GLOBAL MANGROVE WATCH

GFOI Global Forest Observations Initiative

The Global Mangrove Watch Platform and Datasets

– Relevance to Activity Data & Emission Factors

Ake Rosenqvist (JAXA/soloEO)
Pete Bunting (Aberystwyth Univ)
Lammert Hilarides (Wetlands Int'l)
Takeo Tadono (JAXA)

JAXA soloEO The Nature Conservancy Wetlands International

The Global Mangrove Watch (GMW) Platform

https://www.globalmangrovewatch.org

Mangrove area

Annual area change

Early Warning

Species

Blue Carbon
(AGB & Soil Carbon)

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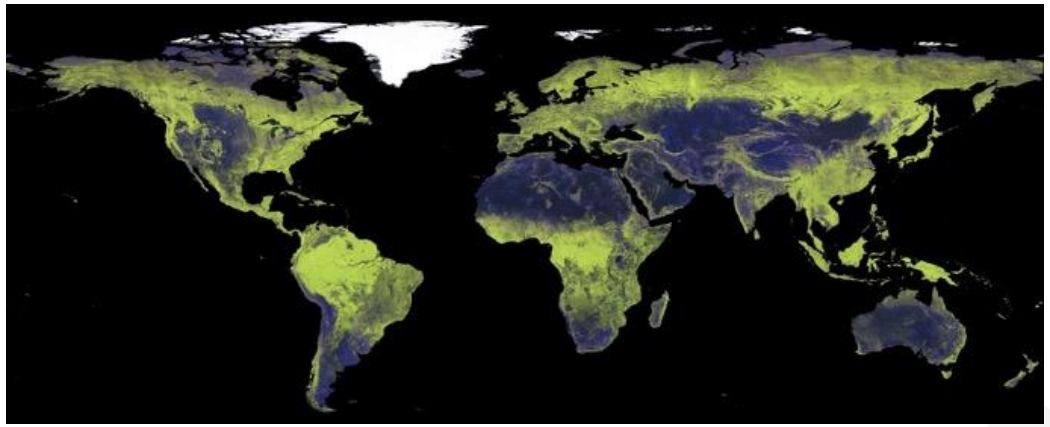
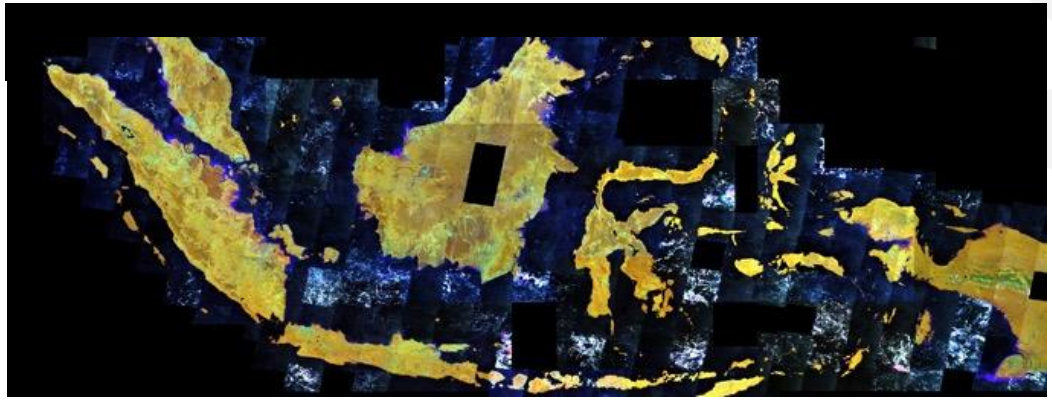
Satellite data used



Satellite Radar (SAR)



