

Nationwide seagrass mapping using analysis-ready Sentinel-2 and PlanetScope data to support the Nationally Determined Contributions of Seychelles

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Wissen für Morgen





SEYCHELLES' NATIONAL CLIMATE CHANGE POLICY

“Making Seychelles Climate Resilient”



May 2020

SDG 14: Conserve and sustainably use the Oceans, Seas and Marine Resources for Sustainable Development.

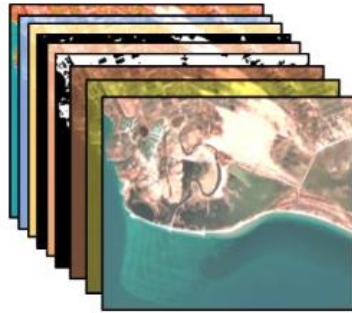
→ Protection of blue carbon such as mangroves and seagrasses



EO-driven coastal ecosystem accounting

Powerful Cloud computing
Google Earth Engine

TB-scale satellite data analytics
(Sentinel-2, PlanetScope NICFI)



Machine Learning

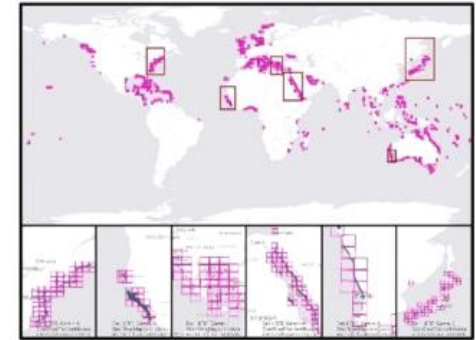


Big reference data



**GLOBAL
SEAGRASS
WATCH**
serverless is more

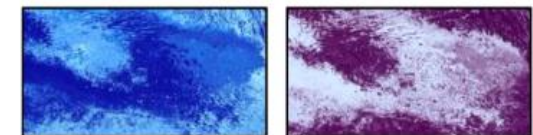
Spatially-explicit
seagrass ecosystem extent



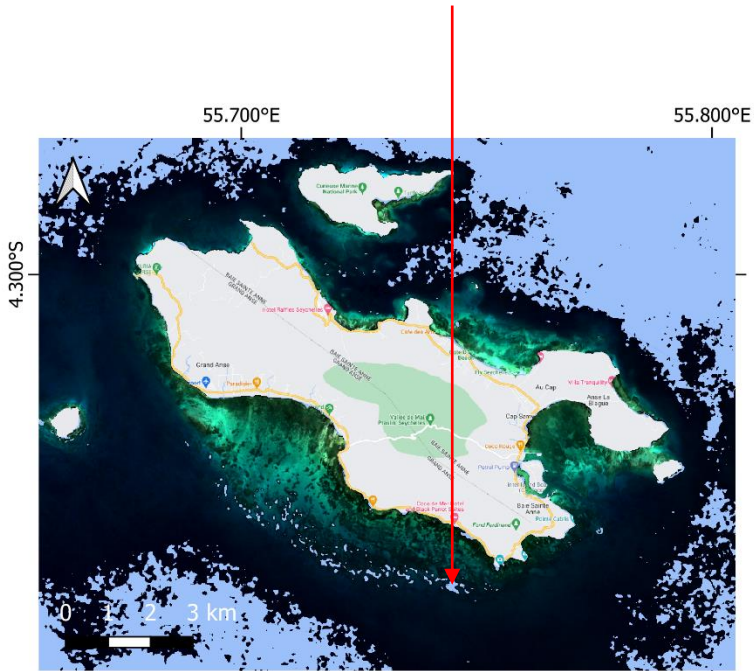
Spatially-explicit
seagrass ecosystem condition & services



