

A high-resolution satellite or aerial photograph showing a massive glacier on the left, characterized by its white and blue-toned ice. In the center, a large field of broken, white sea ice is visible, with dark, turbulent water beneath it. To the right, a large, dark, textured landmass, possibly a coastal area or another glacier, is shown. The overall scene conveys a sense of the scale and dynamics of Earth's cryosphere.

We aim at improving the quality of our Earth
by understanding the nature of its changes

isardSAT®

Company Presentation

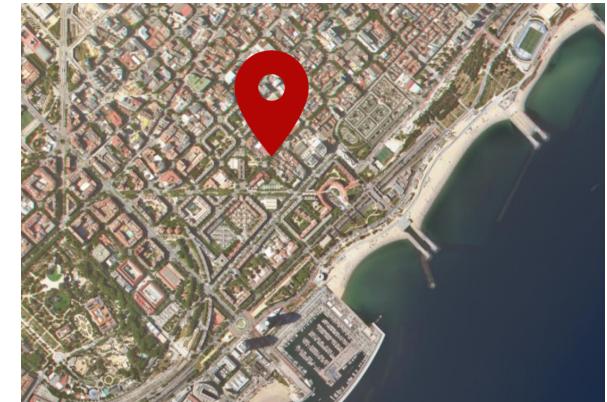
Research and services provider enterprise in the Earth Observation Field



Where are we?



Surrey Research Park
Guildford, United Kingdom



C/ Doctor Trueta, 113, 1r
Barcelona, Catalonia (Spain)

isardSAT was founded in 2006 in Barcelona with the mission to improve the knowledge of our planet Earth through Remote Sensing. Today, we are a team of more than 60 remote sensing experts based at Barcelona, with a subsidiary in Guildford (UK).

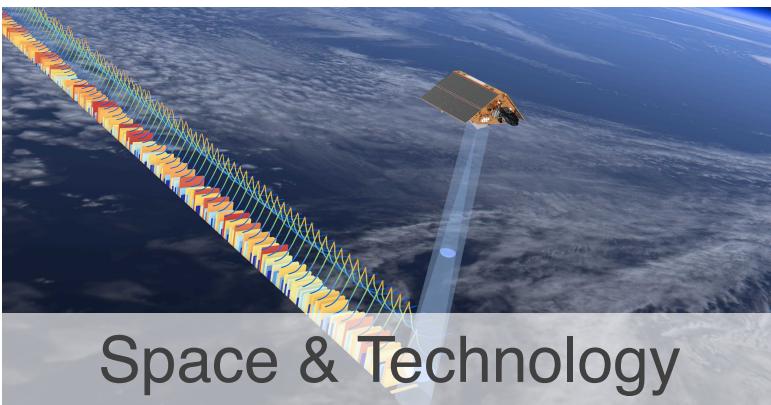
Partners



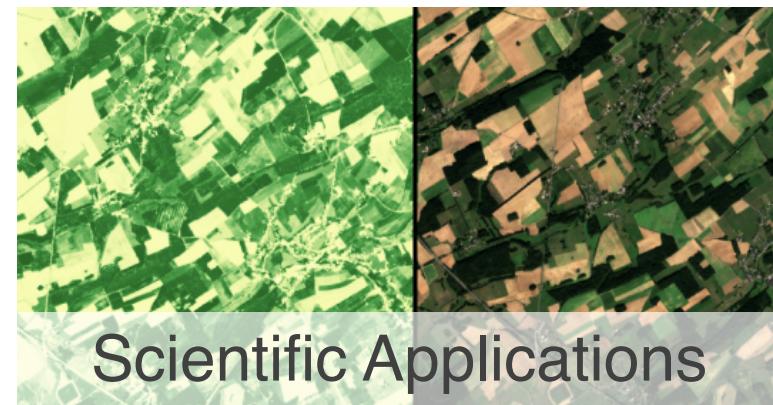
Funding institutions



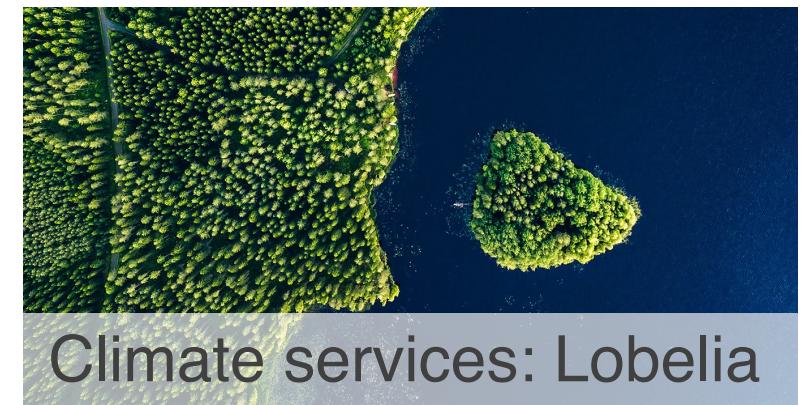
3 units



Space & Technology



Scientific Applications



Climate services: Lobelia

What do we do?

Microwave instruments

- Design
- Performance
- Calibration
- Validation



Exploitation platforms

Toolboxes

Operational EO services

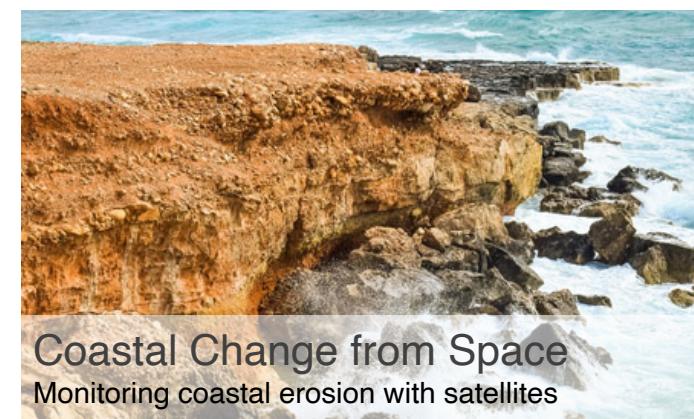
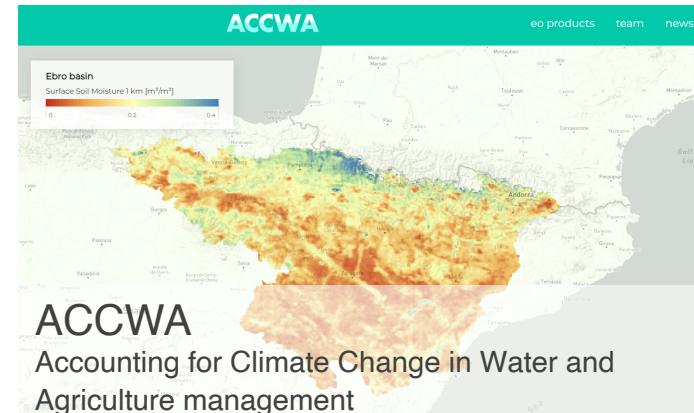
Ground Prototype
Processors
Mission Performance
Centers

Advanced algorithms for
data processing

Scientific Applications

Studies for scientific applications with the data obtained by EO instruments.

- Development of innovative algorithms for estimating geophysical variables from microwave data.
- Scientific projects in the field of hydrology.
- Water resources management, drought, flood and forest fire forecasting, and irrigation.



