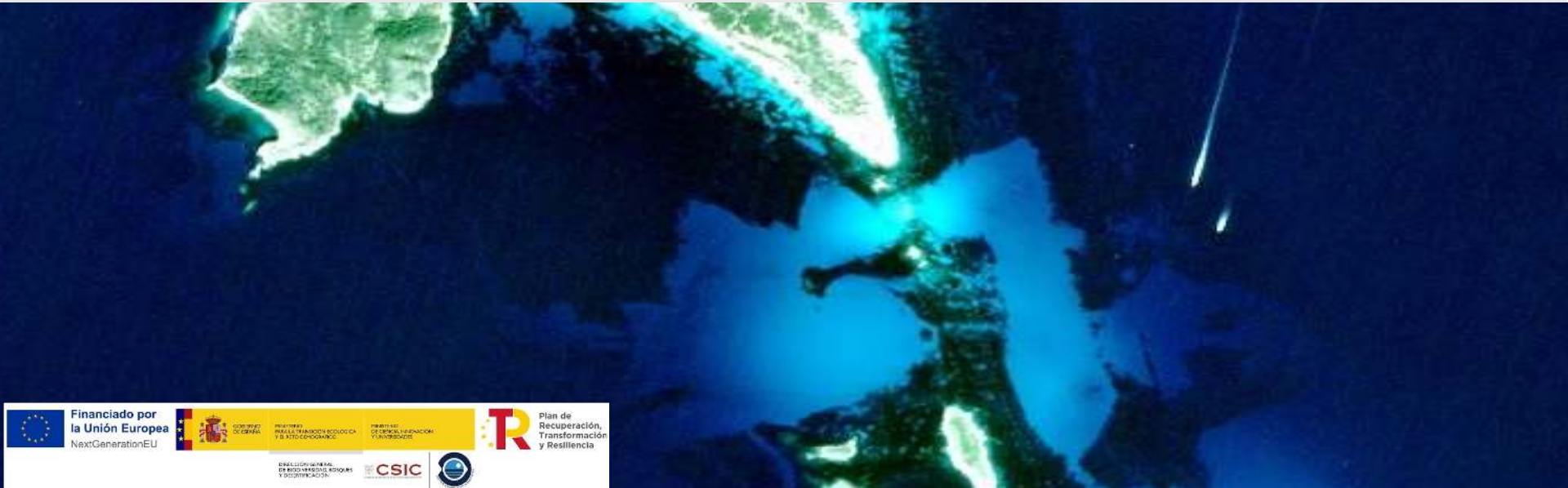
MERGING SCALES AND METHODOLOGIES:

FROM UNDERWATER TOWED CAMERAS TO SENTINEL-2 TO ASSESS SEAGRASS DISTRIBUTION

Fernando García-González, Jose Martínez-Garrido, Jaime Bernardeau-Esteller, María D. Belando, Irene Rojo, Marta García-Sánchez, Carmen Mompeán, Rocío García-Muñoz, Lázaro Marín-Guirao & Juan M. Ruiz

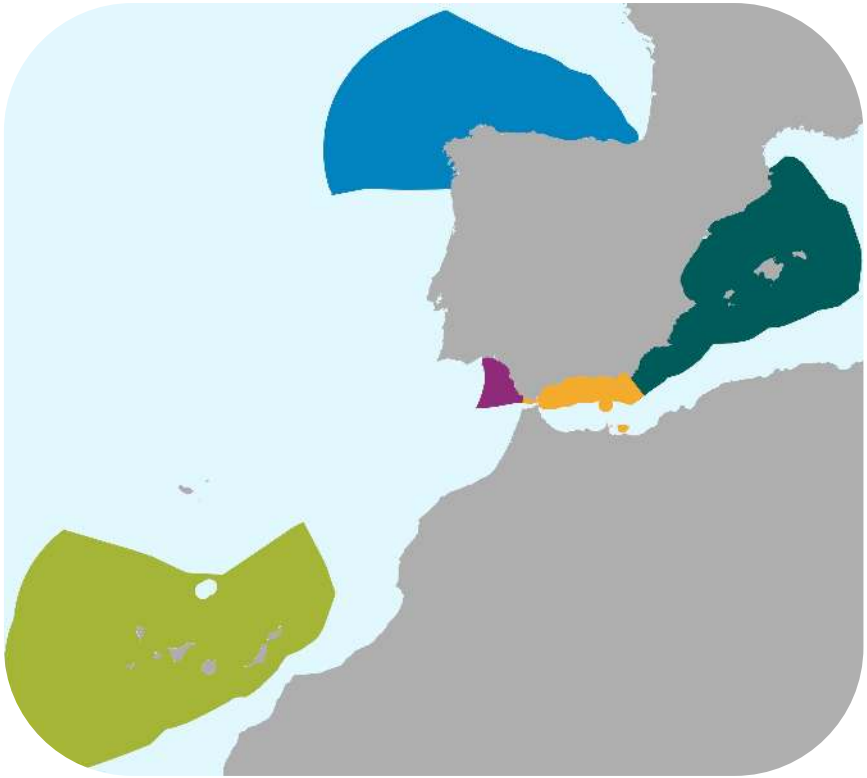
Seagrass Ecology Group (GEAM) - Spanish Institute of Oceanography - National Scientific Research Council (IEO-CSIC)



Financiado por la Unión Europea NextGenerationEU

Plan de Recuperación, Transformación y Resiliencia

CSIC



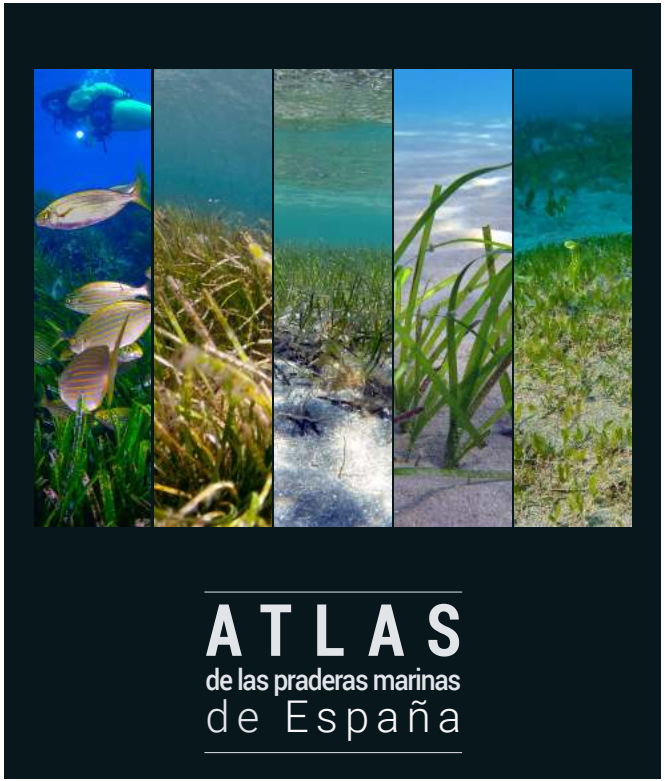
5 Spanish Marine Regions

North Atlantic
South Atlantic
Gibraltar and Alboran Sea
Mediterranean
Canary Islands

INTRO

SEAGRASS OBSERVING SYSTEM





"I have great admiration for the fact that with so many participants in this project, it has led to the publication of the Sea-grass Atlas of Spain, a work that is unique in its genre. I very much hope that this Spanish example will be followed by scientists in other countries."

