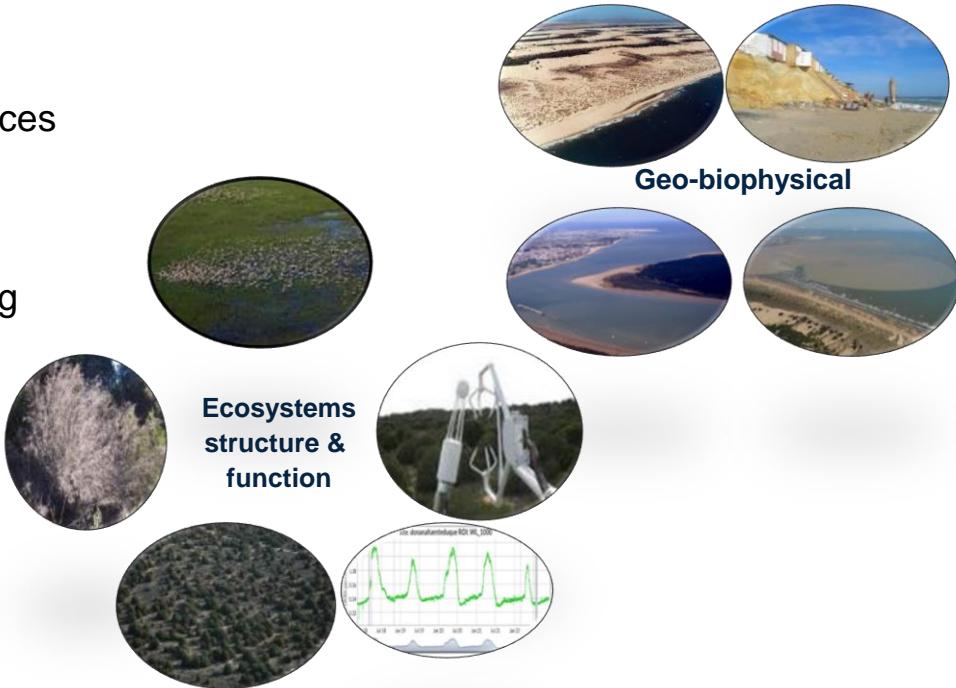
- Habitats
- Ecosystem function & services
- Land use and land cover

Methods based on:

- Remote & Proximal Sensing
- Landscape ecology

Outcomes

- Reports
- WMS/Mapping
- Trends
- Anomalies

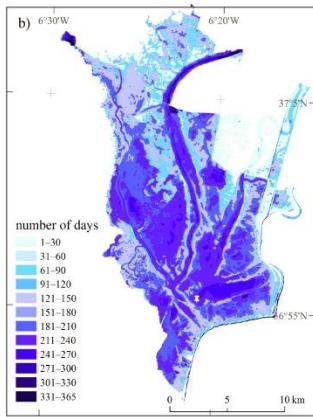


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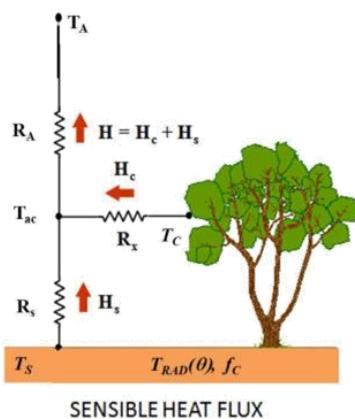
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Selected SOVs (indicators and services)

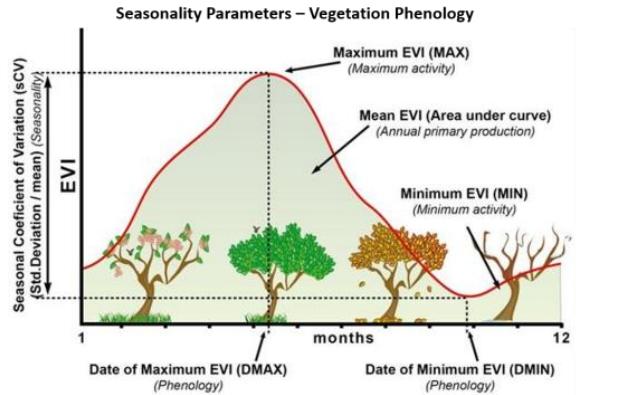
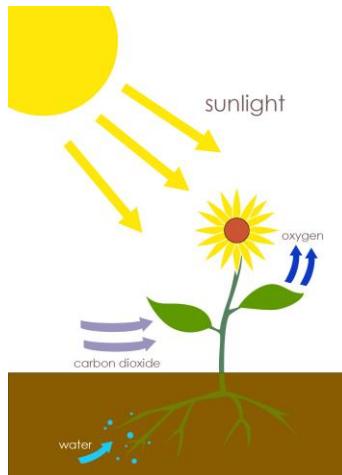
- Land cover Phenology (not only plants)
- Land Surface Temperature (input for E balance)
- Surface water (hydroperiod & soil moisture)
- Water and CO₂ fluxes