Data

From surface to root-zone soil moisture derived from L-band MW

Temporal coverage

since 2010

Spatial coverage

Global

Temporal resolution

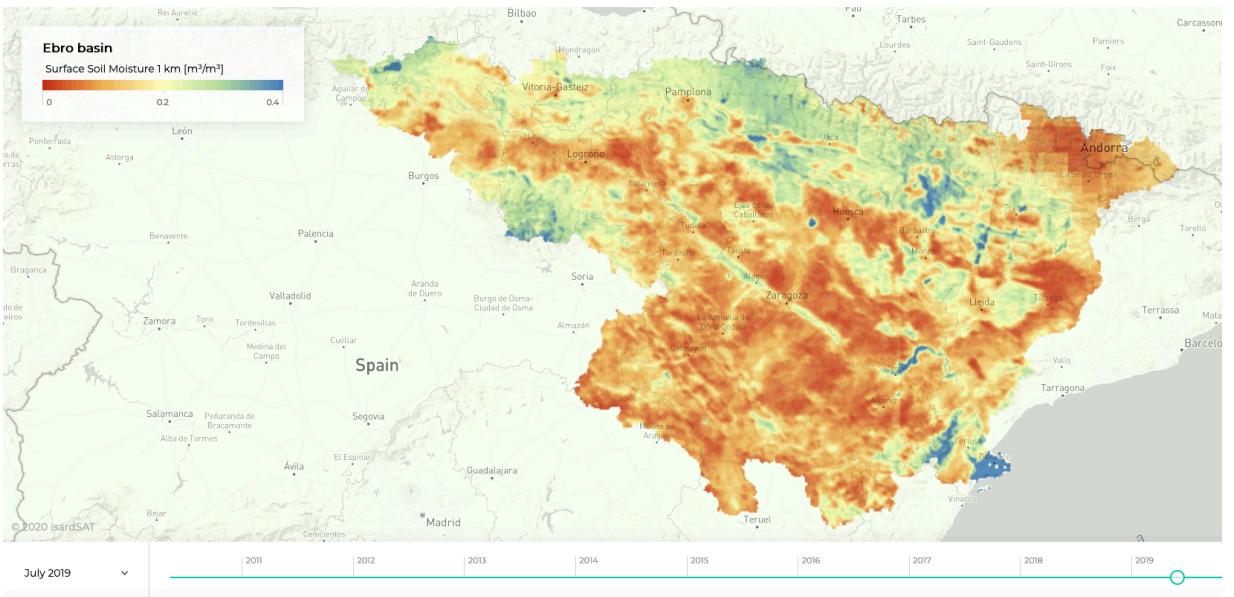
every 1/2 days

Spatial resolution

1 km

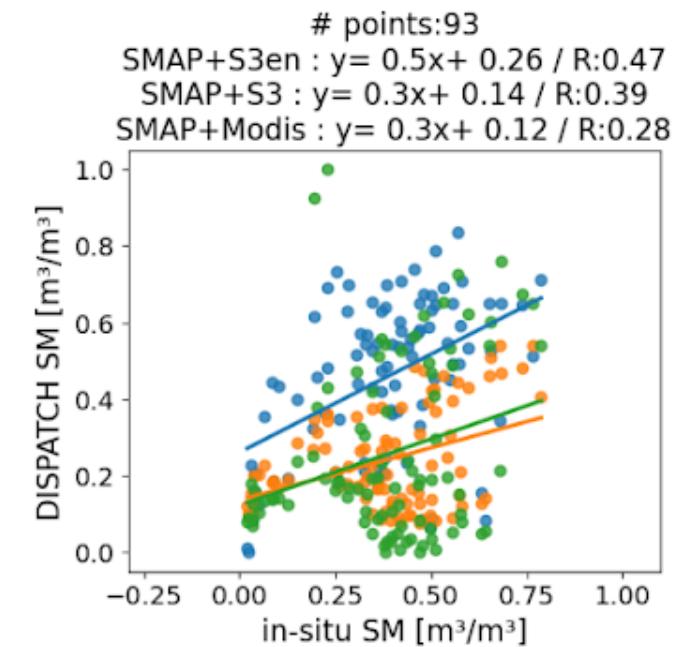
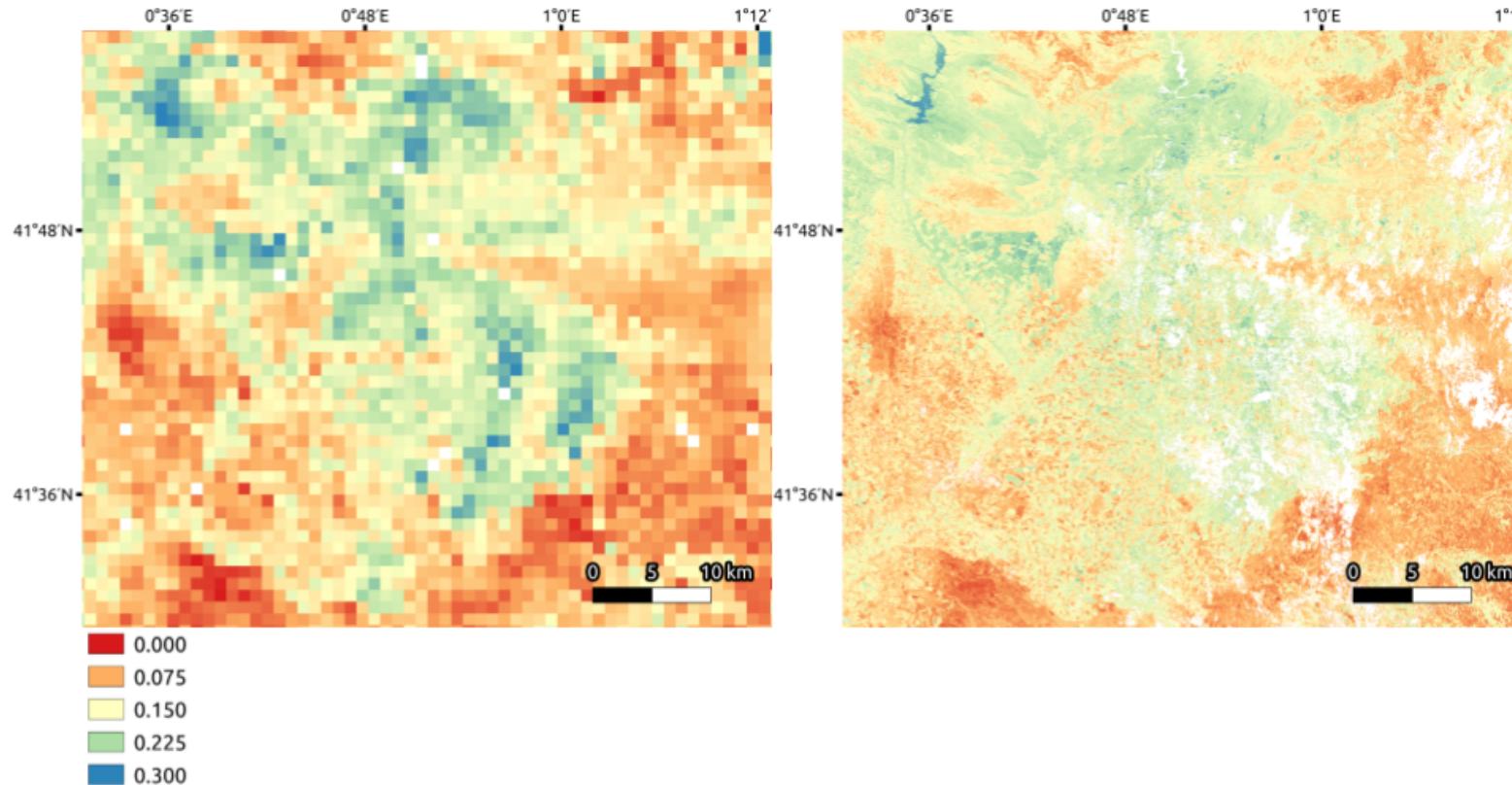
Delivery

WMS, FTP, direct download



High resolution soil moisture, disaggregation with SMOS/SMAP in combination with thermal/optical data S3/MODIS (Merlin et al. 2013, Stefan et al. 2021)

Soil Moisture at the parcel scale (20 m)



Paolini, Giovanni, et al. "Disaggregation of SMAP soil moisture at 20 m resolution: validation and sub-field scale analysis." *Remote Sensing* 14.1 (2021): 167.

