

Global Mangrove Watch



Description: The Global Mangrove Watch (GMW) is a collaboration between Aberystwyth University (U.K.), solo Earth Observation (soloEO; Japan), Wetlands International the World Conservation Monitoring Centre (UNEP-WCMC) and the Japan Aerospace Exploration Agency (JAXA).

The GMW aims to provide geospatial information about mangrove extent and changes to the Ramsar Convention, national wetland practitioners, decision makers and NGOs. It is part of the Ramsar Science and Technical Review Panel (STRP) work plan for 2016-2018 and a Pilot Project to the Ramsar Global Wetlands Observation System (GWOS), which is implemented under the GEO-Wetlands Initiative. The primary objective of the GMW has been to provide countries lacking a national mangrove monitoring system with first cut mangrove extent and change maps, to help safeguard against further mangrove forest loss and degradation.

The GMW has generated a global baseline map of mangroves for 2010 using ALOS PALSAR and Landsat (optical) data, and changes from this baseline for seven epochs between 1996 and 2017 derived from JERS-1, ALOS and ALOS-2. Annual maps are planned from 2018 and onwards.

Citation(s): Bunting P., Rosenqvist A., Lucas R., Rebelo L-M., Hilarides L., Thomas N., Hardy A., Itoh T., Shimada M. and Finlayson C.M. (2018). The Global Mangrove Watch – a New 2010 Global Baseline of Mangrove Extent. *Remote Sensing* 10(10): 1669. doi: 10.3390/rs1010669.

Other cited references:

Thomas N, Lucas R, Bunting P, Hardy A, Rosenqvist A, Simard M. (2017). Distribution and drivers of global mangrove forest change, 1996-2010. *PLOS ONE* 12: e0179302. doi: 10.1371/journal.pone.0179302

Temporal range: 1996 - 2016

Geographical range: Global

Supplementary information: The methods used to create this dataset are described in detail in Thomas et al. (2017).

The Global Mangrove Watch uses using ALOS PALSAR and Landsat data. More

information on ALOS PALSAR can be found at:
<https://www.eorc.jaxa.jp/ALOS/en/about/palsar.htm>

Purpose of creation:

This project aimed to initiate a mangrove monitoring system (Global Mangrove Watch; GMW) by achieving a mangrove baseline for the nominal year 2010 and mapping the changes in forest extent with the provision of newly acquired data. This baseline was achieved using a combination of optical and radar data whilst the time-series change detection relied on radar data alone. The GMW was originally formed as part of the JAXA Kyoto & Carbon initiative and aims to:

- Generate revised baseline maps of mangrove extent in the tropics and subtropics for 2010 and 2015;
- Undertake routine monitoring of mangroves;
- Provide validation of the products through reference to field and other remote sensing acquisitions for key sites worldwide;
- Describe and understand the causes and consequences of change, whether natural or anthropogenic; and
- Contribute to the Ramsar Global Wetlands Observing System (GWOS).

Creation methodology:

The approach adopted by the GMW was first to establish a baseline map of mangroves for 2010 at a global level through a random forests classification of both Landsat sensor spectral composite data (all spectral wavebands) and Advanced Land Observing Satellite (ALOS) Phased Arrayed L-band Synthetic Aperture Radar (SAR) data. The use of both optical and radar data benefited the random forest classification as these are sensitive to differences in the species composition, cover and also distribution of woody (branch, trunk and root) material. Changes away from and within this baseline were subsequently derived for 1996 (JERS-1) 2007, 2008, 2009 (ALOS PALSAR), 2015 and 2016 (ALOS-2 PALSAR-2) using a histogram thresholding approach (Thomas et al., 2017), with these data reflecting losses or gains in mangrove wood volume/biomass. The GMW maps integrate both optical and radar sensors for the period of observation. No mapping was available prior to 1996.

This work thus maps changes relative to existing pan-tropical and subtropical mangrove baseline data sets using mid-1990's JERS-1 SAR data, ALOS PALSAR data acquired in 2007, 2008, 2009 and 2010 and ALOS-2 PALSAR-2 annually from 2015 onwards.

Version:

2.0

Data lineage:

This work utilized ALOS-2 PALSAR-2 data to detect changes in forest extent from the 2010 baseline to 2014 and beyond, whilst historic changes in extent were detected using JERS-1 imagery collected in the mid-1990s. Annual maps are planned from 2018 and onwards, available at <https://www.globalmangrovetwatch.org/datasets/>.

Category:

Biogenic habitat

Keywords:

coastal, blue carbon, remote sensing, satellite, mangrove, forest, habitat, ecosystem

Similar datasets: WCMC-010, WCMC-011, WCMC-012

Limitations: The Landsat-7 ETM+ scanline error affects the classification in certain areas, resulting in striping artefacts in the data.

In 2018, to assess the GMW data quality, classification accuracy was assessed with over 53,800 randomly sampled points across 20 randomly selected regions. Overall accuracy was 95.25 %, while User's and Producer's accuracies for the mangrove class were estimated at 97.5% and 94.0%, respectively. Users should be aware that it is a global-scale dataset, generated with a single methodology applied over all regions. As such, the accuracy of the map may vary between locations. Factors such as satellite data availability (due to clouds, cloud shadows and Landsat-7 ETM+ scanline error), mangrove species composition and level of degradation all influence the accuracy. The mangrove seaward border is generally more accurately defined than the landward side, where the distinction between mangrove and certain terrestrial vegetation types (e.g. tropical rainforest) can be lower.

Maintenance frequency: Data are updated on a yearly basis.

Main access/use constraint: Creative Commons Attribution 4.0 Unported (CC BY 4.0). See <https://creativecommons.org/licenses/by/4.0/> for details. Free to (1) copy and redistribute the material in any medium or format, (2) remix, transform, and build upon the material for any purpose, even commercially. You must give appropriate credit, provide a link to the license, and indicate if changes were made. You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use. You may not apply legal terms or technological measures that legally restrict others from doing anything the license permits.

Other access/use constraints:

Contact organisation: Global Mangrove Watch

Organisation type: Creator Acronym: GMW

Name: Ake Rosenqvist **Position:** K&C Science Coordinator

City: Tokyo **Country:** Japan

E-mail: ake.rosenqvist@soloEO.com

Web site:

Data format(s): Vector (polygon; .shp), WMS

Distribution format(s): Vector (polygon; .shp), WMS **Dataset size (uncompressed):** 840 MB

Webpage and/or download: <http://www.eorc.jaxa.jp/ALOS/en/kyoto/mangrovewatch.htm>

Other webpage: <http://www.arcgis.com/home/webmap/viewer.html?webmap=cc7b73b3ca264768ac769fb75755ffe5>

Web map service: https://gis.unep-wcmc.org/arcgis/rest/services/marine/GMW_001_Change1996_2016/MapServer

Dataset ID: GMW-001

Factsheet: <http://wcmc.io/mangroves>

Resolution, scale: 0.8 arc seconds

Reference system: WGS 1984

West bounding: -175.3

East bounding: 179.9

South bounding: -38.8

North bounding: 33.8

Metadata standard: UNEP-WCMC Specific

Date of metadata: 13/06/2019