Per-pixel
probabilities & uncertainties

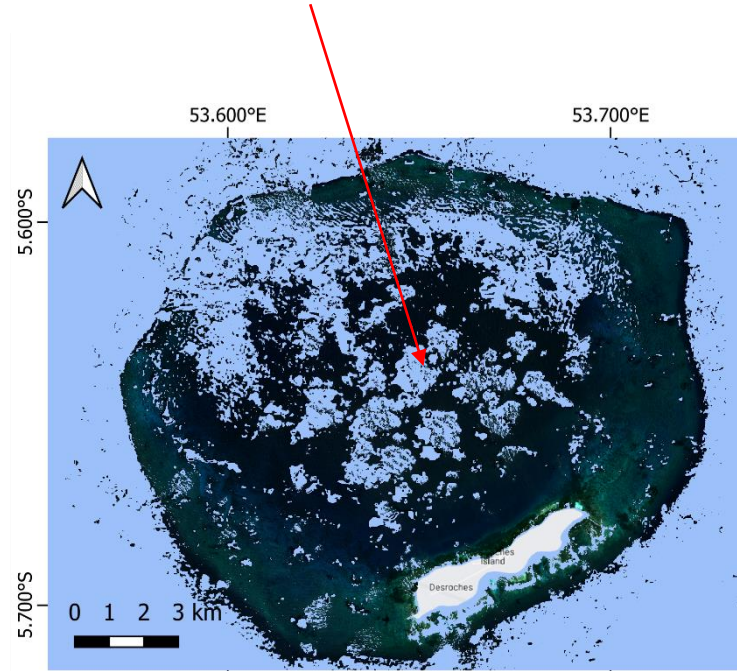


Missing pixels



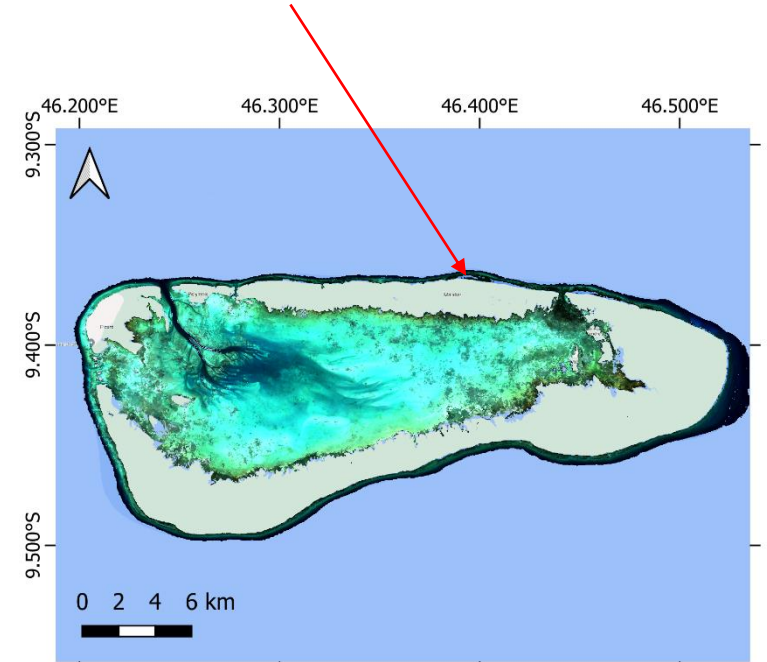
Praslin, Seychelles

Missing pixels



Desroches, Seychelles

Missing pixels



Aldabra, Seychelles



Are there alternatives to the Sentinel-2 Dataset on Google Earth Engine?