C. den Hartog

BOOK CHAPTERS

CARTOGRAPHIES

North Atlantic

NORGRASS (20 Field days)
- 12 monitoring stations
- 10 underwater video tracks
- drone imagery
- 2000+ ground truth points

Mediterranean

CHEGRASS (20 Field days)
IBGRASS (35 field days)
ACHOGRASS (20 field days)
CATGRASS (25 field days)
- 189 monitoring stations
- 196 underwater video tracks
- 16 deep limit marks
- AUV imagery
- drone imagery
- 100+ ground truth points



Canary Islands

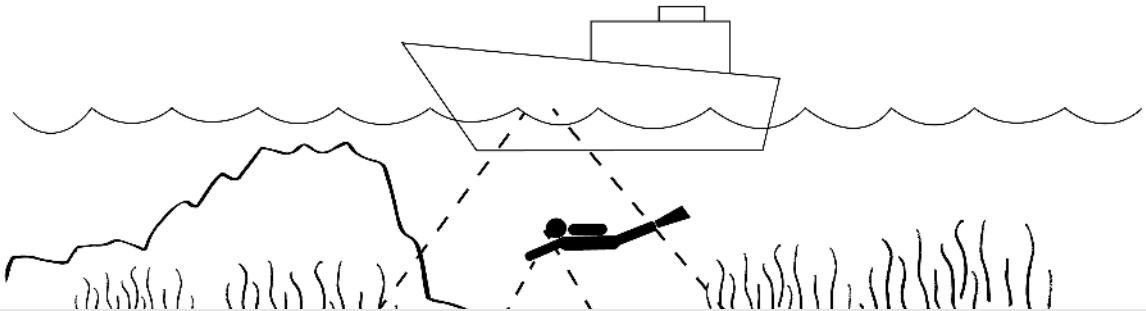
CATGRASS (60 Field days)
- 21 monitoring locations
- 105 underwater video tracks
- drone imagery
- +2000 ground truth points

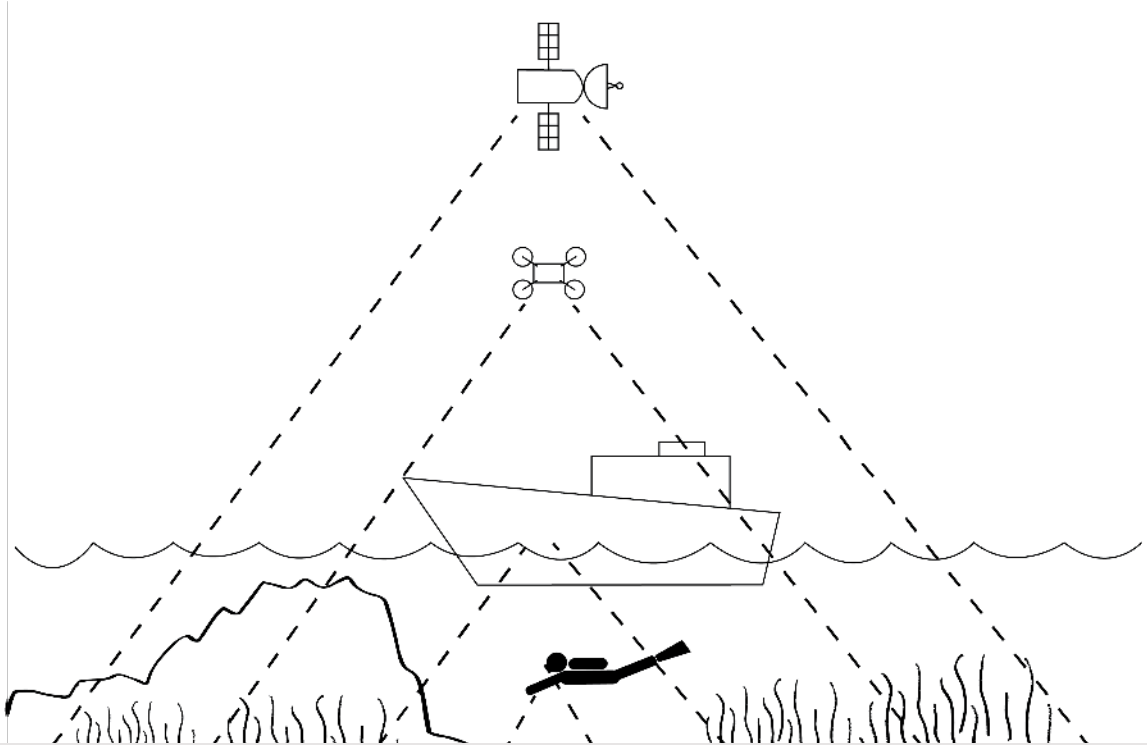
Gibraltar and Alboran Sea

ANDAGRASS (20 Field days)
- 41 monitoring stations
- 35 underwater video tracks
- +2000 ground truth points
- drone imagery

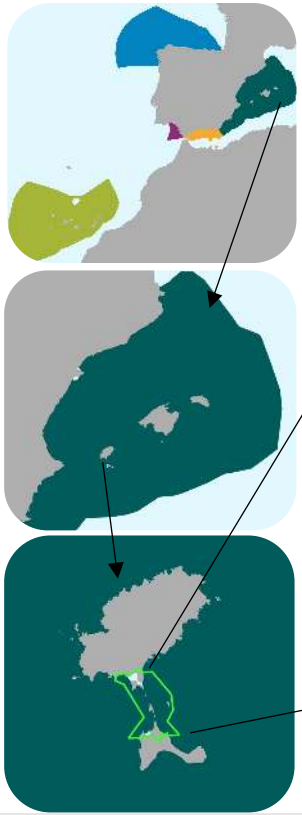
PAST 2 YEARS

- 200+ FIELD DAYS
- 230 MONITORING STATIONS (1000+ TOTAL)
- 16 DEEP LIMIT MARKS
- 346 UNDERWATER VIDEO TRACKS
- DRONE + AUV IMAGERY
- 2000+ GROUND TRUTH POINTS
- AND MANY BEERS