Observatori de la Sequera TA i AP





Generalitat de Catalunya
Departament d'Agricultura, Ramaderia,
Pesca i Alimentació
Escola Agraria de Gàndesa

Butlletí de l'Observatori de la Sequera a la Terra Alta

- Data de publicació: 16/11/2020 03:23
- Darrera data amb observacions: 14/11/2020
- Validesa: 16/11/2020 - 23/11/2020

Precipitació recollida i seguiment de la sequera meteorològica

Estació	Darrera Setmana (08/11-14/11)	Darrer mes complet (Octubre)	Qualificació de la sequera del darrer mes complet
Batea	1.0	10.2	Normal
Gàndesa	0.7	14.2	-
Horta Sant Joan	1.4	12.0	Sec

Dades meteorològiques

- A Batea, Gàndesa i Horta de Sant Joan estem utilitzant dades del Servei Meteorògic de Catalunya.
- A la Pobla de Massaluca estem utilitzant dades de l'Agència Estatal de Meteorologia.
- La probabilitat de precipitació dels propers dies es calcula en base a la previsió de l'Agència Estatal de Meteorologia.

Humitat del sòl

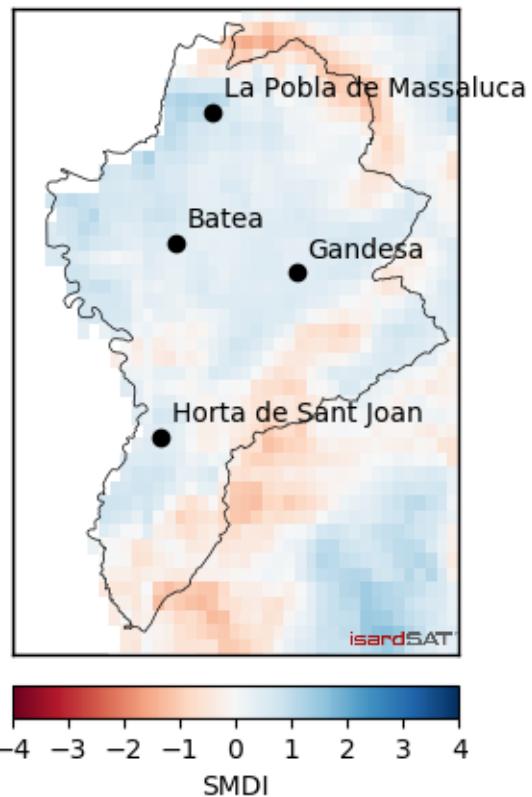
- La humitat del sòl es presenta mitjançant l'índex d'humitat del sòl (SWI), que val 100% a capacitat de camp i 0% al punt de pansament permanent (o inferior).
- Aquesta humitat del sòl es qualifica en base a l'índex de sequera SMDI, que és relatiu al clima de cada indret i té en compte la humitat del sòl de la setmana en curs i les setmanes precedents.
- La humitat del sòl s'estima amb un model de balanç hidràtic, que és calibrat regularment en base a les dades d'humitat del sòl observades.

Recomanacions de reg

Abans d'aplicar els regs s'ha de tenir en compte que:

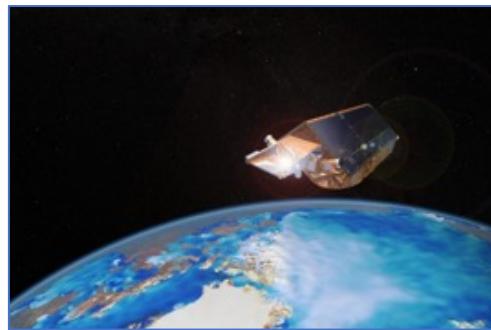
- El reg recomanat s'ha d'aplicar cada dia de la setmana que comença avui.
- El reg recomanat s'ha calculat considerant que no plourà durant aquesta setmana. Si al llarg de la setmana plou, els regs hauran de disminuir.
- Per calcular el reg recomanat s'estima l'evapotranspiració de la setmana en base a les previsió de temperatura per aquesta setmana de l'Agència Estatal de Meteorologia. - El valor de reg recomanat és orientatiu. Cadascú l'haurà de modificar en funció de l'estat fenològic de les plantes.
- El temps de reg s'ha calculat tenint en compte considerant 2 goters de 4 l/h per cep, amb un marc de 2.8 m. * 1.20 m.
- La necessitat de reg s'ha calculat en base a un model de balanç hidràtic, basat en els principis del manual FAO-56 de l'Organització de Nacions Unides per l'Agricultura i l'Alimentació (FAO).

01/11/2020-07/11/2020

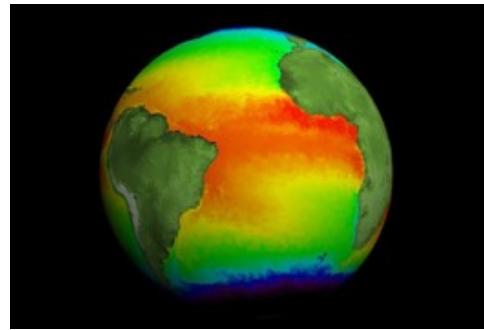


Climate services: Lobelia

Lobelia connects the latest scientific knowledge about our changing climate with operational services that support end-users with sound decision making.



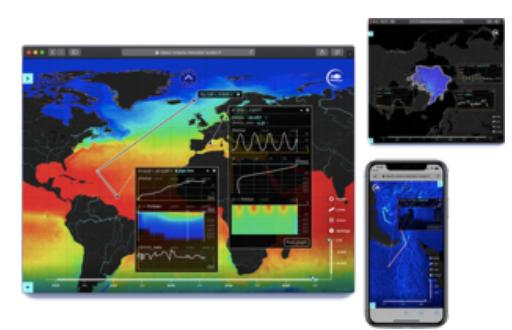
Earth Observation big data processing and AI



Applied climate science



Cloud-native tech



Understanding of user needs and existing practices



C/ Doctor Trueta, 113, 1r
08005 Barcelona

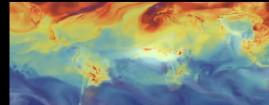
Surrey Research Park
40 Occam Road
Guilford, Surrey GU2 7YG, UK

+ 34 93 350 55 08
info@isardSAT.cat
<https://www.isardsat.cat/>



Lobelia.

Continuous optical and SAR-based coastline change monitoring service



Space data for Sustainable Tourism

17th May 2024





Delineation and monitoring of coastlines using optical imagery

DATA	Temporal evolution / Projections of global coastal change	
Temporal coverage	2015 - today (Sentinel-2)	1984 - today (Landsat)
Spatial coverage	Coastal zones	
Temporal sampling	12 days	16 days
Spatial resolution	10 m	30 m



Sentinel-2

Sentinel-2 (from 2015 to 2023) 10 m: Three beaches (Santa Susana, Pals and Altafulla) all dates without clouds.