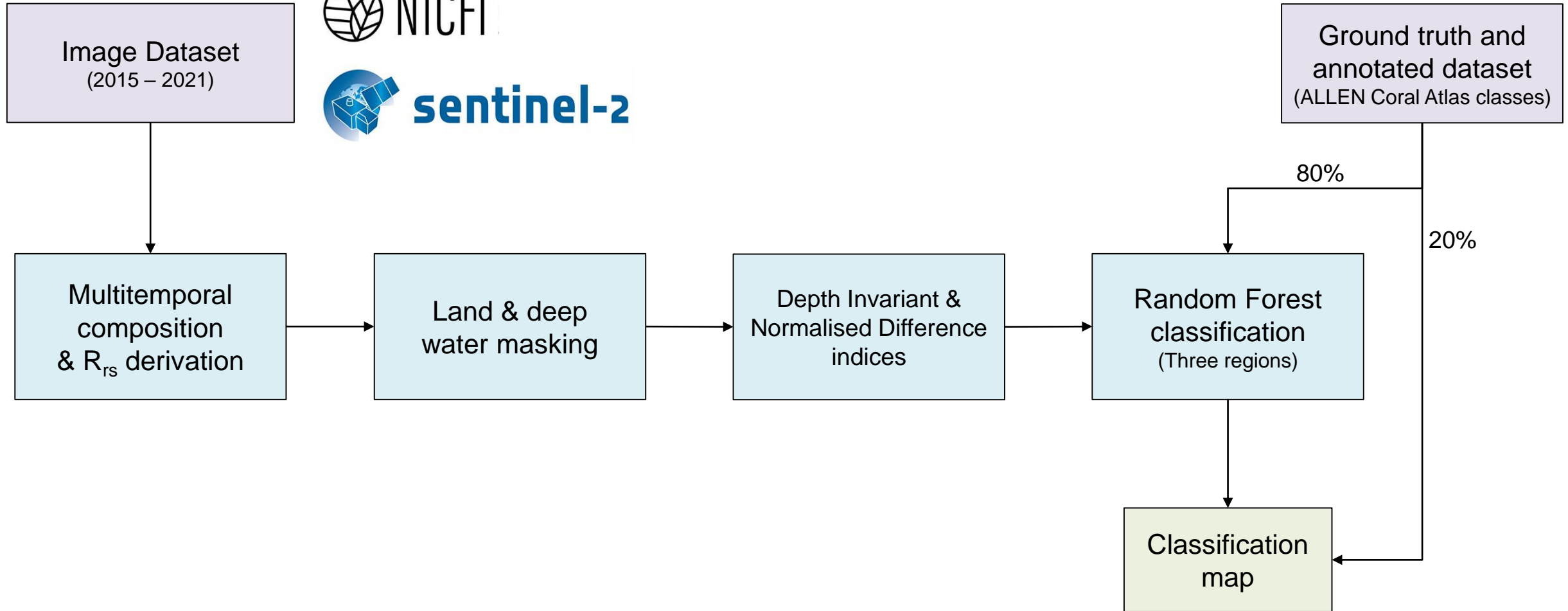


Analysis Ready Dataset (GEE)

	PlanetScope NICFI	Sentinel-2
Type	Multitemporal composites (Biannual – Dec 2015 to Jun 2020) (Monthly – Sep 2020 to present)	Single images
Spatial resolution	4.77 (5) m	10/20/60 m
Revisit cycle	30.3 hours	5 days
Spectral resolution	4 bands (R, G, B, N)	13 bands (not all are applicable for aquatic RS)
Coverage	Covered since 2015, buffered areas from coastline	Some areas are covered since 2015, others only since 2021