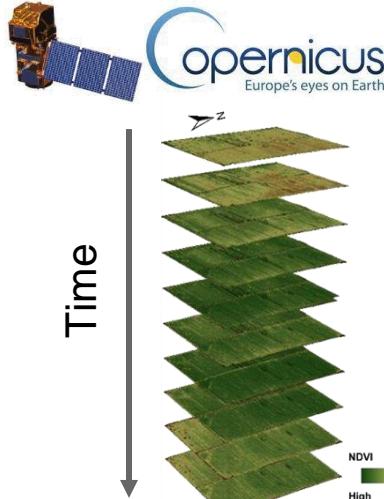
Hydroperiod of Doñana marshes
(Díaz-Delgado et al. 2016)



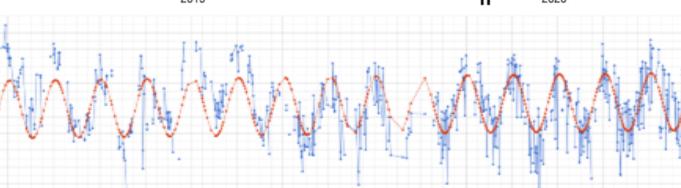
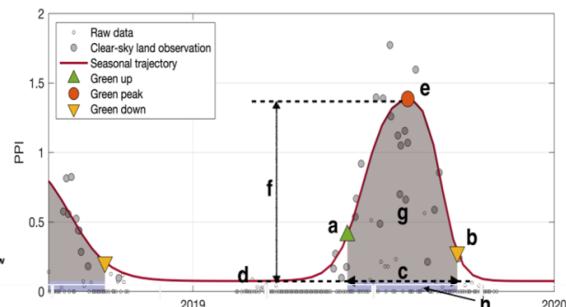
Norman and Kustas, et al. (1995)



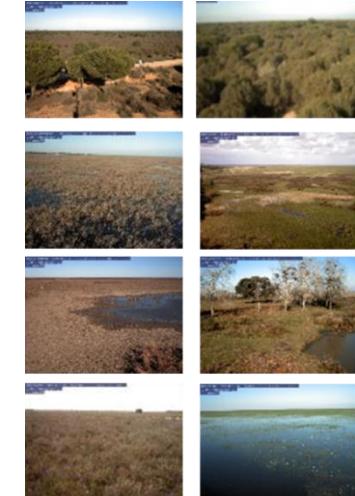
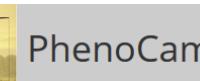
Earth Observation