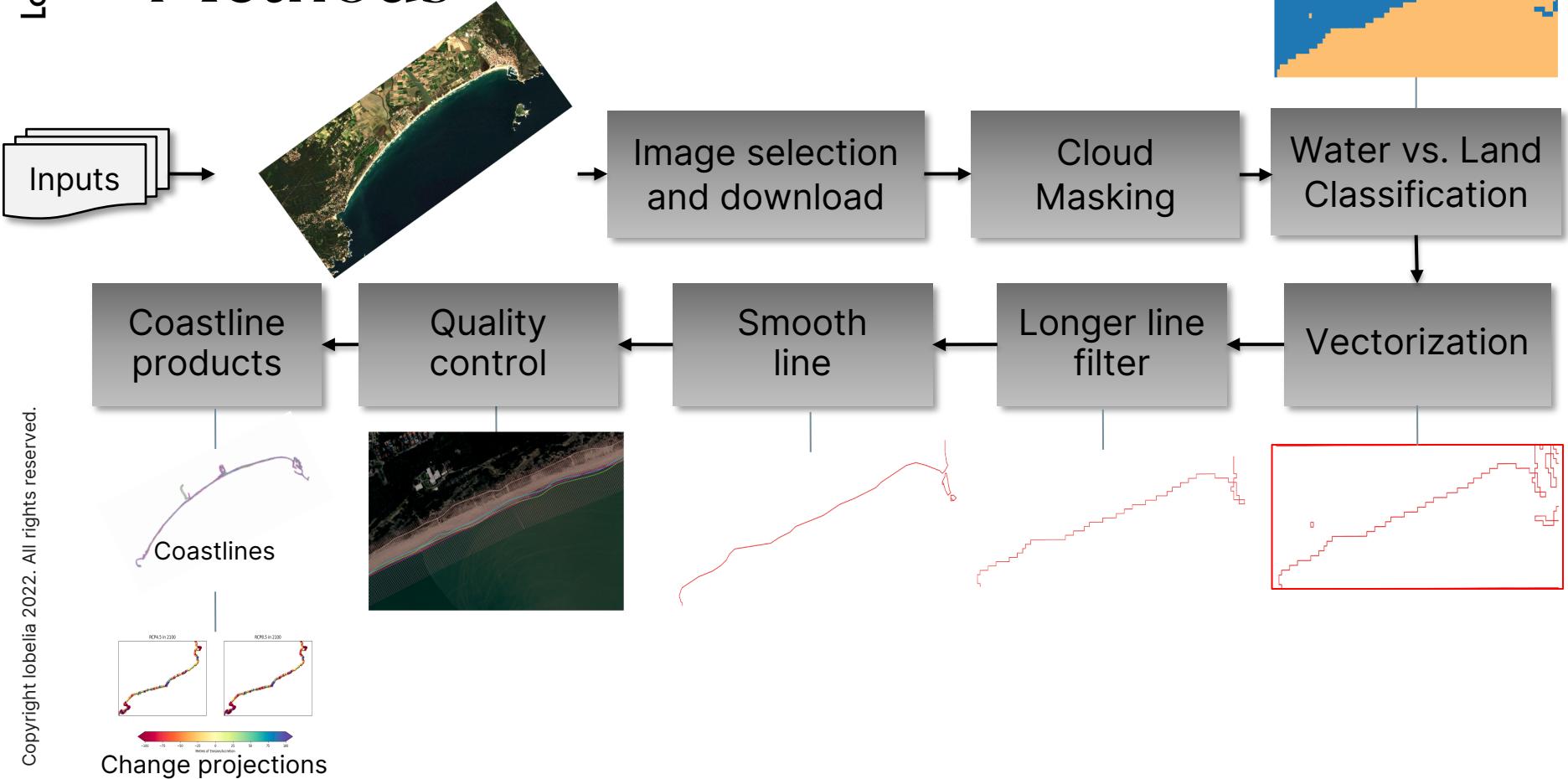
Spatial and temporal resolution

Landsat 5, 7 and 8 (from 1984 to 2023) 30 m: The entire coast of Catalonia per year.