Optical satellite data

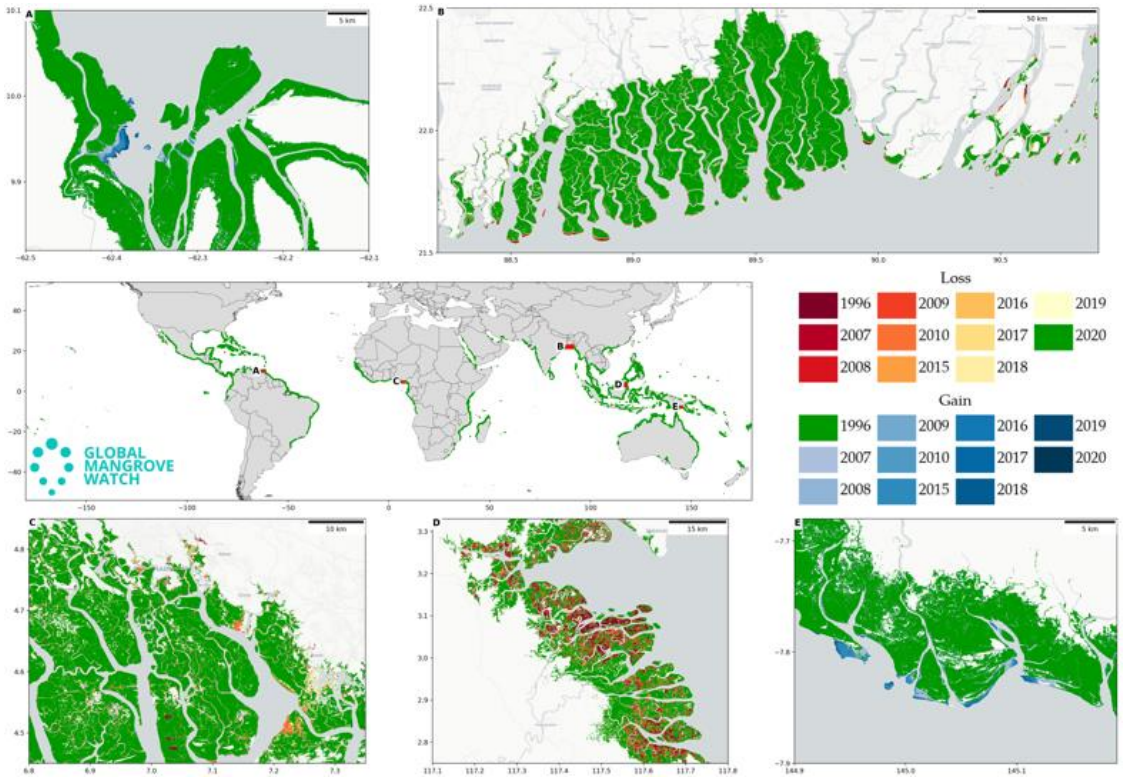
Synthetic Aperture Radar (JERS-1, ALOS, ALOS-2):

- Acquisitions regardless of clouds, smoke and haze.
- L-band wavelength (23.5 cm) sensitive to vegetation structure and for detection of changes.
- 20 annual epochs between 1992 and 2023

Optical satellite data (Sentinel-2 & Landsat):

- Sensitive to vegetation spectral characteristics.
- Distinction of mangrove/non-mangrove.
- Limited by cloud cover
- Used for 2010 (Landsat) and 2020 (Sentinel-2) baselines

GMW v3.0 (2022) → GMW v4.0 (2025)



- Time-series 1990 - 2024
- 15 annual epochs (radar)
- 8 annual epochs (optical)

remote sensing MDPI

Article

Global Mangrove Extent Change 1996–2020: Global Mangrove Watch Version 3.0

Pete Bunting [1,*], Ake Rosenqvist [2], Lammert Hilarides [3], Richard M. Lucas [1], Nathan Thomas [4,5], Takeo Tadono [6], Thomas A. Worthington [7], Mark Spalding [7,8], Nicholas J. Murray [9] and Lisa-Maria Rebelo [10]