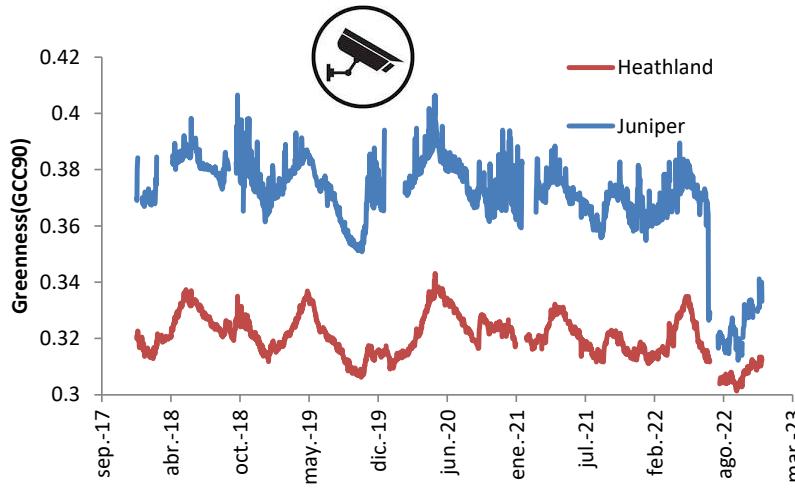
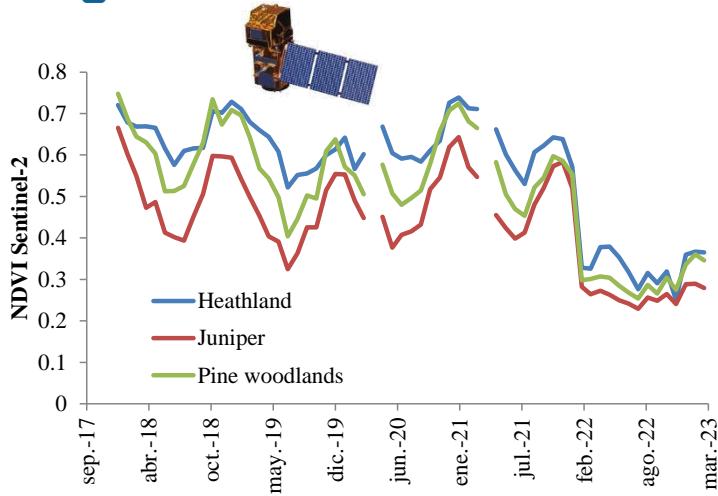
Phenology monitoring



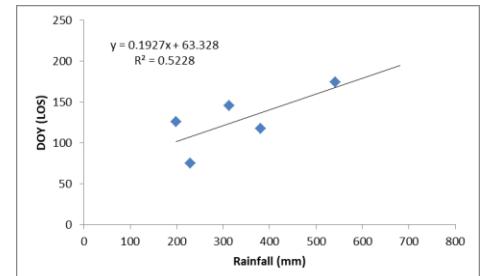
In situ



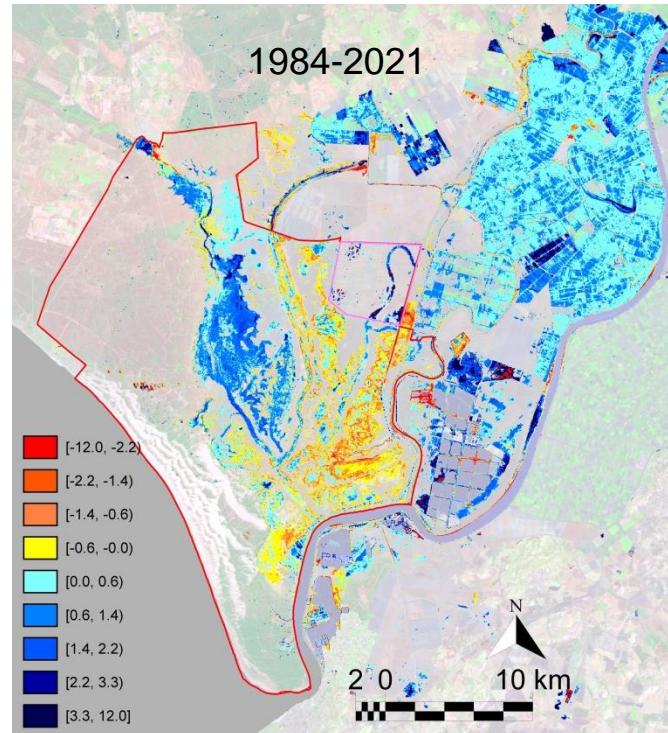
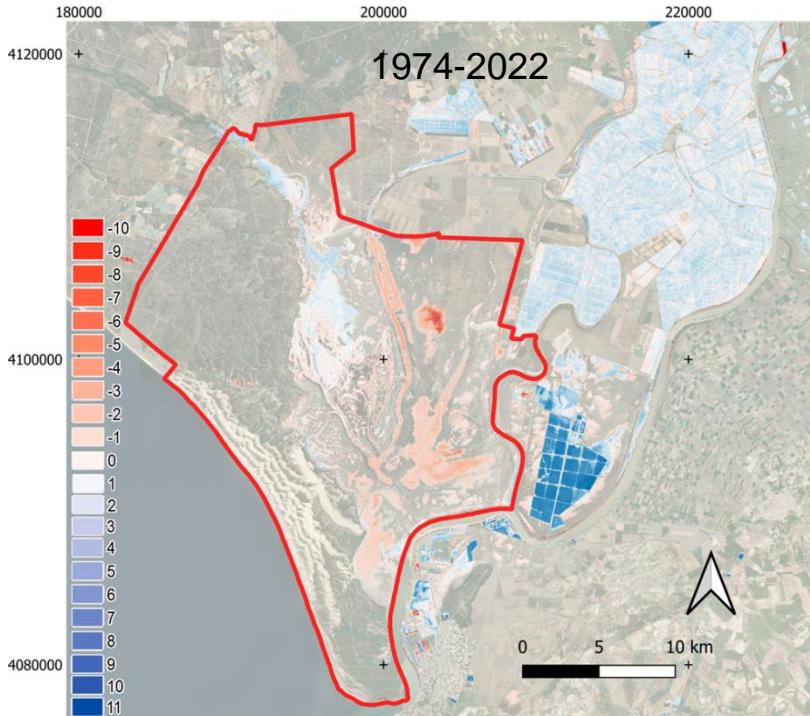
Phenology validation (extreme drought)