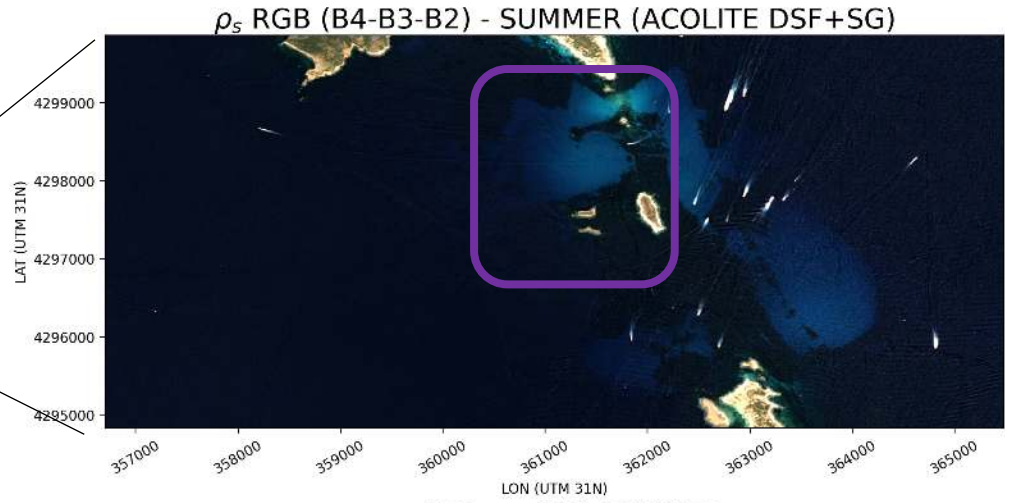




ELS FREUS D'EIVISSA I FORMENTERA MARINE PROTECTED AREA

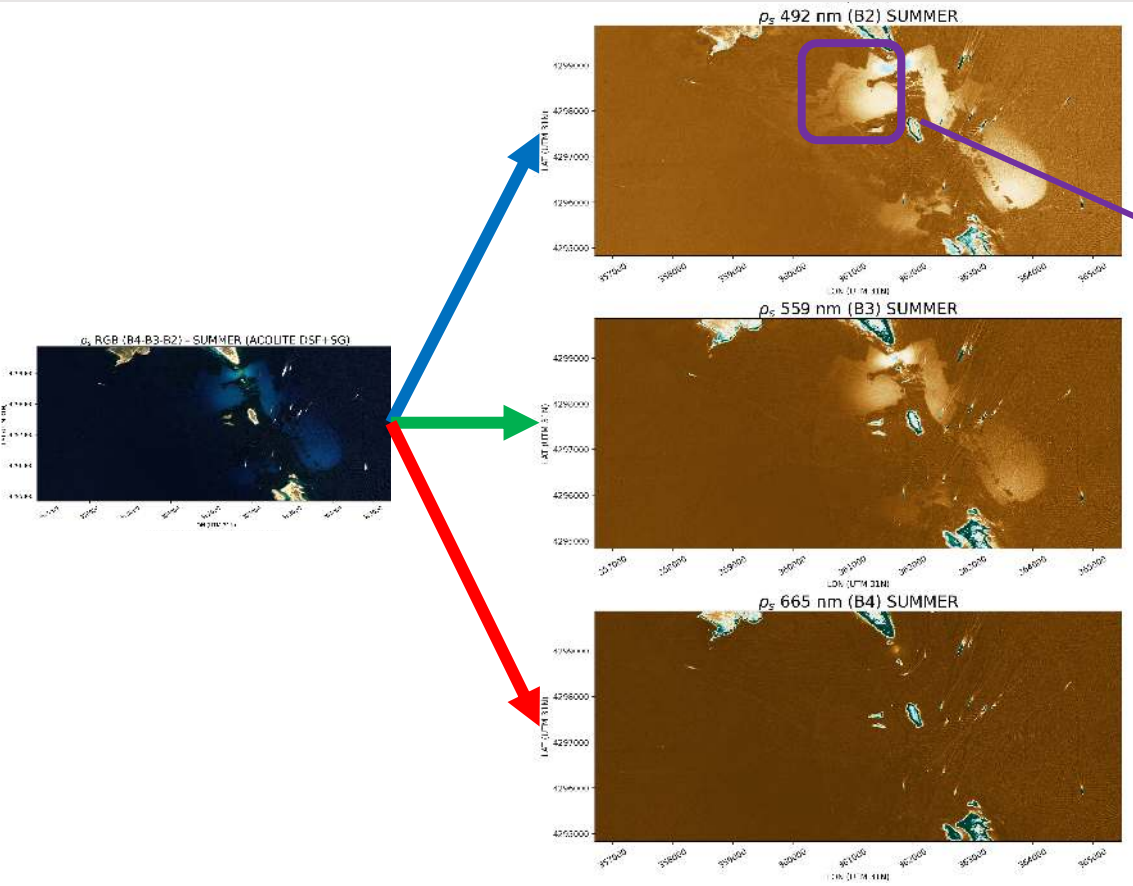




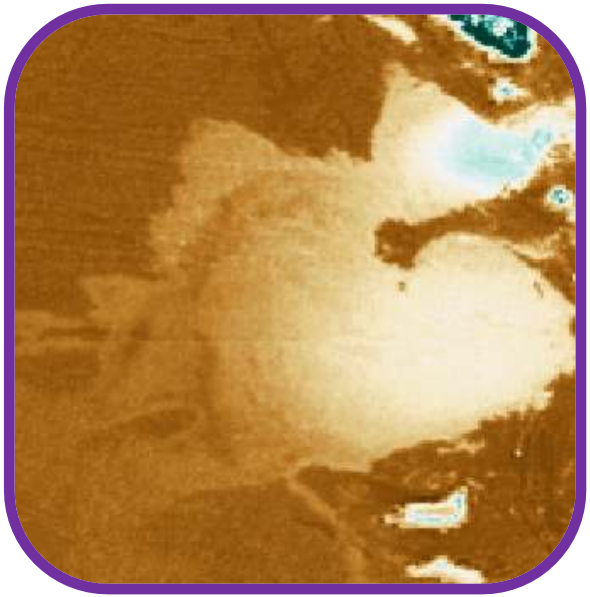


METHODS

SENTINEL-2 IMAGERY

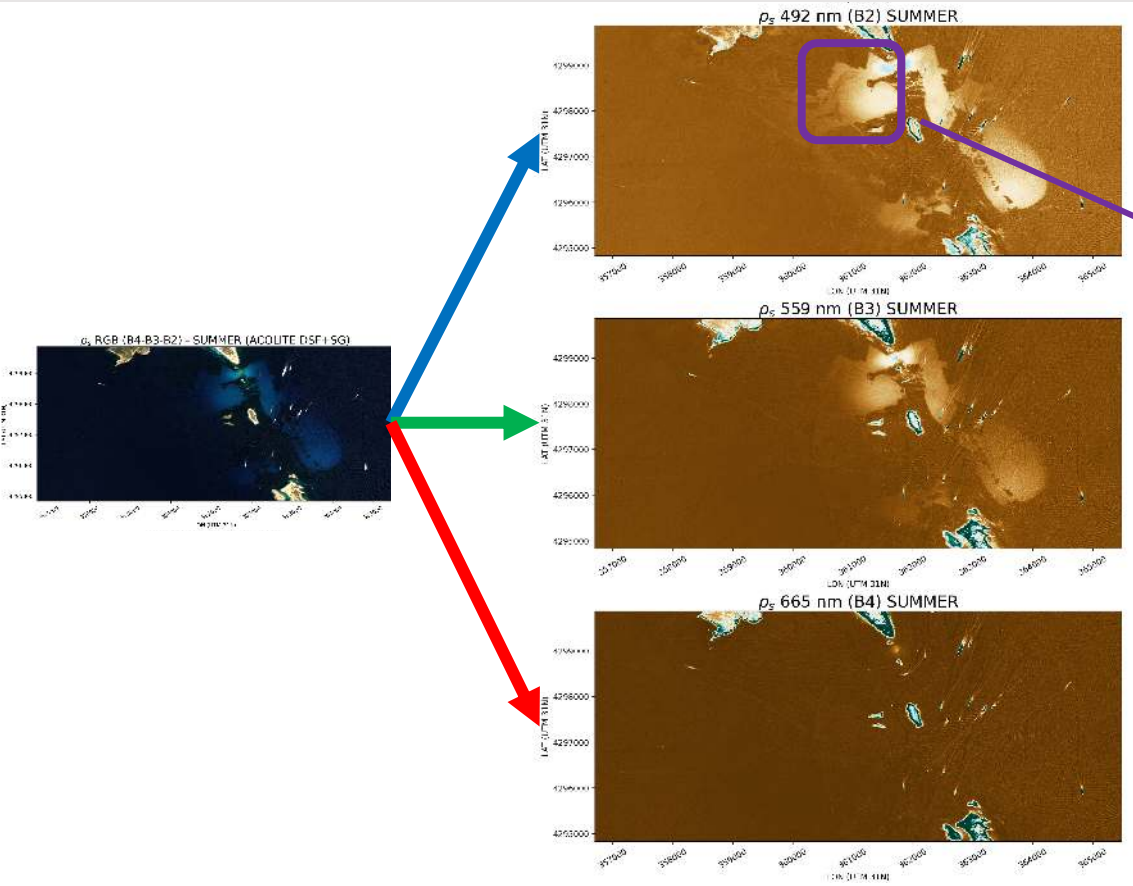


SUMMER

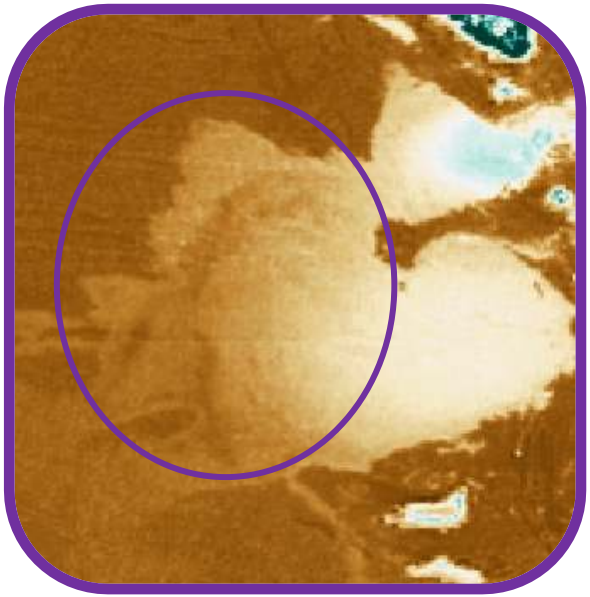


METHODS