❖ Estimates of annual anthropogenic change in mangrove extent → Activity Data

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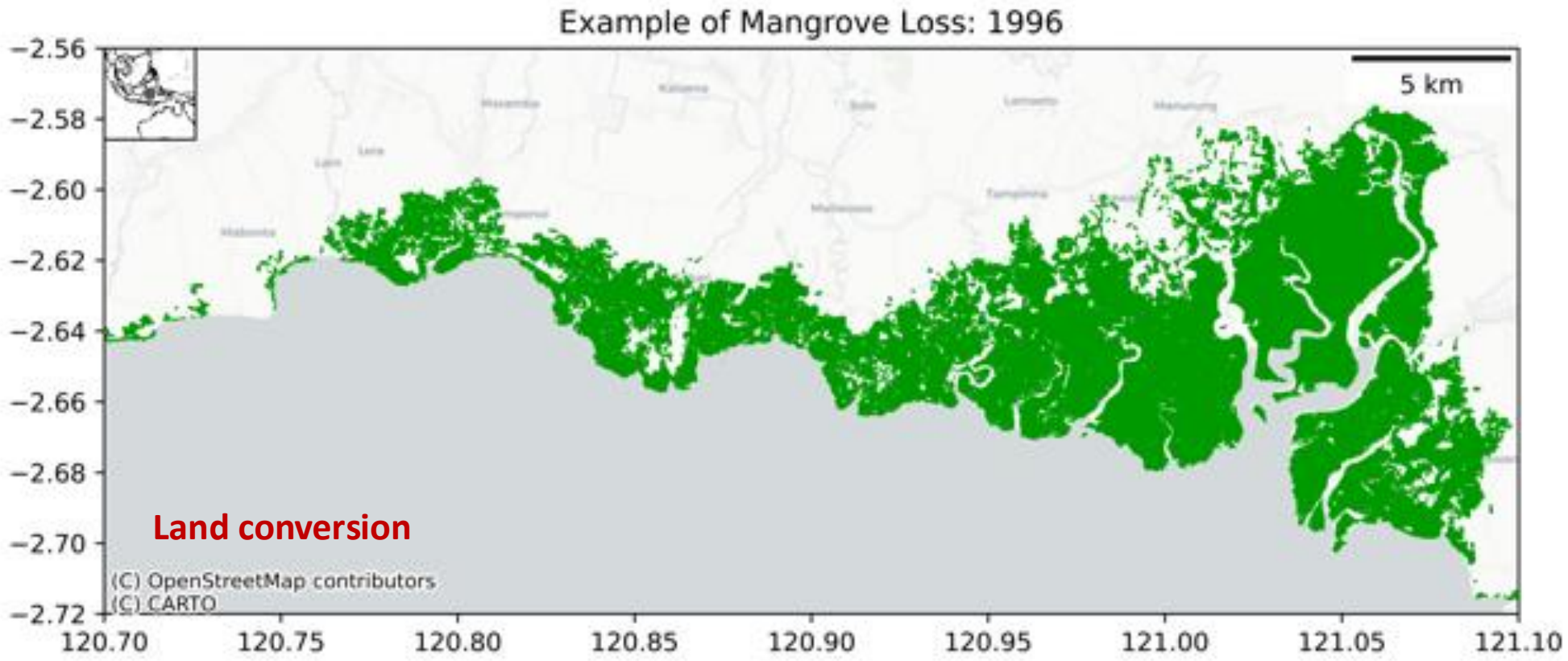
Mapping of annual anthropogenic changes – Activity Data

