Tropical and Subtropical Wetland Distribution

# Summary

This dataset shows a distribution of wetland that covers the tropics and sub tropics (40° N to 60° S; 180° E to -180° W), excluding small islands. It was mapped in 231 meters spatial resolution by combining a hydrological model and annual time series of satellite-derived estimates of soil moisture to represent water flow and surface wetness that are then combined with geomorphological data.

# Process information

Compared to previous mapping efforts (e.g. remotely sensed through inundation patters or vegetation cover, or analytically derived through a hydrological model) our method incorporates a higher level of complexity by developing three biophysical indices that capture three key properties of wetlands:

1. The need for sufficient water supply for a long-enough time period;

2. The need for water logged soils;

3. The need for a geomorphological position where water can be supplied and retained.

Our method draws on the conclusion that combining different data sources is the best approach for mapping wetlands (Bwangoy et al., 2010), and includes observational data for climate, geomorphology and phenological responses.

# Wetland classes

Below is list of wetland classes in the dataset and its attributes, derived through the combination of soil surface wetness data (hydrological model + phenology responses of soil wetness) and geomorphological characteristics.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Category** | **Geomorphology** | **Moisture conditions** | **Vegetation and soil conditions** | **Code** |
| Open water | Lakes and permanent rivers | Open water surface |  | 10 |
| Mangrove | In close proximity to coast or estuaries. | Permanently wet, but with tidal variations in water levels. | Dominated by different mangrove species; peat formation, but with limited depth. | 20 |
| Swamps (incl. bogs) | Usually bound to valleys and plains; planar surfaces. | Wet all year around, but not necessarily inundated. | Usually tree covered. Peat domes with peat depths up to 45 m; otherwise with more limited peat depths. | 30 |
| Fens | In valleys or lower slope positions. | Mainly fed by ground water, and thus a stable water supply. | Often nutrient-rich and with dense vegetation; peat forming. | 40 |
| Riverine and lacustrine | Aligned with the adjacent water body. | Permanently wet. | Varying vegetation, not seldom with zonation reflecting proximity to water source; peat forming. | 50 |
| Floodplains (floodouts) | Floodouts: On alluvial deposits. | Fed by permanent rivers, large variations in water levels but never drying out. | Forested or non-forested; grasses, rushes and sedges; peat forming. Peat forming. | 60 |
| Floodplains: On alluvial deposits or in valleys | Annual flooding and drying regime with distinct dry season. | Forested or non-forested. No peat formation. | 70 |
| Marshes | General marshes: in valleys and plains, coastal marshes, salt marshes, savannah and prairie marshes etc. | No distinct intra-annual wetness cycle, permanently moist but not necessarily water saturated soils. | Usually not forested; grasses, rushes and sedges, but also herbs and bushes; no peat formation, but organic matter accumulation can occur, mixed with minerogenic sediments. | 80 |
| Wetlands in arid climate: formed in channel valleys and over alluvial deposits. | With a pronounced seasonality in soil moisture regime usually determined by lateral flow components. | Can be regarded as an intermediate category between floodplains/floodouts and marshes, restricted to arid climate. Organic matter accumulation can occur, mixed with minerogenic sediments. | 90 |
| Wet meadows: transition zones between wetlands and surrounding drylands, sometimes on open slopes. | Varying water source dependent on hydrological position and landscape geomorphology. | Usually dominated by grasslands, woody vegetation if the soil moisture regime allows. No or little organic matter accumulation. | 100 |

# Time period of content

2011

# Published date

2016

# Spatial Information

## Reference system

Geographic coordinate system

## Datum

WGS84

## Pixel size

0.0011139935(eq. 123m)

## Extent

Top Left coordinates: 39.9999999964°, -179.999997771°

Bottom Right coordinates: -60.0009704103°, 179.999262518°

# File Information

## Format

GeoTIFF

## Pixel depth

8 bit

## Columns x Rows

323161 X 89767

## Original Reference System

## For geographic re-projections please note that the original reference system at which the data were produced is:

## Reference system original: undefined, sinusoidal

## Linear unit: Meter (1m)

## Angular unit: Degree (0.0174532925199433)

## Columns x Rows original reference system: 134400 X 48000

## Pixel size original reference system: 231.6563581, 231.6563581 m

## Top Left coordinates: 4447802.07867N, -12231455.7163W

Bottom Right coordinates: -6671703.11024S, 18903158.8126E

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Please cite this work as: [Gumbricht et al. (2017) An expert system model for mapping tropical wetlands and peatlands reveals South America as the largest contributor. Global Change Biology.](http://www.cifor.org/library/6419/an-expert-system-model-for-mapping-tropical-wetlands-and-peatlands-reveals-south-america-as-the-largest-contributor/) DOI: [10.1111/gcb.13689](http://dx.doi.org/10.1111/gcb.13689)

# Reference

Gumbricht T (2015) Hybrid mapping of pantropical wetlands from optical satellite images, hydrology and geomorphology. In: Remote Sensing of Wetlands: Applications and Advances. (eds Ralph W. Tiner, Megan W. Lang, Victor V. Klemas), pp 433-452. CRP Press. Taylor and Francis Group. Boca Raton, Florida.

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