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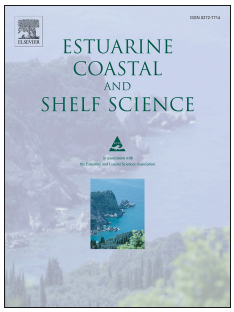

Assessing changes of mangrove forest in a coastal region of southeast China using multi-temporal satellite images

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PII: S0272-7714(17)31073-9

DOI: 10.1016/j.ecss.2018.04.021

Reference: YECSS 5825

To appear in: *Estuarine, Coastal and Shelf Science*

Received Date: 7 November 2017

Revised Date: 6 April 2018

Accepted Date: 18 April 2018

Please cite this article as: Wang, M., Cao, W., Guan, Q., Wu, G., Wang, F., Assessing changes of mangrove forest in a coastal region of southeast China using multi-temporal satellite images, *Estuarine, Coastal and Shelf Science* (2018), doi: 10.1016/j.ecss.2018.04.021.

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Abstract: Mangroves provide many ecological, economic, and social benefits to humans. In the Jiulong River Estuary of Fujian Province, China, many mangroves have been lost largely due to human activities and so artificial planting has been implemented. However, the spatial and temporal dynamics of mangrove forests are still largely unknown at this location. This study aimed to identify changes to mangrove distribution and aboveground biomass (AGB) in three periods (1995-2004, 2004-2014 and 1995-2014) in order to influence mangrove management. Landsat satellite imagery and the threshold value method were used to classify mangroves. Landsat satellite imagery, field-based biomass investigations, elevation data and an allometric biomass equation were employed to develop an AGB model using a multiple linear regression method. Both mangrove area and AGB increased from 1995 to 2014 with an increase rate of 5.5 % and 7.2 % for mangrove area and AGB, respectively. Mangrove expansion was the main cause for AGB and area increase. In addition, AGB increase due to the growth of mangroves without extending the area also has great potential in AGB increase. Similar to AGB, above-ground carbon increased from 57 t C/ha in 1995 to 79 t C/ha in 2014, which demonstrated that mangroves in this region can help to mitigate climate warming. However, a large-scale continuous decrease of mangrove forest in the JRE was observed, likely caused by growing human activities. Moreover, tidal range change during 2004-2014 resulted in a more adverse impact on mangroves.

Keywords: Mangrove forest; Above-ground biomass; Spatial-temporal dynamics; Remote sensing; Jiulong River Estuary

1. Introduction

Mangroves occur at the land-ocean interface in the tropics and subtropics and have important