Losses: (e.g.) Land conversion; timber extraction

Gains: (e.g.) Restoration



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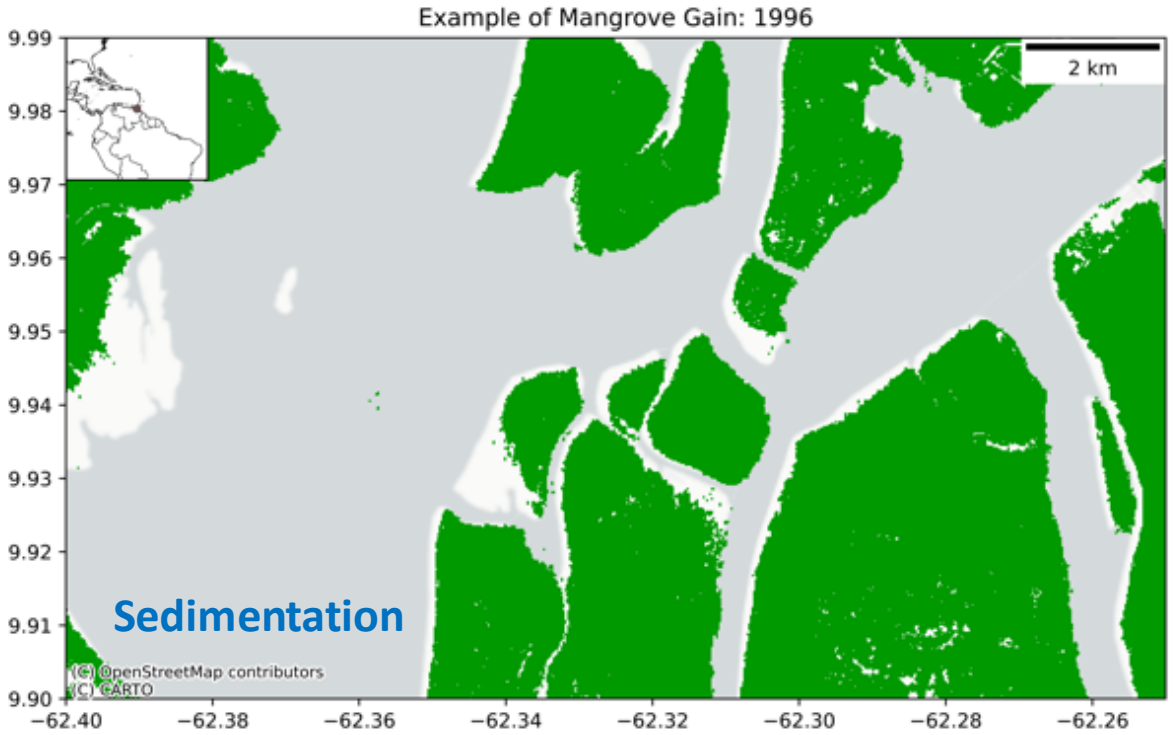
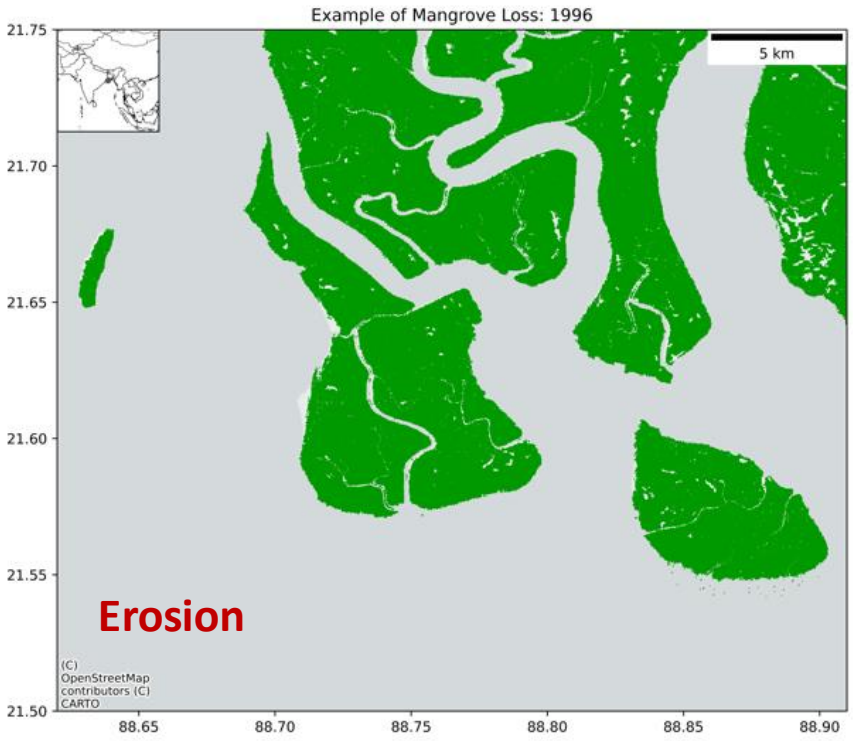
Mapping of annual non-anthropogenic changes