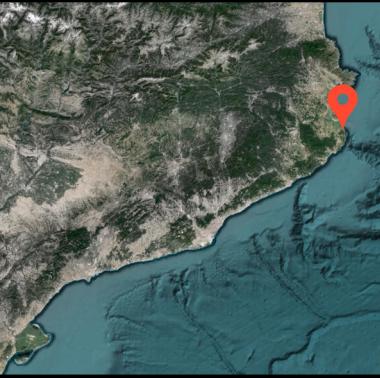
Landsat-8

Methods



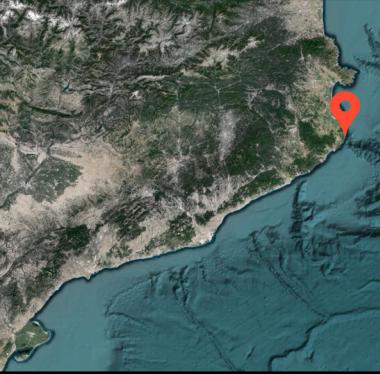
Estartit beach,
Costa Brava

Catalunya



Pals beach, Costa Brava

Catalunya



Continuous SAR-based coastline change monitoring service

DATA

Coastline time series/ Change Rate estimates

Temporal coverage

2014 -today

Spatial coverage

Coastal environments

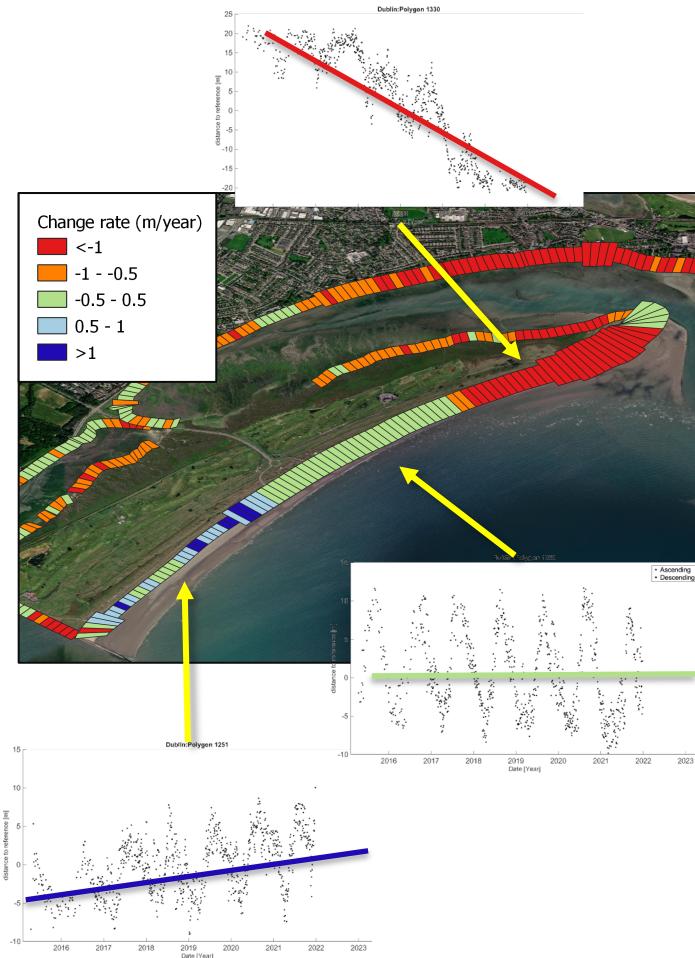
Temporal sampling

Weekly

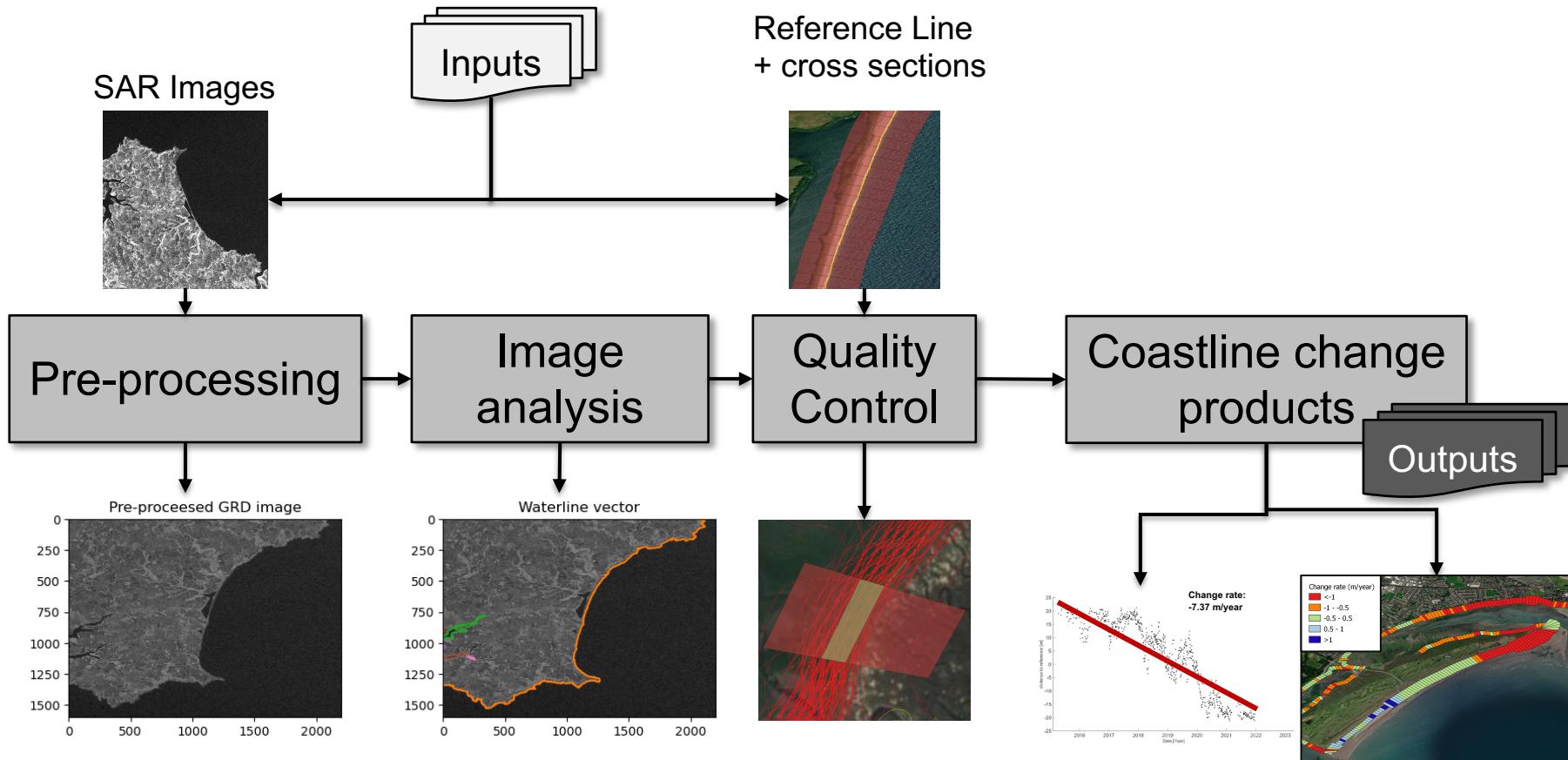
6 months

Spatial sampling

Configurable between 10 to 100 meters along the coast



Coastline Change Monitoring Methods



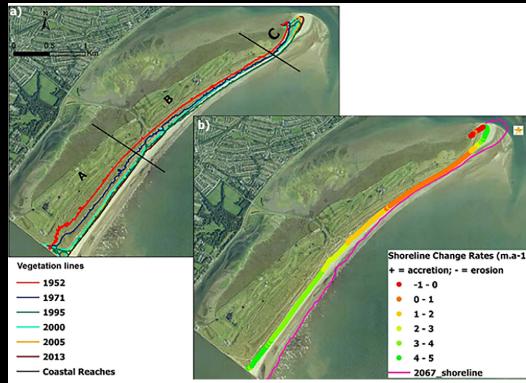
Bull island, Ireland



Sentinel-1 images 2014-2022

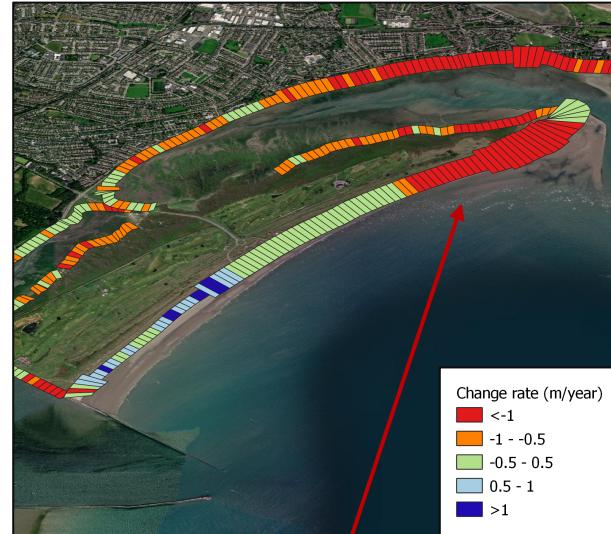


5 km beach with clear erosion-accretion processed at the edges

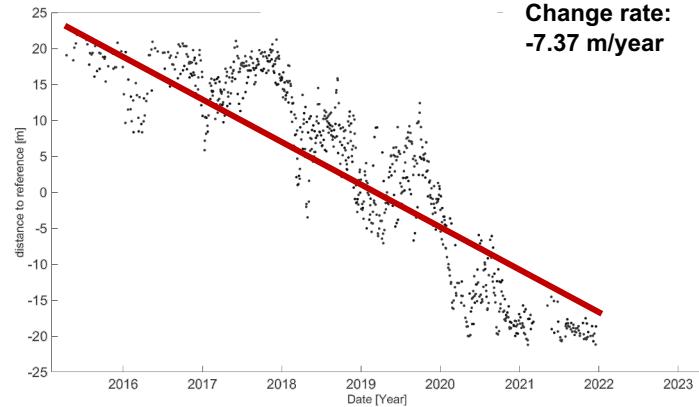


Sojan Mathew et al. [link](#)

Coastline
change rate



Coastline position
time series

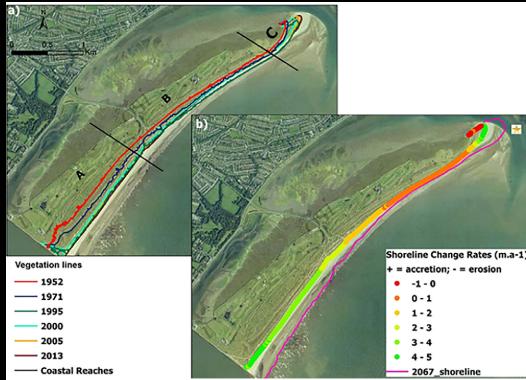


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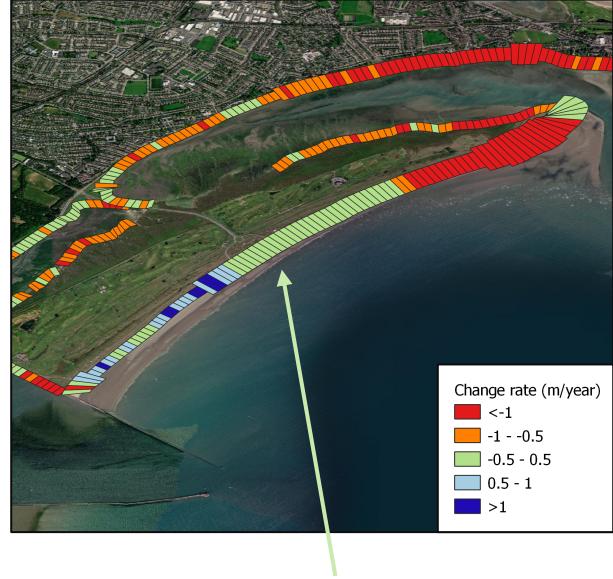
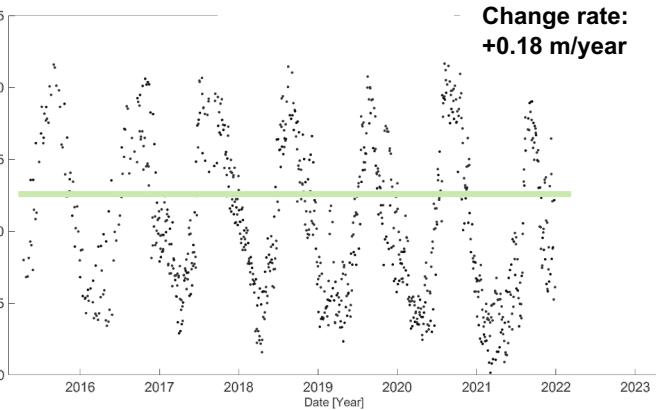
Sentinel-1 images 2014-2022

5 km beach with clear erosion-accretion processed at the edges



Sojan Mathew et al. [link](#)

Coastline position time series



Salinas-Espartal, Asturias



Sentinel-1 images 2014-2022

Main causes of erosion

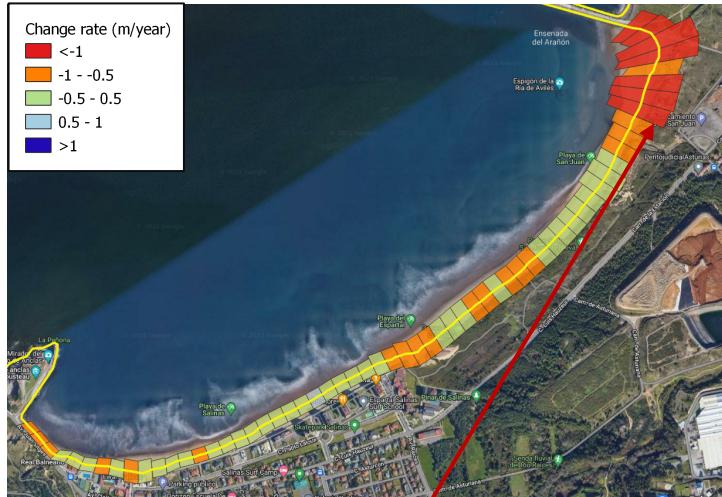
Sea Level Rise

- Increase of extreme meteo events, Climate Change
- Dredging
- Man made rigid structures