SENTINEL-2 IMAGERY

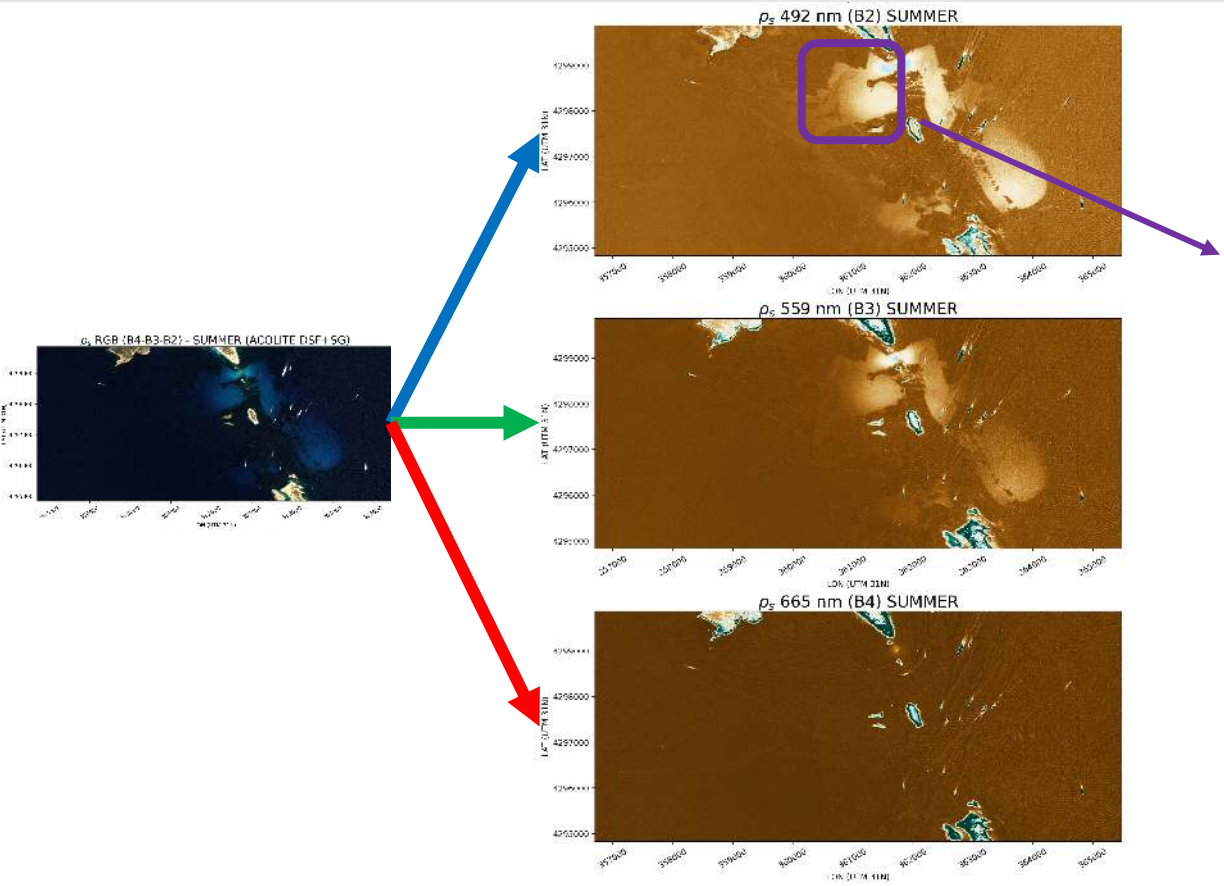


SUMMER



METHODS

SENTINEL-2 IMAGERY

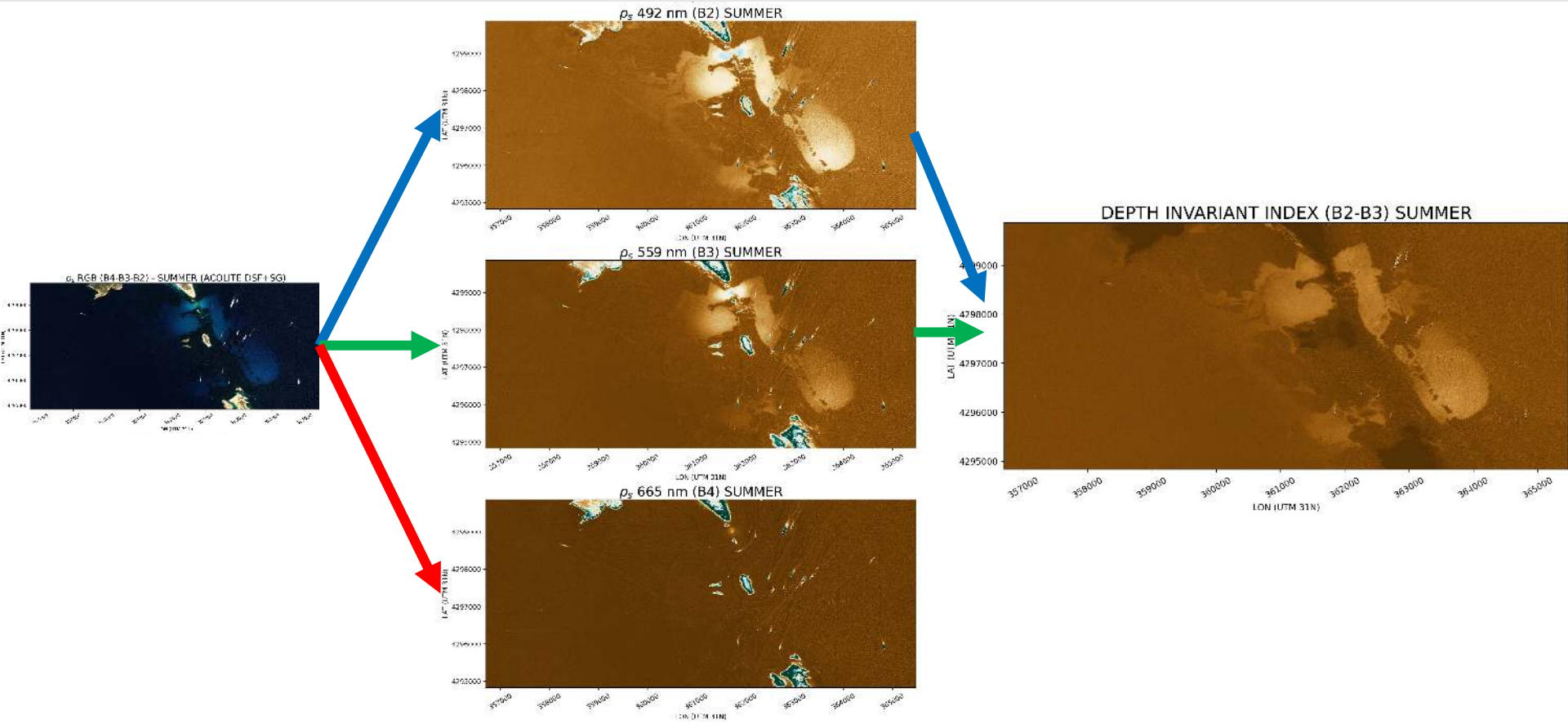


SUMMER

WINTER

METHODS

SENTINEL-2 IMAGERY



METHODS

TOWED CAM

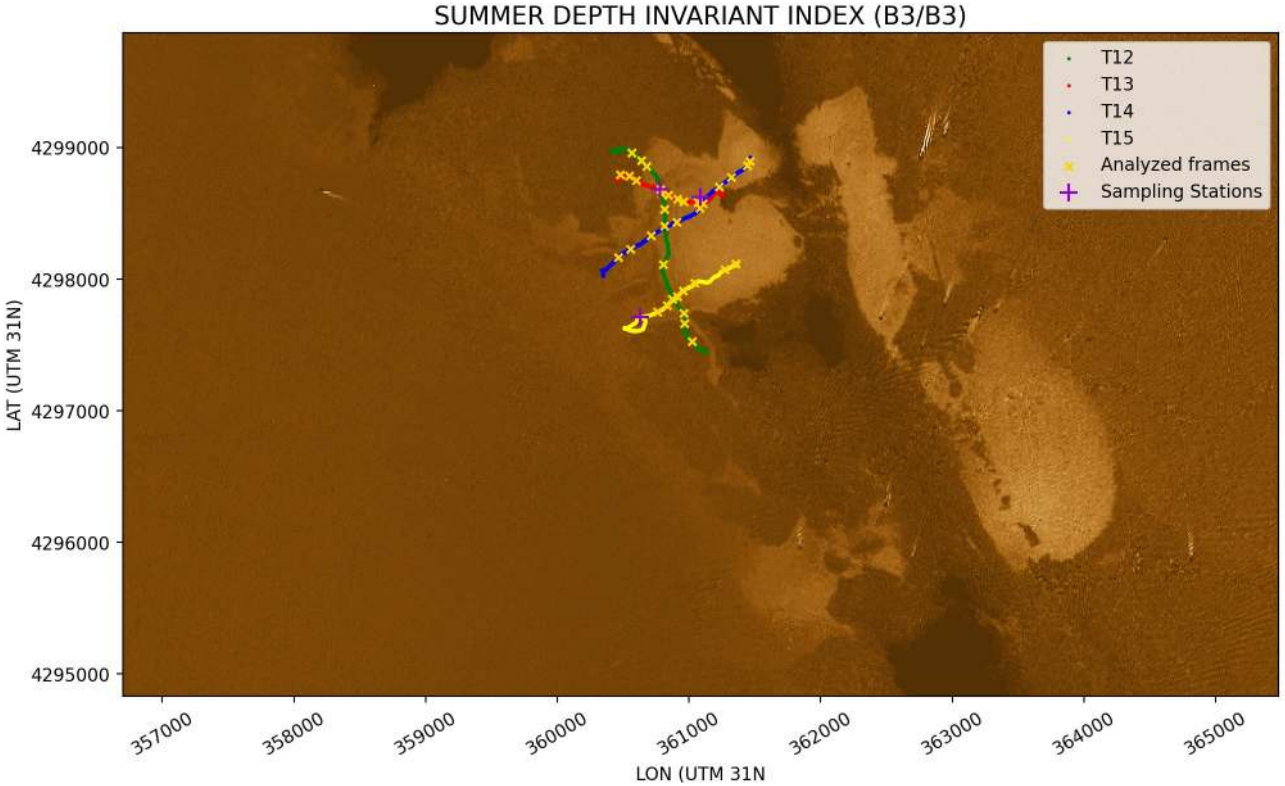






METHODS

TOWED CAM % COVER





% Cover

0 %

20 %

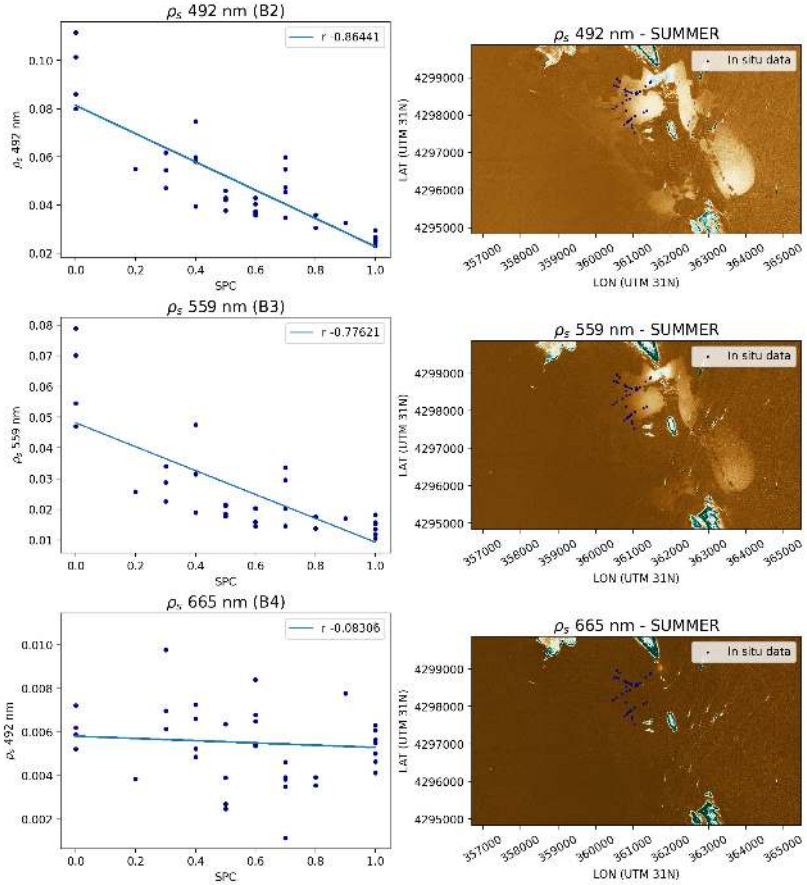