Work flow



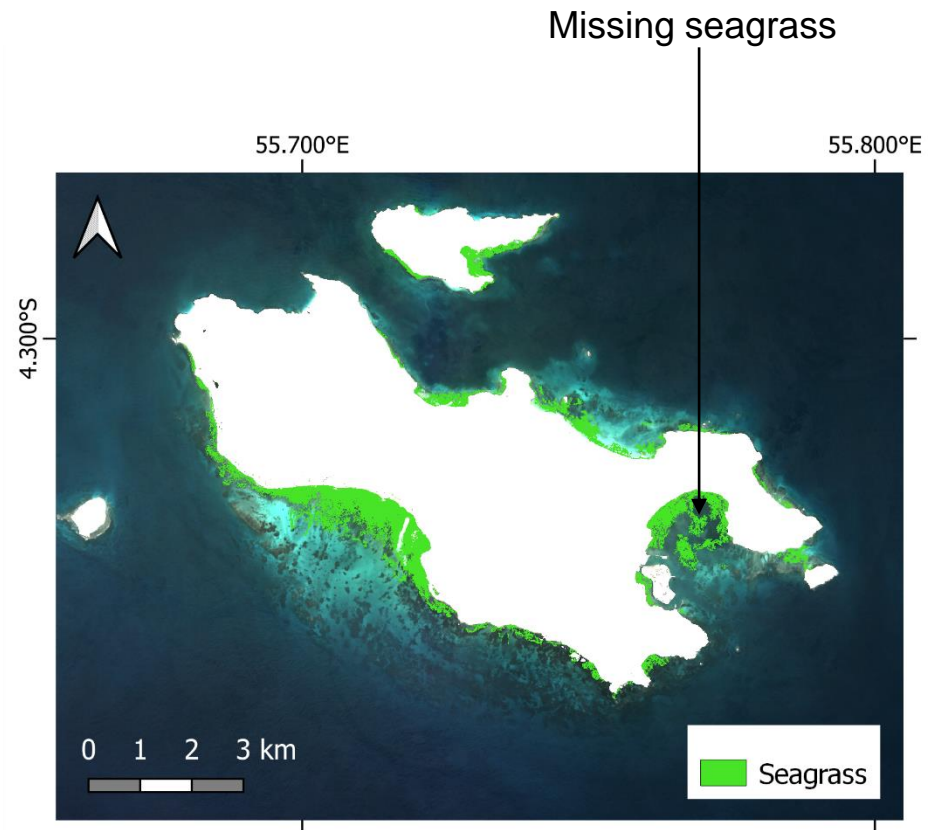
Results



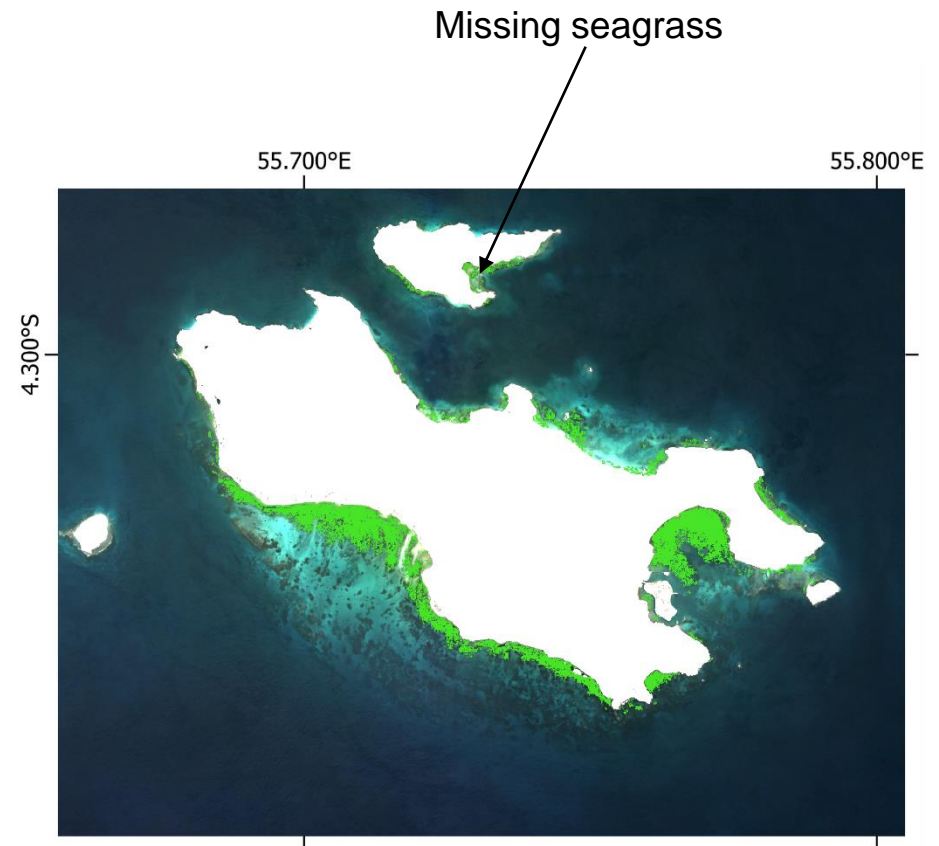
<u>North</u>		
Overall accuracy	69.7%	66.9%
PA (Seagrass)	57.2%	54.3%
UA (Seagrass)	65.9%	61.5%
<u>Central</u>		
Overall accuracy	64.2%	56.3%
PA (Seagrass)	80.2%	77.0%
UA (Seagrass)	70.4%	67.6%
<u>South</u>		
Overall accuracy	68.4%	64.2%
PA (Seagrass)	81.9%	79.6%
UA (Seagrass)	73.9%	73.5%