Losses: (e.g.) Erosion, Dieback, Storm damage, …

Gains: (e.g.) Sedimentation, natural expansion, …





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Mapping of annual changes

Regional- and country-level area statistics

Region	FAO[2]		GMW v3.0[4]										
	FAO ~1980	FAO ~1990	1996	2007	2008	2009	2010	2015	2016	2017	2018	2019	2020
North & Central America & the Caribbean	29,508	25,922	23,949	23,438	23,167	23,094	22,947	22,728	22,684	22,757	22,885	22,913	22,827
South America	22,223	20,733	20,516	20,274	20,210	20,219	20,205	20,200	20,251	20,331	20,377	20,395	20,378
West & Central Africa	27,060	24,854	22,090	22,038	21,937	21,947	21,931	21,906	21,816	21,812	21,805	21,793	21,715
East & Southern Africa	9,642	9,422	7,902	7,809	7,733	7,721	7,708	7,699	7,681	7,690	7,703	7,690	7,630
Middle East	557	499	344	338	331	327	308	292	284	285	287	290	285
South Asia	12,893	11,433	9,818	9,723	9,647	9,623	9,596	9,616	9,661	9,679	9,715	9,660	9,549
Southeast Asia	63,893	55,191	50,679	49,254	48,664	48,572	48,441	48,116	47,965	47,953	47,983	48,046	48,222
East Asia	350	291	257	237	231	226	224	228	232	233	230	230	228
Australia & New Zealand	14,860	14,810	10,945	10,752	10,618	10,618	10,562	10,478	10,426	10,451	10,497	10,518	10,467
Pacific Islands	6,954	6,095	6,104	6,110	6,107	6,106	6,098	6,082	6,070	6,069	6,072	6,070	6,058
Total	187,940	169,250	152,604	149,973	148,645	148,453	148,020	147,345	147,070	147,260	147,554	147,605	147,359