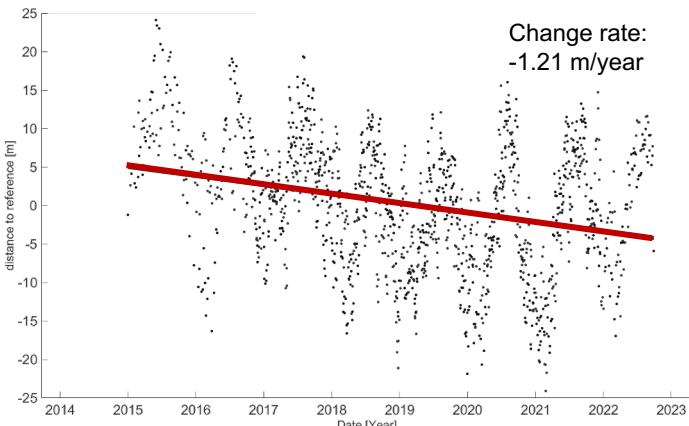
Source: *laprobetapaisaje*



Coastline change rate



Coastline position time series



Salinas-Espartal, Asturias



Sentinel-1 images 2014-2022

Main causes of erosion

Sea Level Rise

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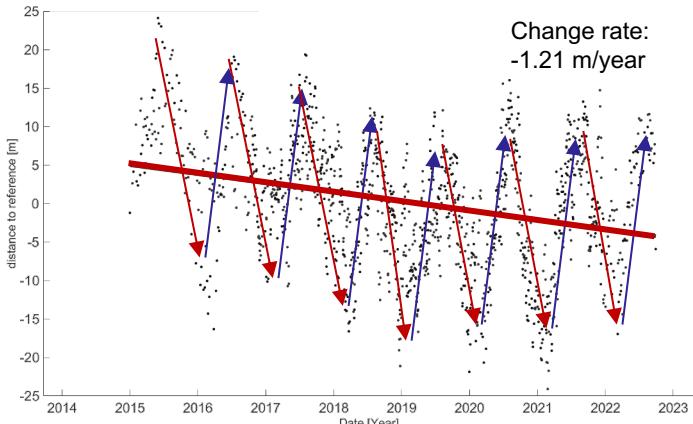
Coastline change rate



Detection of the seasonal erosion-accretion periods.

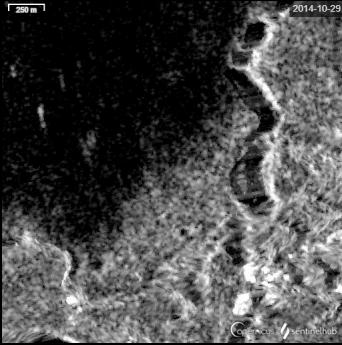
Not possible to observe it with optical satellite data due to the reduced number of images (cloud cover area)

Coastline position time series



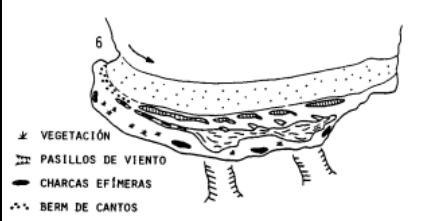
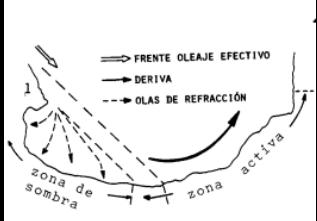
Change rate:
-1.21 m/year

Xagó, Asturias



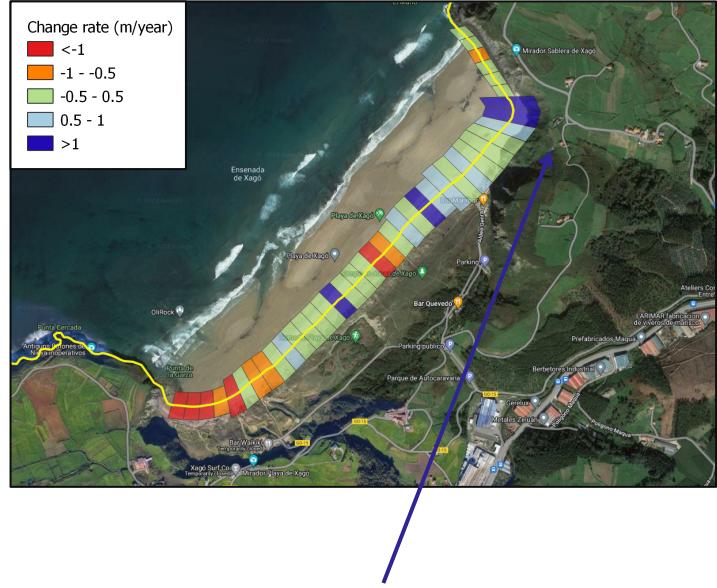
Sentinel-1 images 2014-2022

Contrary to the majority of Cantabrian dune beaches, Xagó is gaining sediments thanks to its situation and orientation.

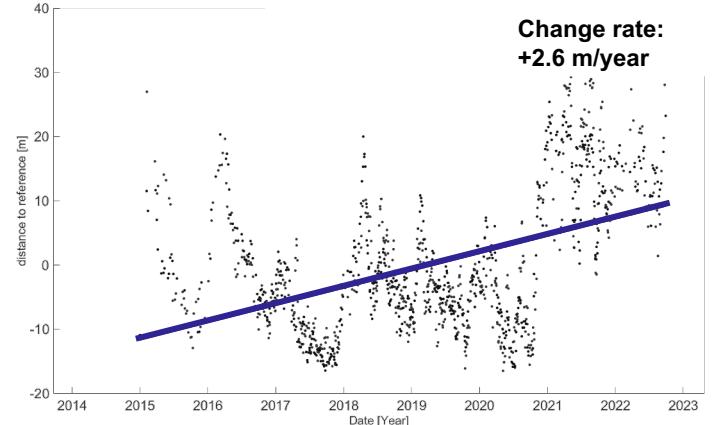


I. Suárez Ruiz et al. <https://doi.org/10.17811/tdg.13.1983.113-129>

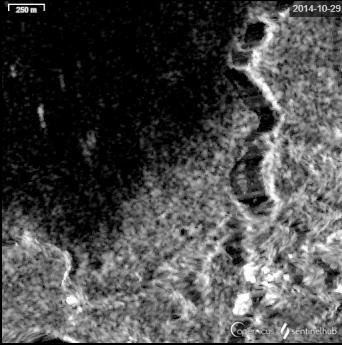
Coastline change rate



Coastline position time series

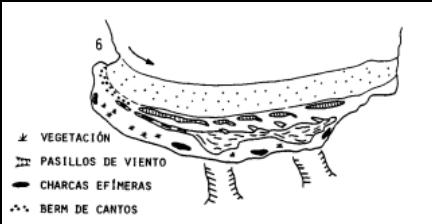
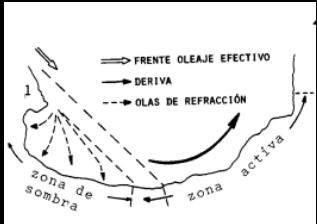