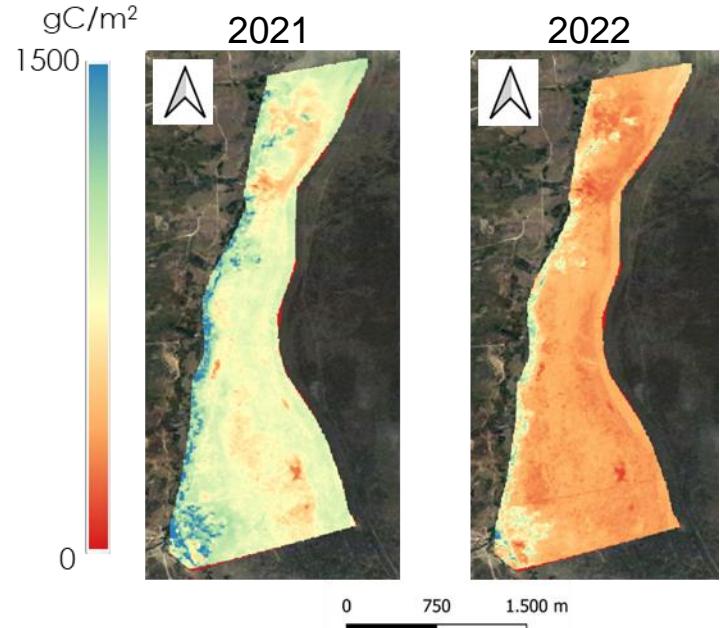
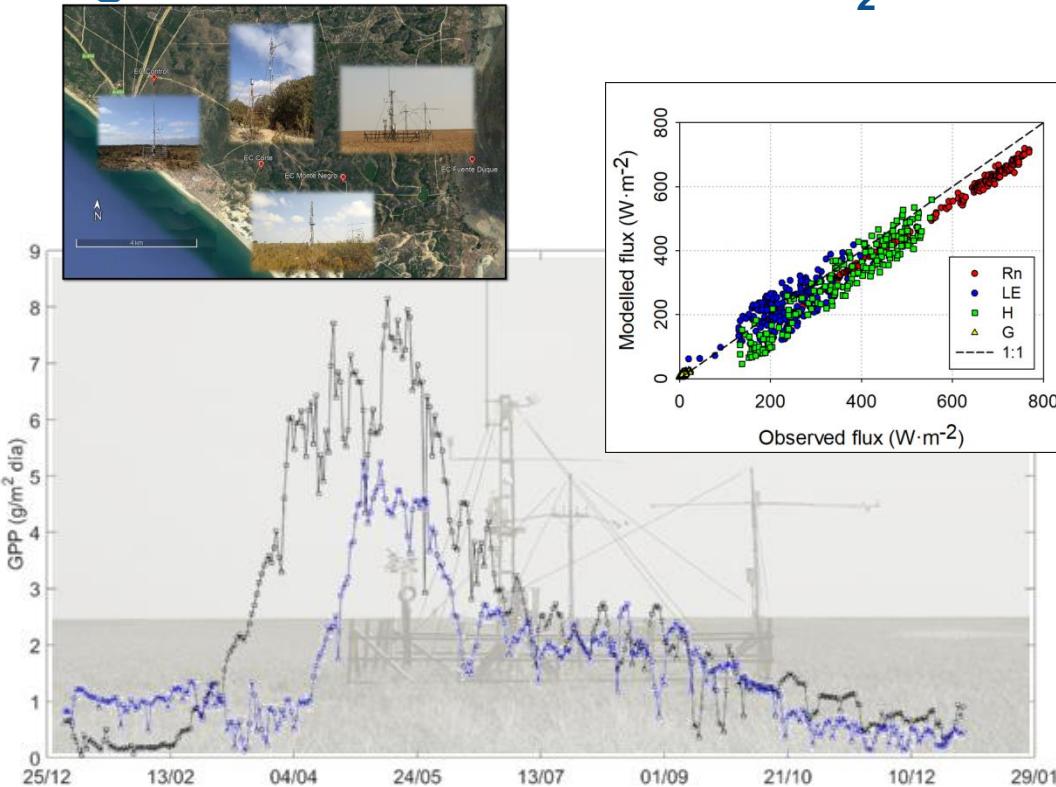
Decrease on
Length of
Growth
Season