Praslin, Seychelles



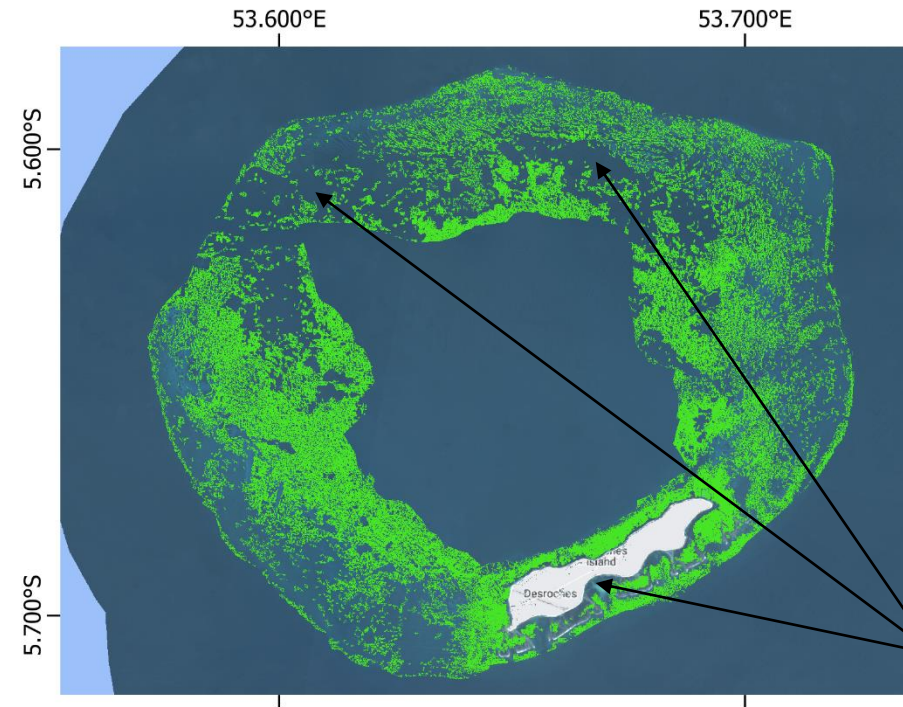
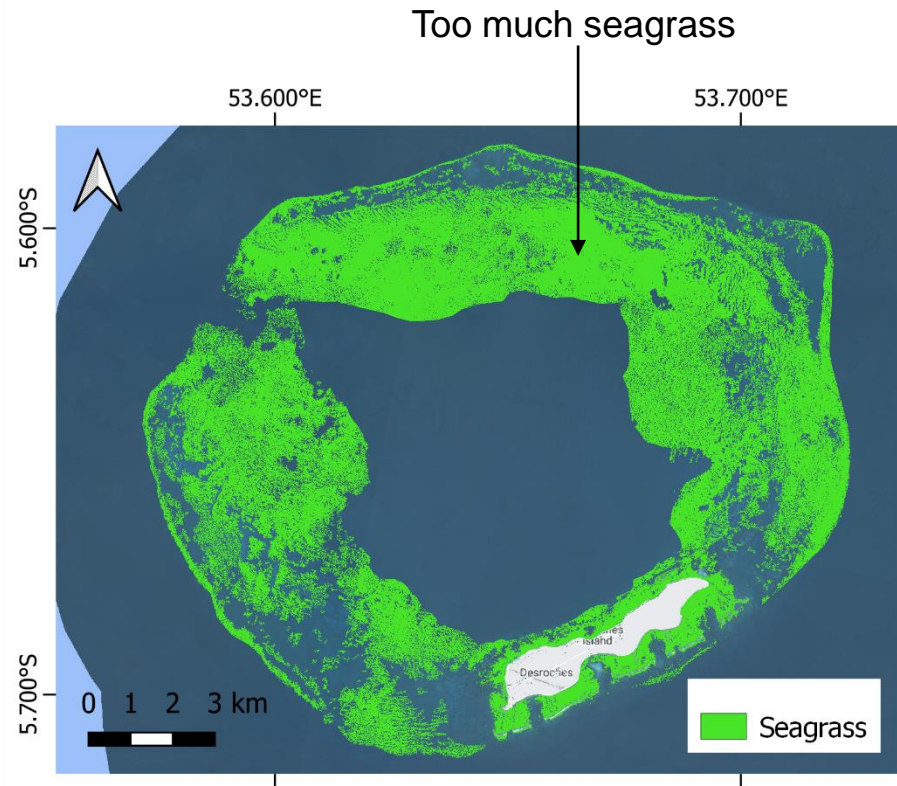
NICFI