40 %

60 %

80 %

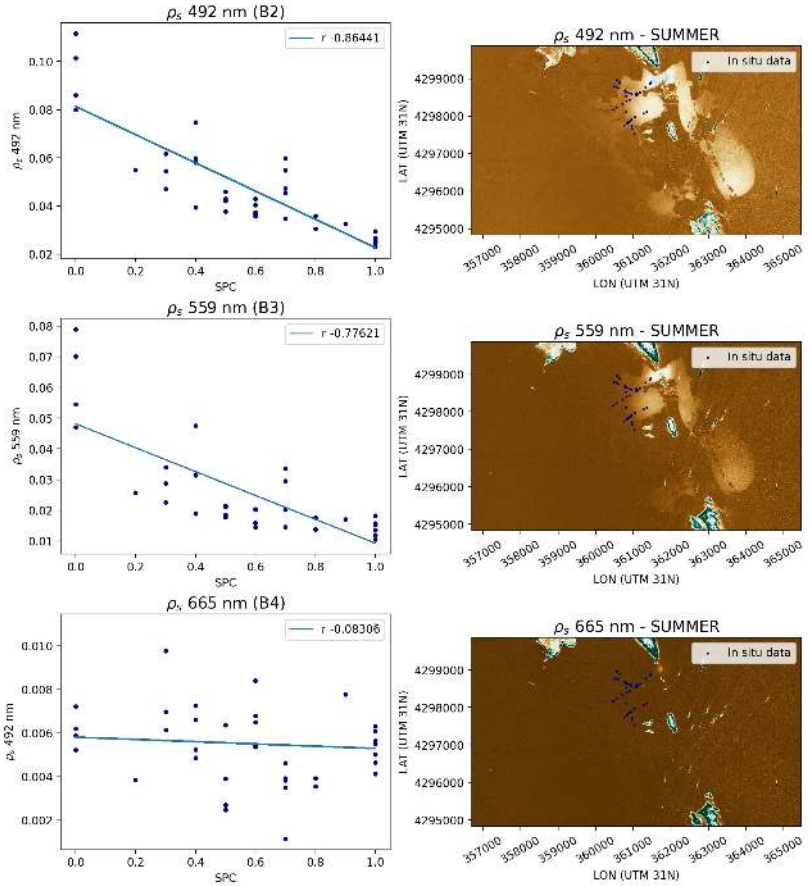
RESULTS

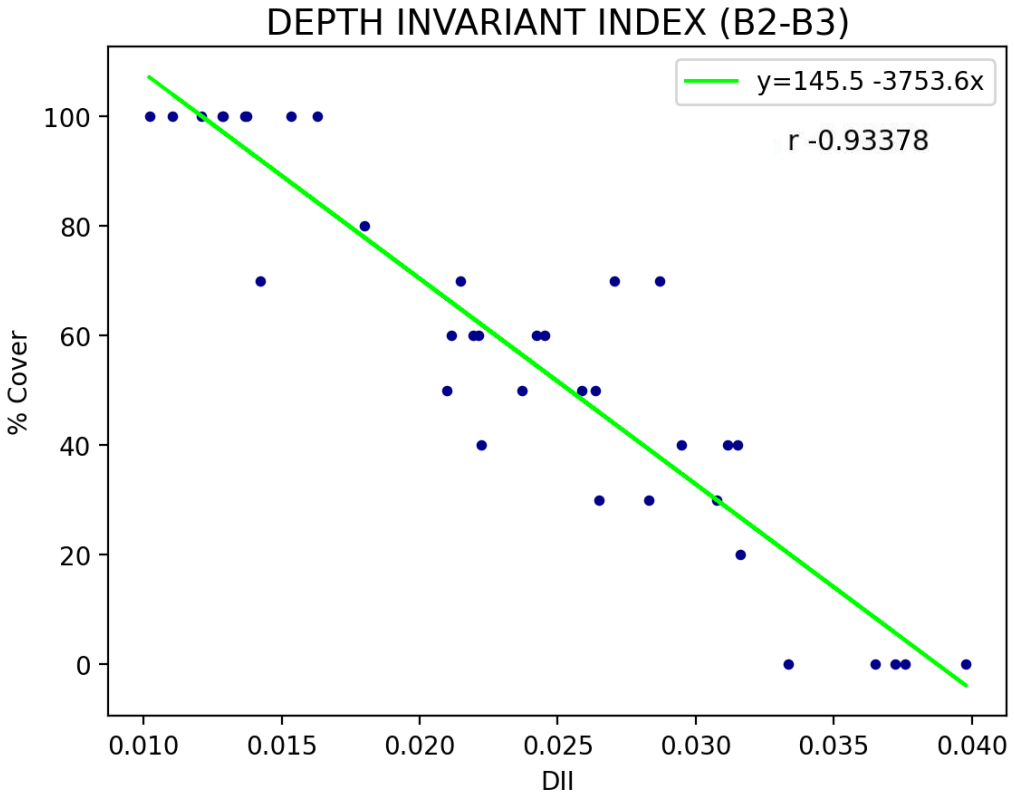
TOWED CAM vs SENTINEL-2



RESULTS

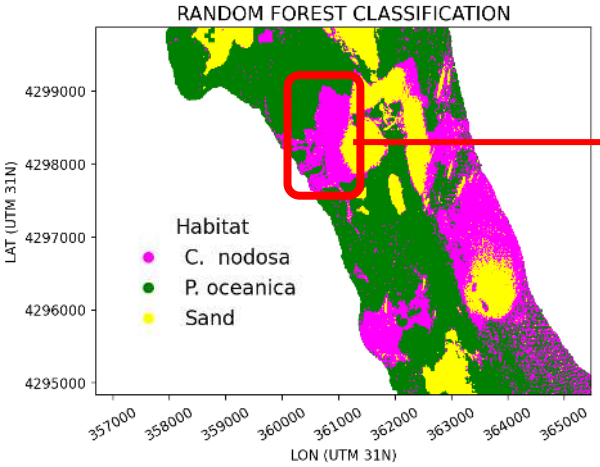
TOWED CAM vs SENTINEL-2

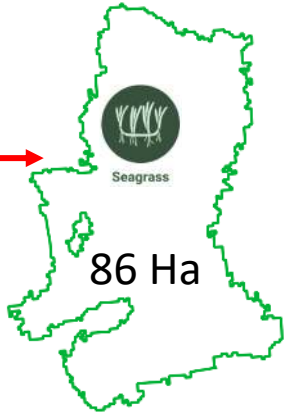


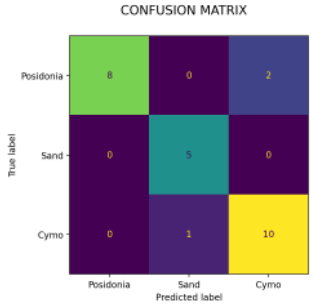


RESULTS

