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TITLE: Status and distribution of mangrove forests of the world using earth observation satellite data

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ABSTRACT:

ABSTRACT Aim Our scientific understanding of the extent and distribution of mangrove forests of the world is inadequate. The available global mangrove databases, compiled using disparate geospatial data sources and national statistics, need to be improved. Here, we mapped the status and distributions of global mangroves using recently available Global Land Survey (GLS) data and the Landsat archive. Methods We interpreted approximately 1000 Landsat scenes using hybrid supervised and unsupervised digital image classification techniques. Each image was normalized for variation in solar angle and earth-sun distance by converting the digital number values to the top-of-the-atmosphere reflectance. Ground truth data and existing maps and databases were used to select training samples and also for iterative labelling. Results were validated using existing GIS data and the published literature to map true mangroves. Results The total area of mangroves in the year 2000 was 137,760 km² in 118 countries and territories in the tropical and subtropical regions of the world. Approximately 75% of world's mangroves are found in just 15 countries, and only 6.9% are protected under the existing protected areas network (IUCN I-IV). Our study confirms earlier findings that the biogeographic distribution of mangroves is generally confined to the tropical and subtropical regions and the largest percentage of mangroves is found between 5° N and 5° S latitude. Main conclusions We report that the remaining area of mangrove forest in the world is less than previously thought. Our estimate is 12.3% smaller than the most recent estimate by the Food and Agriculture Organization (FAO) of the United Nations. We present the most comprehensive, globally consistent and highest resolution (30 m) global mangrove database ever created. We developed and used better mapping techniques and data sources and mapped mangroves with better spatial and thematic details than previous studies.

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