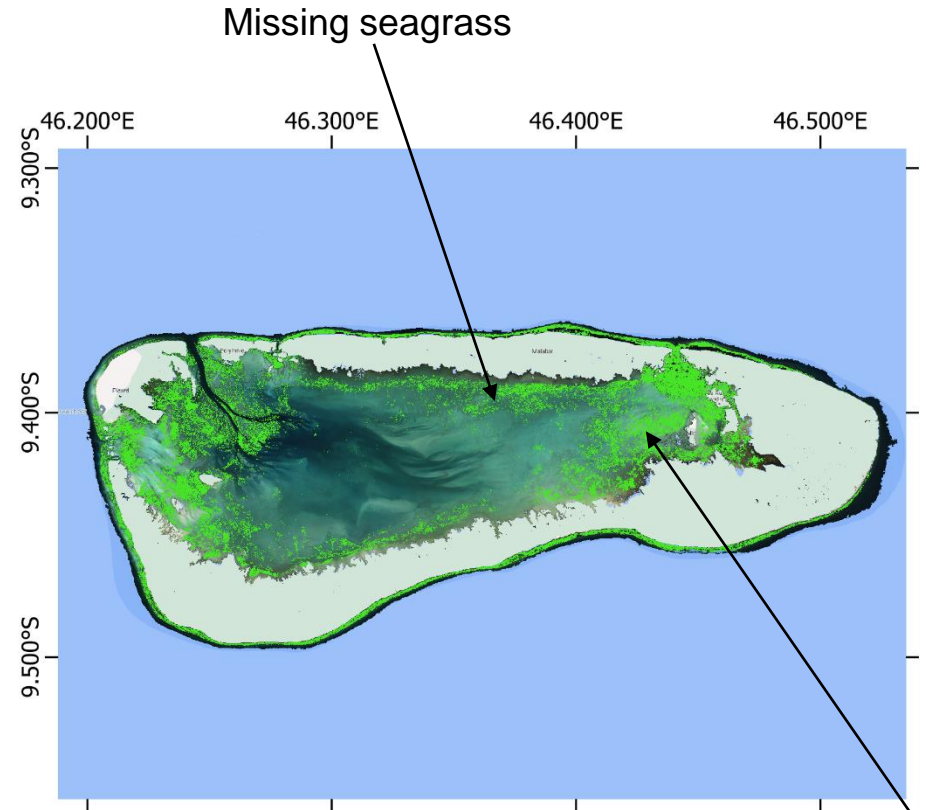
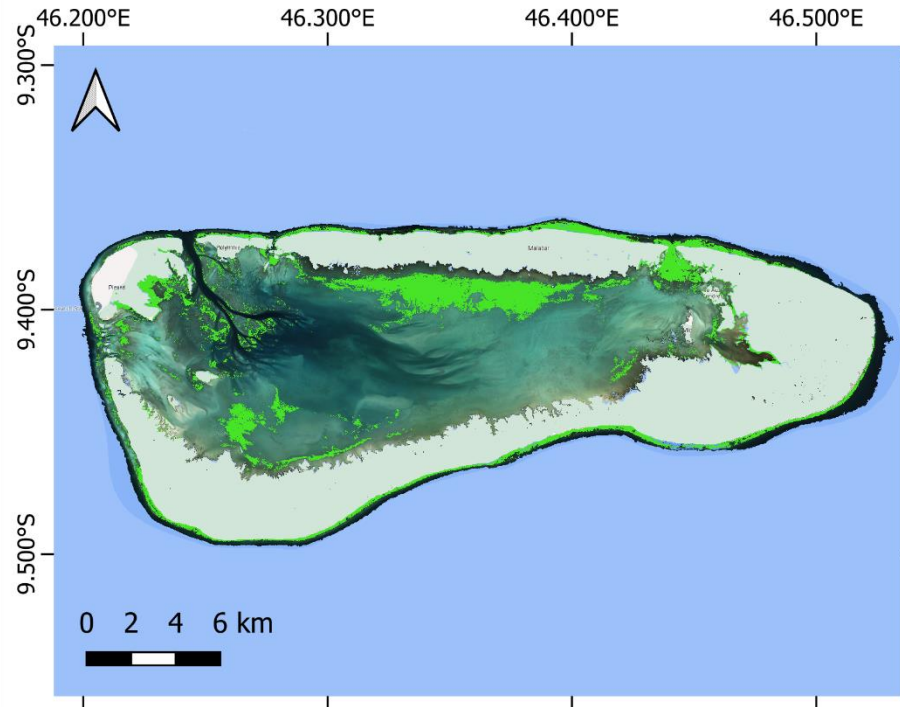
sentinel-2



Desroches, Seychelles



Aldabra, Seychelles



sentinel-2

Too much seagrass



Limitations



Less spectral resolution
(no ultrablue)

"Single" image composites may already
be heterogenous
(despite normalisation using LS8)

Correction issues from the
aforementioned heterogeneity

Don't forget the atmospheric correction!