GENERATION OF % COVER MAP

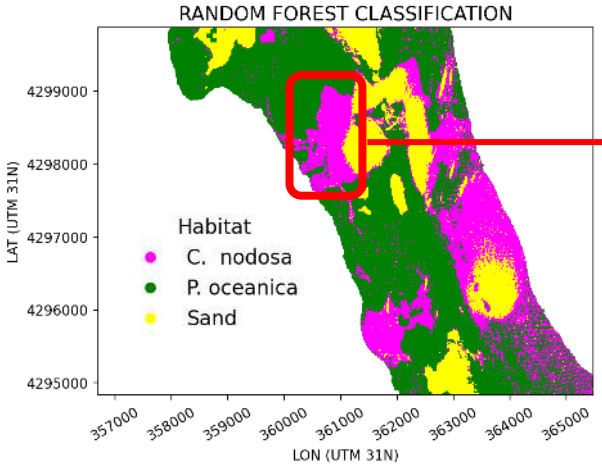


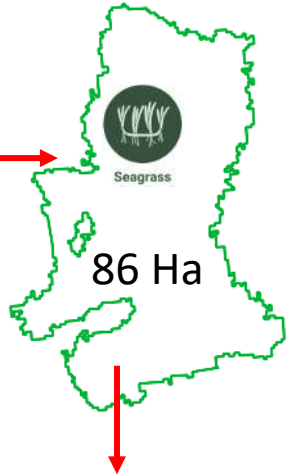


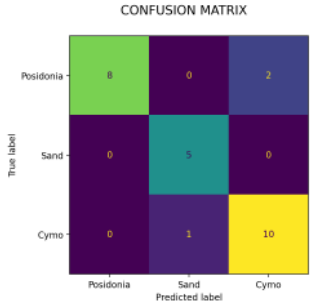


RESULTS

GENERATION OF % COVER MAP

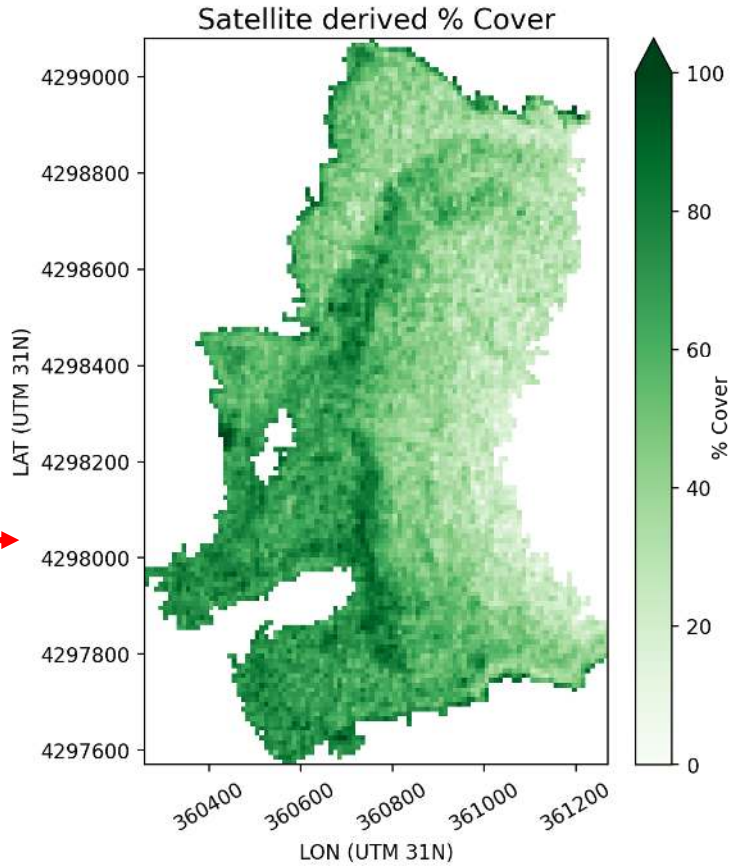






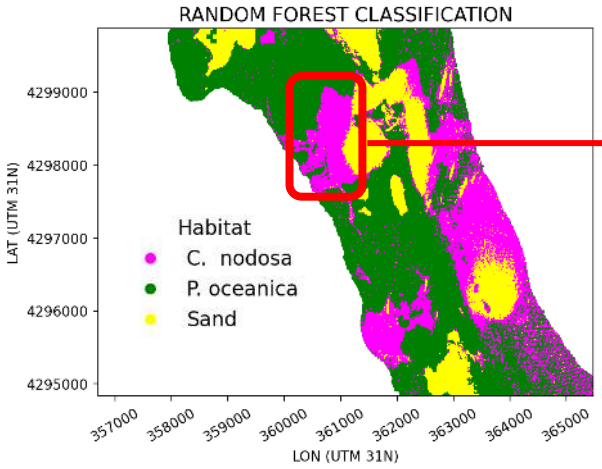
$$y = 145.5 - 3753.6x$$

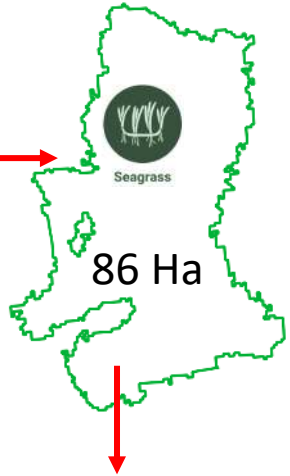