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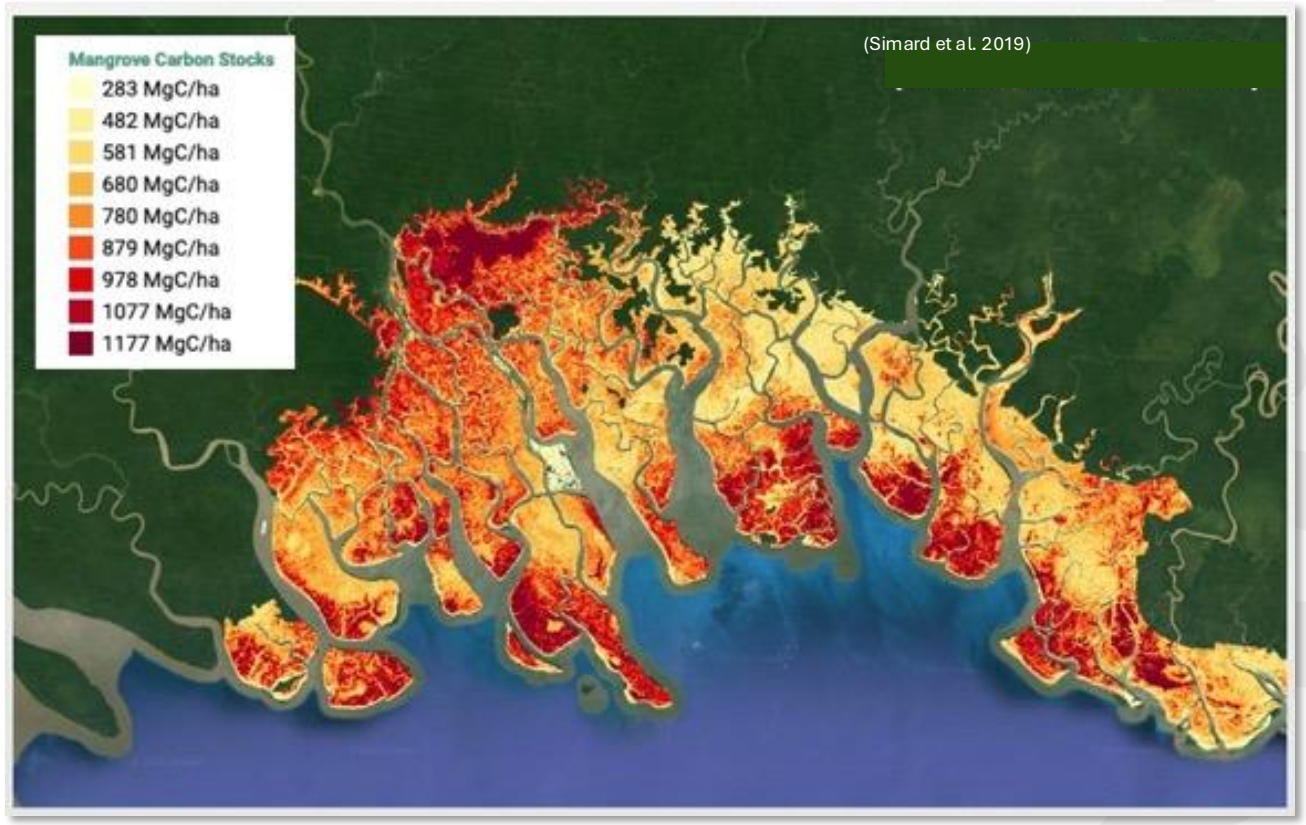
Mangrove Blue Carbon – Emission Factors

Mangrove Biomass & Mangrove Organic Stock



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A New Global Mangrove Height Map with a 12 meter spatial resolution

Marc Simard, Lola Fatoyinbo, Nathan M. Thomas, Atticus E. Stovall, Adriana Parra, Abigail Barenblitt, Pete Bunting & Irena Hajnsek

Scientific Data **12**, Article number: 15 (2025) | Cite this article

ENVIRONMENTAL RESEARCH
LETTERS

LETTER • OPEN ACCESS

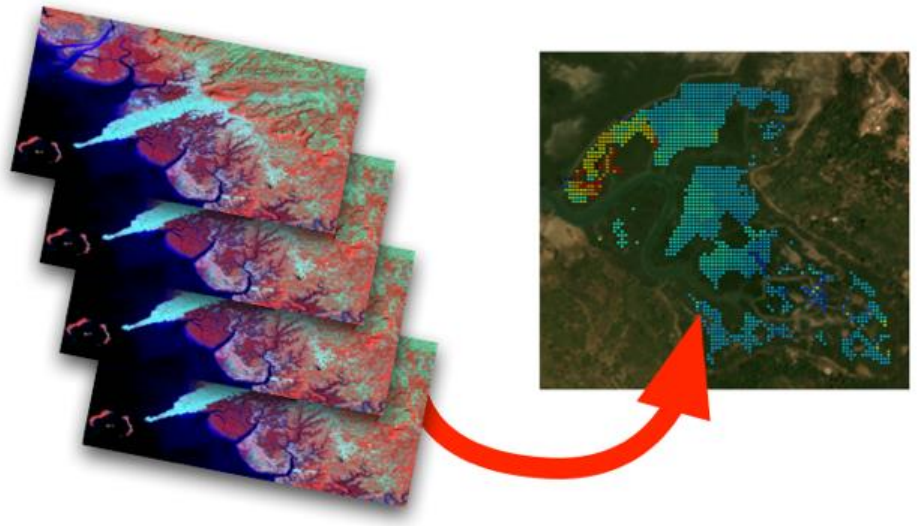
A global map of mangrove forest soil carbon at 30 m spatial resolution