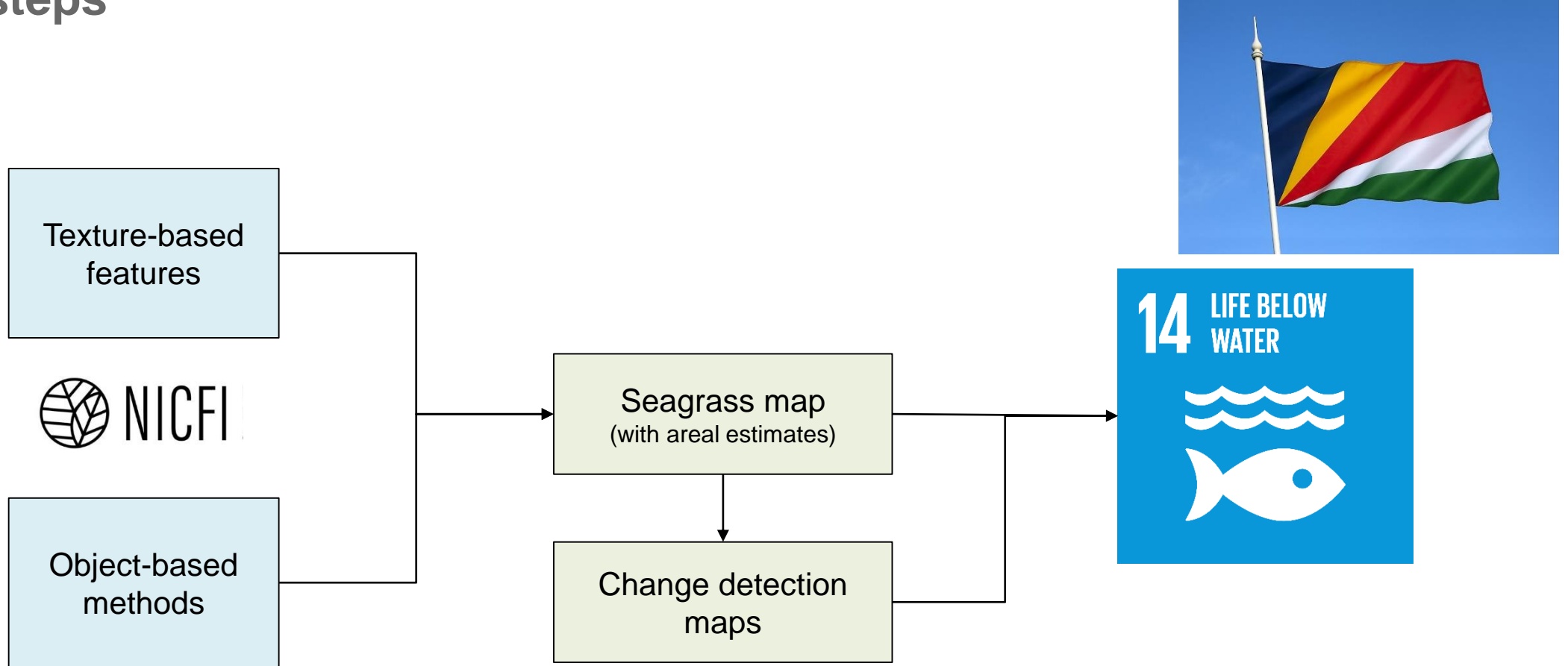
Missing pixels in the
multitemporal composite

Issues with algal mat
misclassification at Aldabra

Classification of deeper seagrasses still a challenge



Future steps



Conclusion

- PlanetScope NICFI is a better alternative to Sentinel-2 on GEE for Seychelles
- More work required to improve the map
- Step towards a blueprint to map seagrasses on a large scale for blue carbon and NDCs



Thank you for your attention

Any questions? Contact me at chengfa.lee@dlr.de!