$$r = -0.93$$

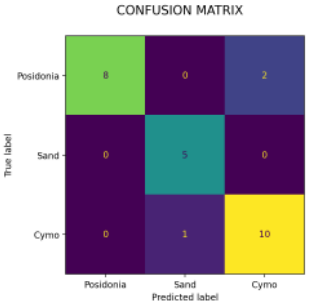


RESULTS

GENERATION OF % COVER MAP



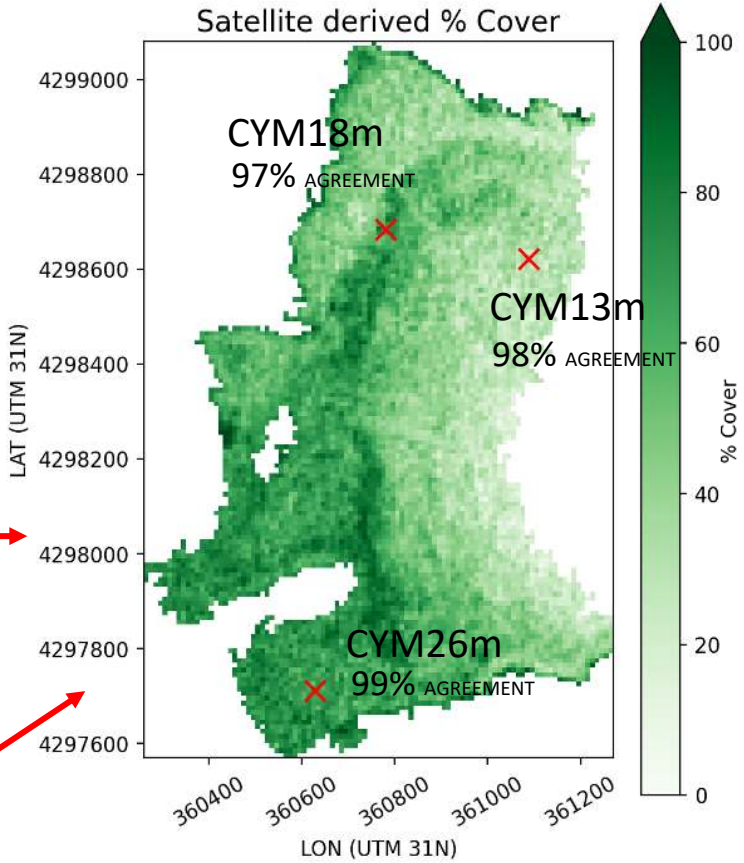




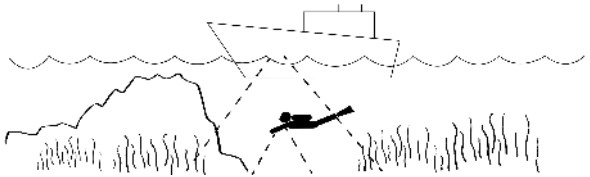
$$y = 145.5 - 3753.6x$$

$$r = -0.93$$

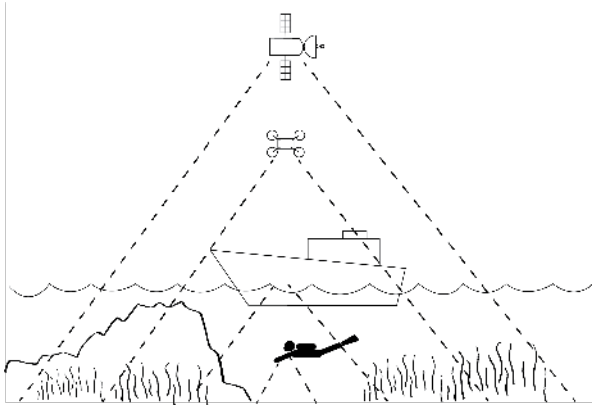
IN SITU % COVER
AT 3 MONITORING STATIONS