Jonathan Sanderman[1,21], Tomislav Hengl[2], Greg Fiske[1], Kylen Solvik[1],

❖ Estimates of mangrove carbon pool → Emission Factors proxies

GMW Change Alerts

Mangrove Early Warning



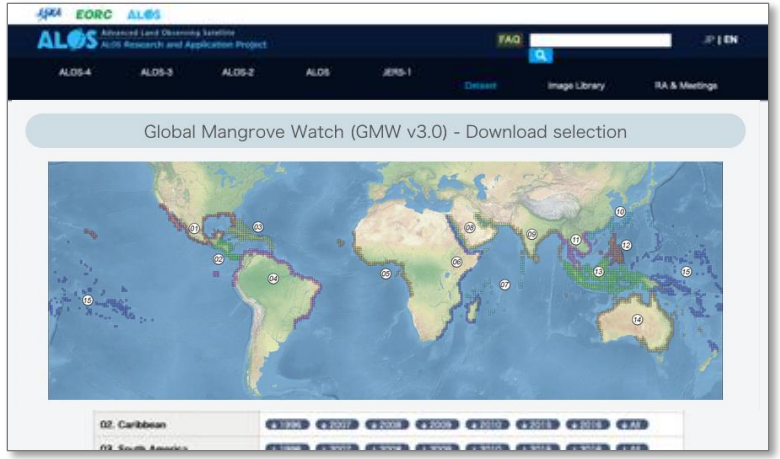
GMW Alerts – Early Warning system for mangroves

- Operational service on the GMW Platform
- Based on Sentinel-2 optical time-series
- Monthly updates
- Time-series scoring system to reduce false positives

- Currently covering ~ 1/3 of global mangroves
- Global coverage foreseen in H1/2026

GMW Data Access

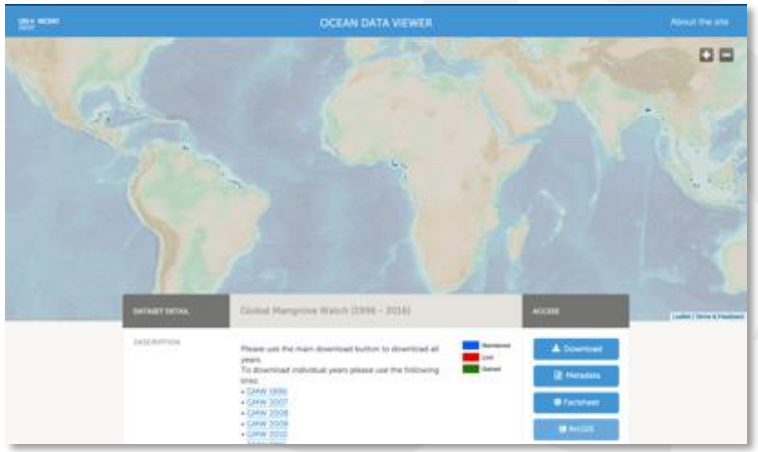
- Public open access
- License: Creative Commons CC BY 4.0



JAXA Earth Observation Research Center

https://www.eorc.jaxa.jp/ALOS/en/dataset/fnf_e.htm

Raster data (GeoTiff)