Xagó, Asturias

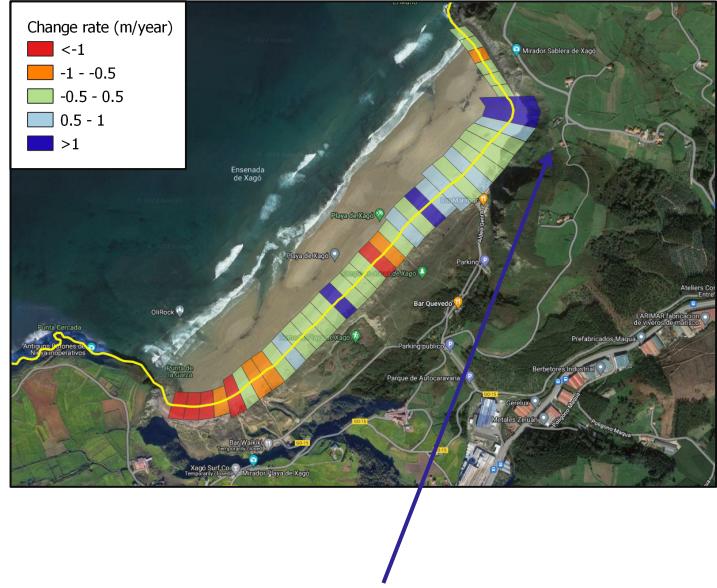


Sentinel-1 images 2014-2022

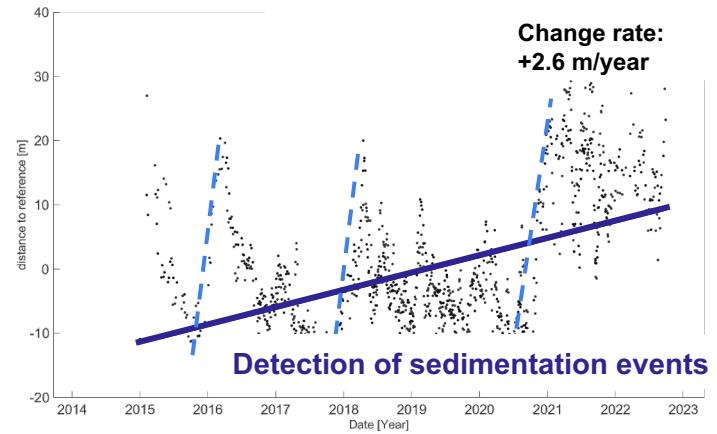
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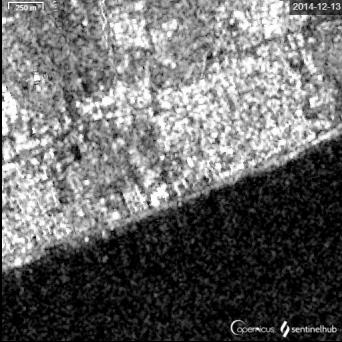
Coastline change rate



Coastline position time series



Pineda de Mar, Catalunya



Sentinel-1 images 2014-2022

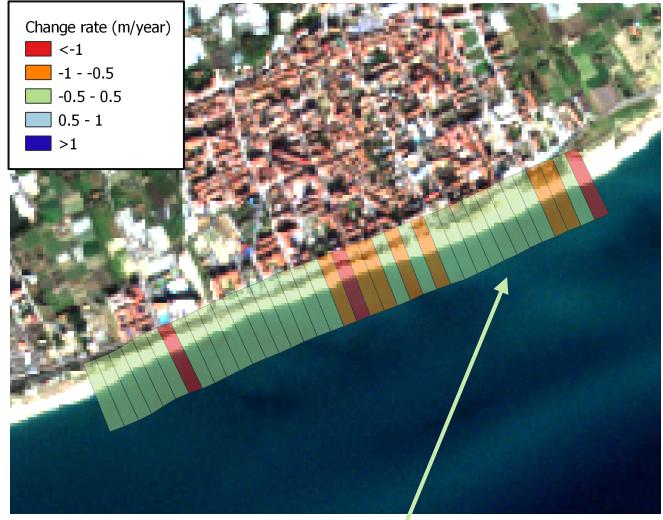
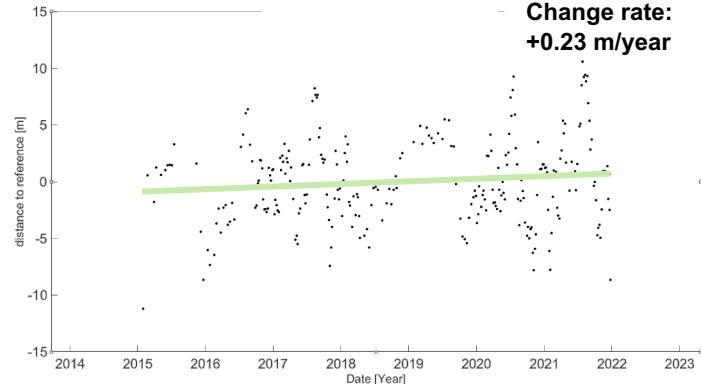


Governmental
actuations planned
in the area in order
to repair the eroded
zones.

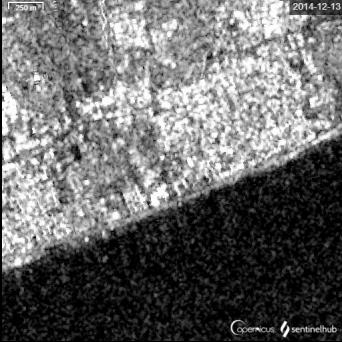


Source: Miteco [link](#)

Coastline position time series



Pineda de Mar, Catalunya



Sentinel-1 images 2014-2022

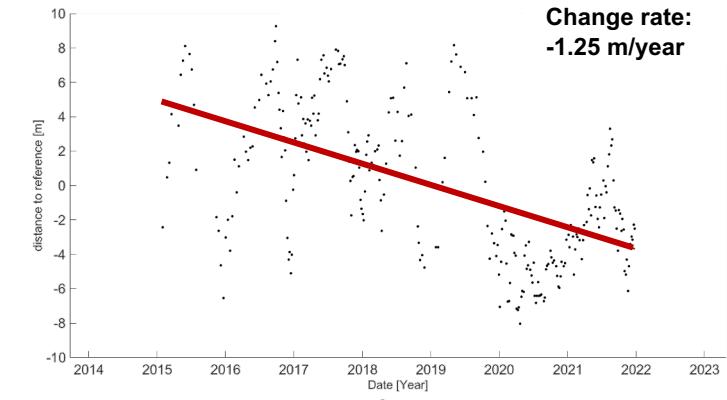
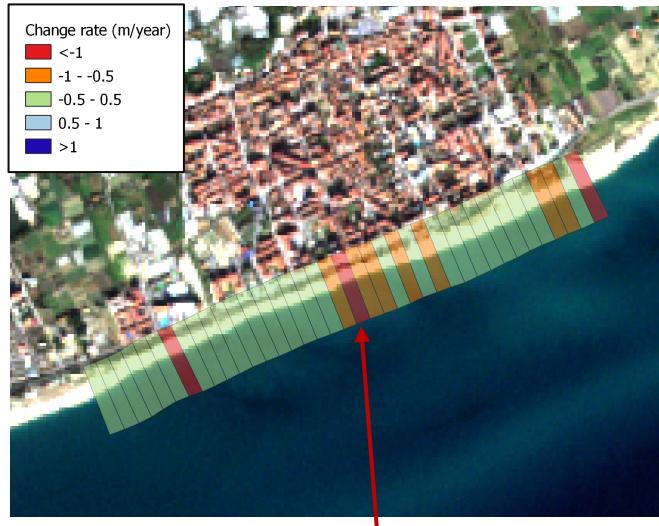


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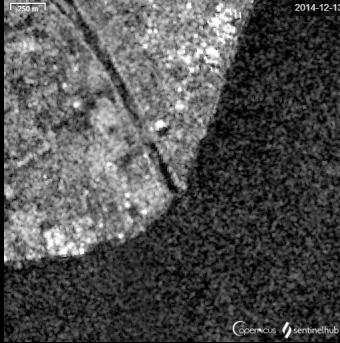


Source: Miteco [link](#)