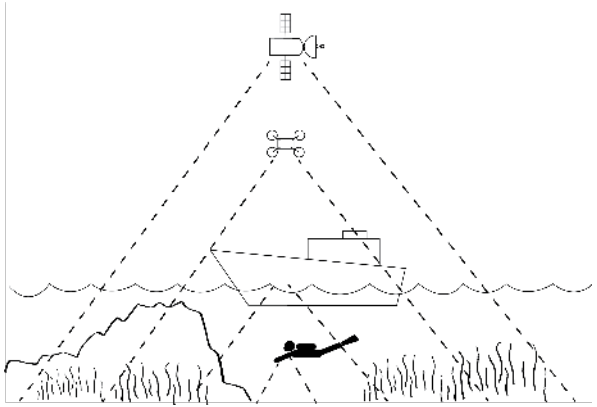
CONCLUSIONS
AND FUTURE WORKS



CONCLUSIONS
AND FUTURE WORKS



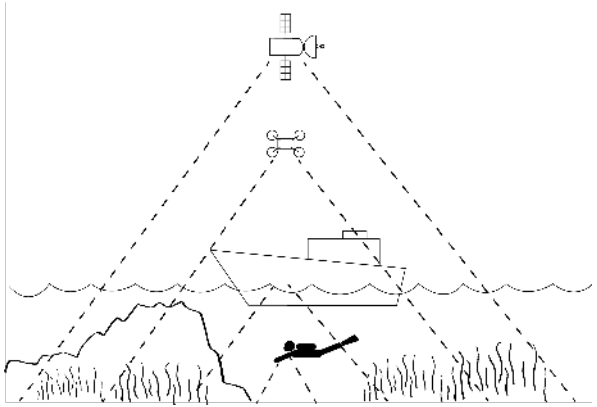
CONCLUSIONS
AND FUTURE WORKS





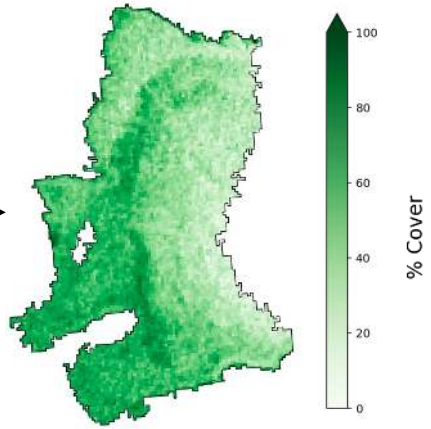
DISTRIBUTION

CONCLUSIONS
AND FUTURE WORKS



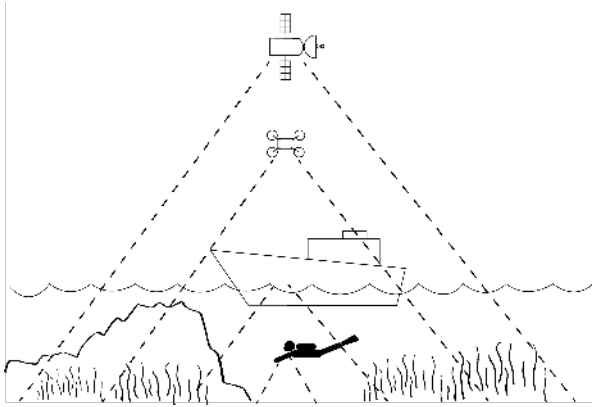


DISTRIBUTION

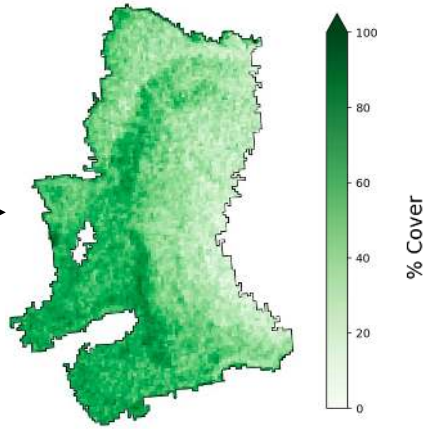


STATUS

CONCLUSIONS
AND FUTURE WORKS





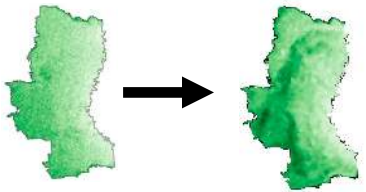


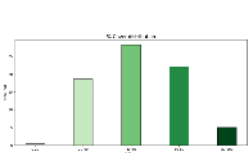
DISTRIBUTION

STATUS

FUTURE WORKS

- Long term trends of *Cymodocea nodosa*





Decadal increase in the ecological status of a North-Atlantic intertidal seagrass meadow observed with multi-mission satellite time-series

Maria Laura Zoffoli [a,*], Pierre Gernez [a], Laurent Godet [b], Steef Peters [c], Simon Oiry [a], Laurent Barillé [a]

[a] Université de Nantes, Laboratoire Mer Molécules Santé, Faculté des Sciences, 2 rue de la Houssinière, 44322 Nantes, France
[b] CNRS, Université de Nantes, UMR 6554, BP. 92208, 44312 Nantes, France
[c] Water Insight, 6709 PG 22 Wageningen, the Netherlands

Long-term analysis of *Zostera noltei*: A retrospective approach for understanding seagrasses' dynamics

Felipe Calleja [a,b], Cristina Galván [b], Ana Silió-Calzada [b], José A. Juanes [b], Bárbara Ondiviela [b,*]

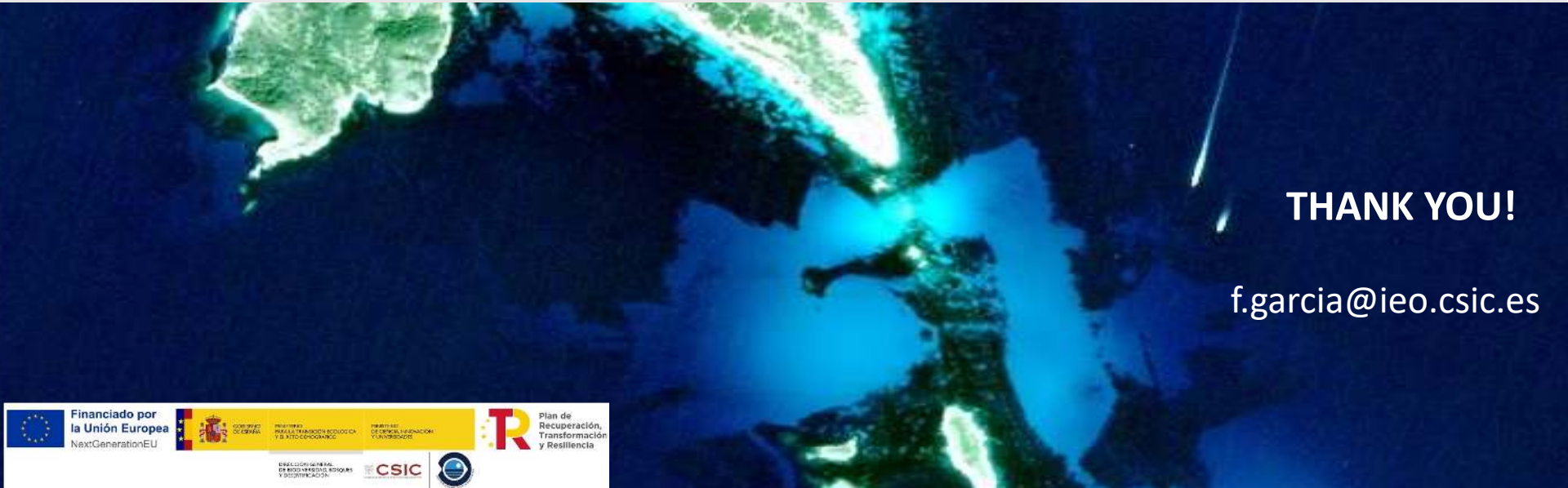
[a] Unidad de Ingeniería Marítima, de Ríos y de Estuarios (IHCANTOS), Ciudad Universitaria Rodrigo Facio Brenes, Universidad de Costa Rica, San José, Costa Rica
[b] Environmental Hydraulics Institute, Universidad de Cantabria, Avda. Isabel Torres, 15, Parque Científico y Tecnológico de Cantabria, 39011 Santander, Spain

MERGING SCALES AND METHODOLOGIES:

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Seagrass Ecology Group (GEAM) - Spanish Institute of Oceanography– National Scientific Research Council (IEO-CSIC)



THANK YOU!

f.garcia@ieo.csic.es

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