Ocean Data Viewer (UNEP-WCMC)

https://data.unep-wcmc.org/datasets/45

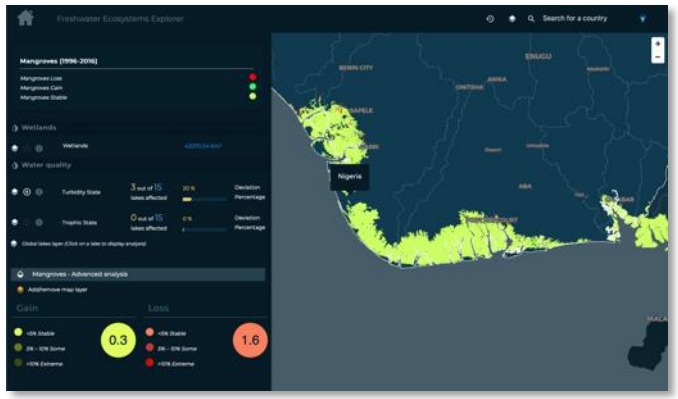
Vector data (.shp)

Zenodo

https://zenodo.org/records/6894273

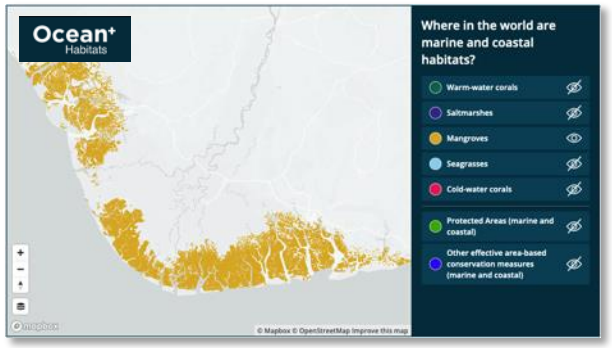
Vector data (.shp)

WWW resources using GMW

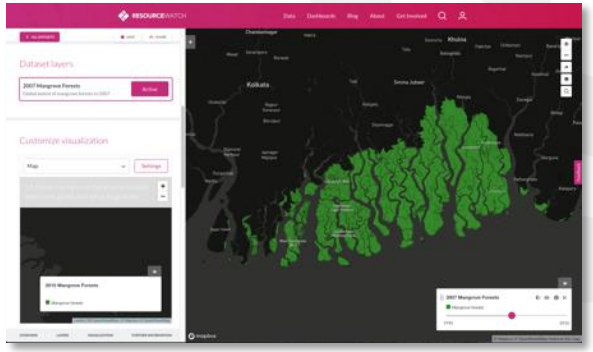


Global Mangrove Watch is used by UNEP as default mangrove layer, *for countries lacking own national mangrove monitoring systems*, for reporting on SDG Indicator 6.6.1 (Change in the extent of water-related ecosystems over time)

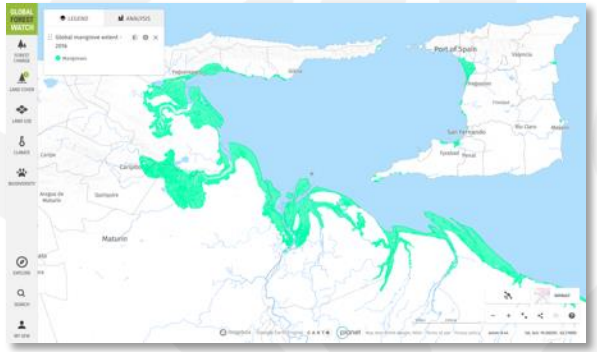
SDG661.app (UNEP)
https://sdg661.app



Ocean+ Habitats (UNEP-WCMC)
https://habitats.oceanplus.org/



Resource Watch (WRI)
https://resourcewatch.org/data/explore/for005a-Mangrove-Forests



Global Forest Watch (WRI)
https://www.globalforestwatch.org

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Thanks for your attention

Contact:

info@globalmangrovewatch.org

www.globalmangrovewatch.org