Coastline
position
time series



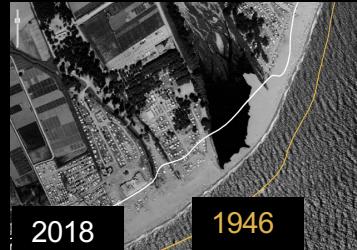
Tordera, Catalunya



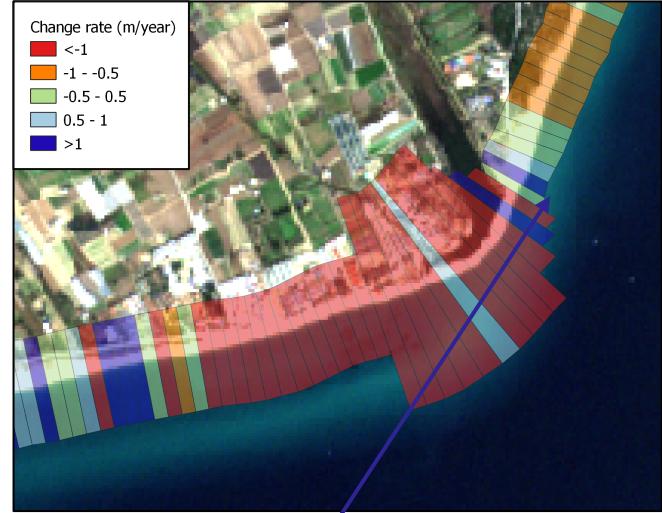
Sentinel-1 images 2014-2022

Tordera river is not proving enough sediments to balance the long-term erosion produced in Tordera beaches. Business, Utilities and Campsites are at risk.

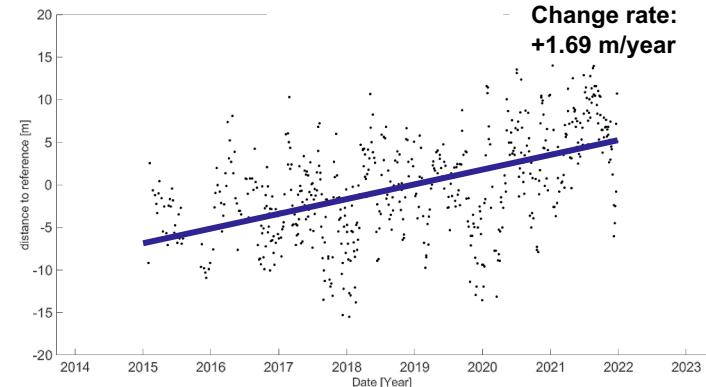
Source: J.M. Panareda [link](#)
J.A. Jiménez [link](#)



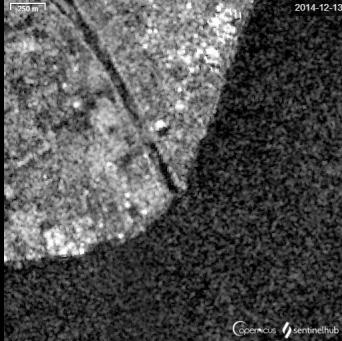
Coastline change rate



Coastline position time series



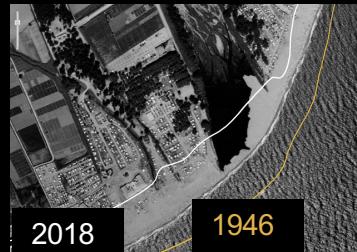
Tordera, Catalunya



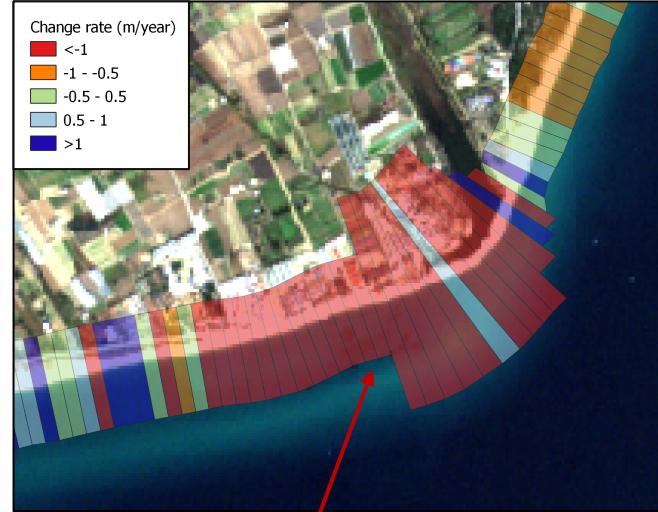
Sentinel-1 images 2014-2022

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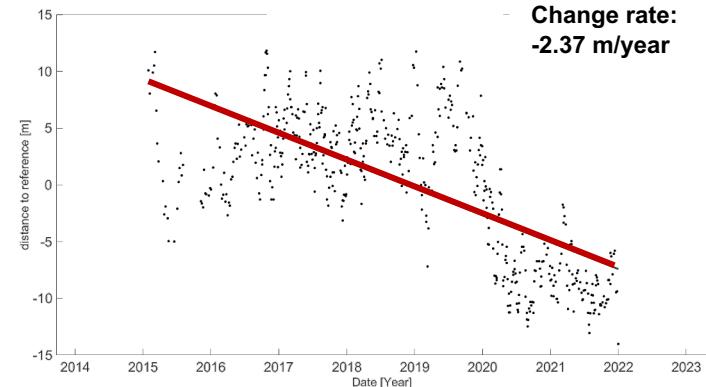
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Coastline change rate

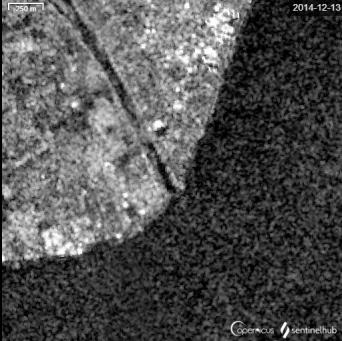


Coastline position time series



Change rate:
-2.37 m/year

Tordera, Catalunya



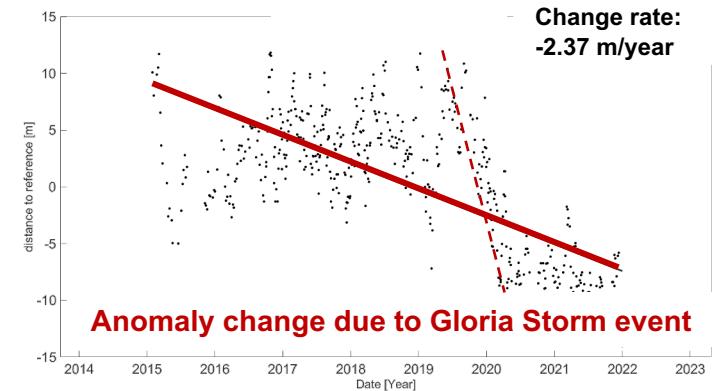
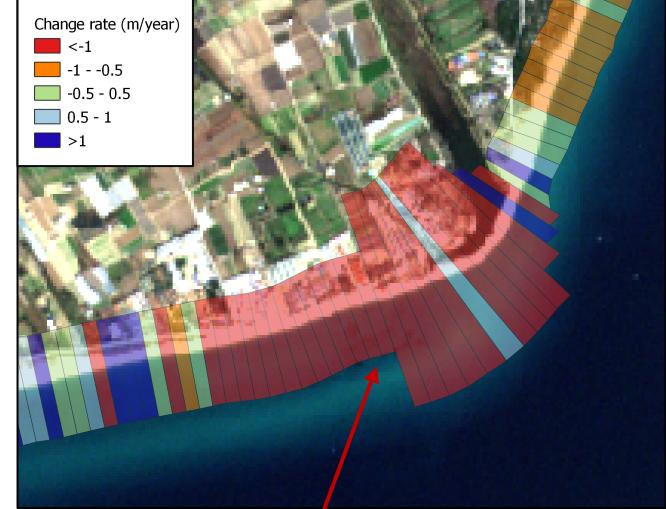
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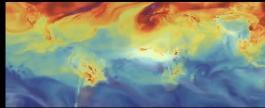


Coastline position time series



Lobelia.

- Optical and SAR-based coastline change monitoring service
- Service starting in 1984
- Robust to meteorological conditions, day and night
- Change rate (erosion – accretion) at 10m – 100m spatial resolution



Lobelia.

Thank you.