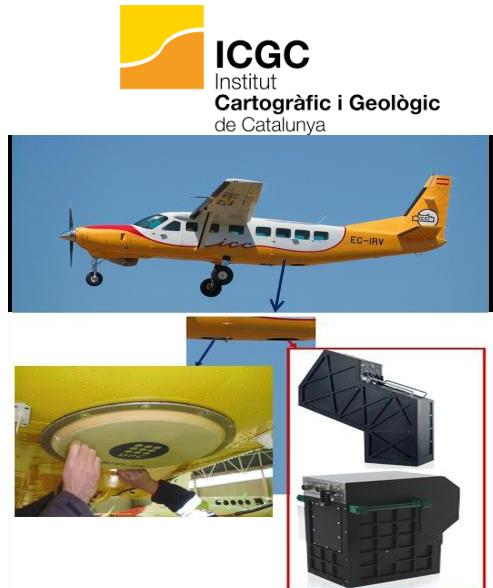
Marsh Hydroperiod & water level trends



Water & CO₂ fluxes (Doñana marshes)

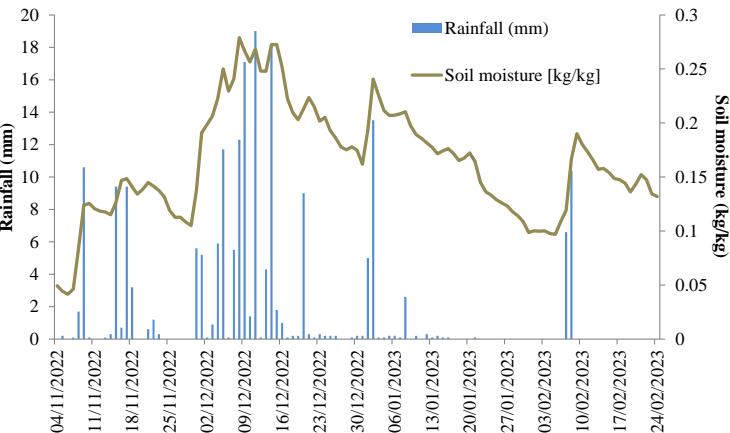


Land surface temperature & Soil moisture



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Accessing Validated products (VRE)



- Phenology
- LST
- Water

elTER Site: Donana Natural Space

Collection: Sentinel-2A/B Phenophy

Year: 2017

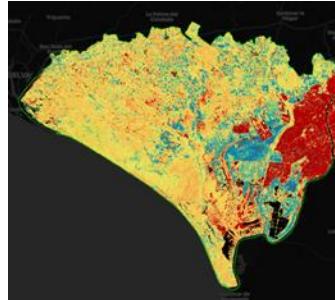
Metric: SOS Metric Value: Doy
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Show Ndv2Gif composite
 Show Raster legend

Apply Download Reset

The raster has been added to the map.

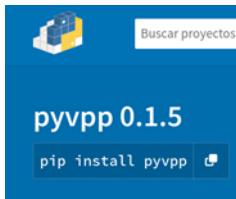


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DOI [10.5281/zenodo.7958093](https://doi.org/10.5281/zenodo.7958093)

DOI [10.5281/zenodo.3516929](https://doi.org/10.5281/zenodo.3516929)



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Thank you! | www.lifewatch.eu/bees-2023

