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## ***Interactive comment on “Spatial heterogeneity in mangroves assessed by GeoEye-1 satellite data: a case-study in Zhanjiang Mangrove National Nature Reserve (ZMNR), China” by K. Leempoel et al.***

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1. In particular the paper talks about Corona, Landsat, and GeoEye analysis but detailed methods of analyzing these diverse data is not given. For example, How did they handle the issue of multiple resolution? What are the pre-processing steps before image classification?

The purpose of using multiple sensors is only to provide a temporal measure of mangrove and aquaculture extent over the area. The supervised classification of the dif-

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ferent mangrove stands is based only on the GeoEye-1 image so there is no issue of resolution for the supervised classification of the mangrove stands. So for the corona image, we digitized manually the mangrove stand into polygons, since this image is not multispectral. For the Landsat image, we did a supervised classification of the different land-uses in ERDAS using the Maximum Likelihood rule and GCPs defined by the image observation. For the pre-processing, the point that we forgot to mention is the coordinate transformation. All images were projected in the same projection system (WGS\_1984\_UTM\_Zone\_49N) in ArcGIS. These information will be added to the paper.

2. Title is almost misleading, focussed on GeoEye-1 only. Suggest revise it to reflect the whole study.

Initially, the purpose of the study was to evaluate the usefulness of a geoeye image for supervised classification of mangrove species. We added the temporal part after observing the importance of aquaculture in the region. I agree the title should more reflect these two parts. I therefore propose the following title: Spatial heterogeneity and in mangroves assessed by high resolution and multi-temporal satellite data: a case-study in Zhanjiang Mangrove National Nature Reserve (ZMNNR), China”

3. Define clear objectives in the abstract.

Ok I could state the objectives in a block instead of spreading them in the abstract

The main objective of this work is to analyze the current spatial distribution of mangrove species in Gaoqiao reserve using very high resolution images. We attempt to understand this distribution firstly through a multi-temporal analysis of satellite data and secondly by using fieldwork measurement of abiotic and biotic parameters to analyze the variation in environmental conditions between the different mangrove stands, assessed through a supervised classification of a high resolution satellite image.

4. Paddy and rice is mentioned, be consistent

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Noted, I will use only rice culture.

5. Page 2593, Line 18: deñÑe what is tall and what is small?

Tall and Small are defined in the material and methods and table1. I will had the following line to the material and methods. We used the five tallest plots (average height) of *A.corniculatum* to define the Tall *A.corniculatum* class, and the five smallest to define the small *A.corniculatum* class. And this one to the results 3.3 Land-use/cover classiñÑation We found that most plots of *A.corniculatum* were correctly assigned to tall and small categories regarding both their relative dominance and height.

6. Page 2594, Line 21, consider reviewing the paper Myint, S. W., C. P. Giri, L. Wang, Z. Zhu, and S. Gillette. 2008. Identifying mangrove species and their surrounding land use and land cover classes using an object oriented approach with a lacunarity spatial measure, *GIScience and Remote Sensing*, 45(2), 188-208

7. To my surprise, the resolution of Landsat is wrongly stated.

Yes, the panchromatic resolution is 15x15m and the multispectral resolution is 30x30m.

8. Page 2596, line 5 and 8: avoid using two "In addition"

Noted, it's on page 2595.

9. Explain how 113 GCPs were selected.

GCPs selection was based on observation during fieldwork campaign, we recorded their location with the GPS.

10. Page 2601 Line 1, describe 2-22 ha?

We know from several studies that if a sustainable use of mangrove is wanted, loads from surrounding aquaculture into the mangrove should be regulated. Therefore, several authors proposed a minimal ratio of surface of mangrove divided by the surface of aquaculture based on several parameters of their case study. This ratio varies in the

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literature between 2 and 22. Although we did not had all the parameters necessary to calculate an accurate ratio for Gaoqiao reserve, we thought it was important to mention that the ratio we observed was below 1, so more than two times lower than the minimal ratio found in the literature.

11. Page 2601 Line 9: the statement that "corona image did not support both supervised and unsupervised classification" is wrong unless the authors got the data in hardcopy form. Digital corona data are available. In any case, explain.

The problem is not to have a digital version of the image, we have one. But Corona images have only one panchromatic band, to my knowledge it is not possible to do an accurate classification of such image based on pixel intensity only. Since the Corona image was only used to estimate the extent of mangrove in 1967, it was easier to digitize it manually than to try all classification methods available.

12. In Fig 2. change the color of mangrove (1967) and add mangrove in 2000.

See additional figure of my responses.

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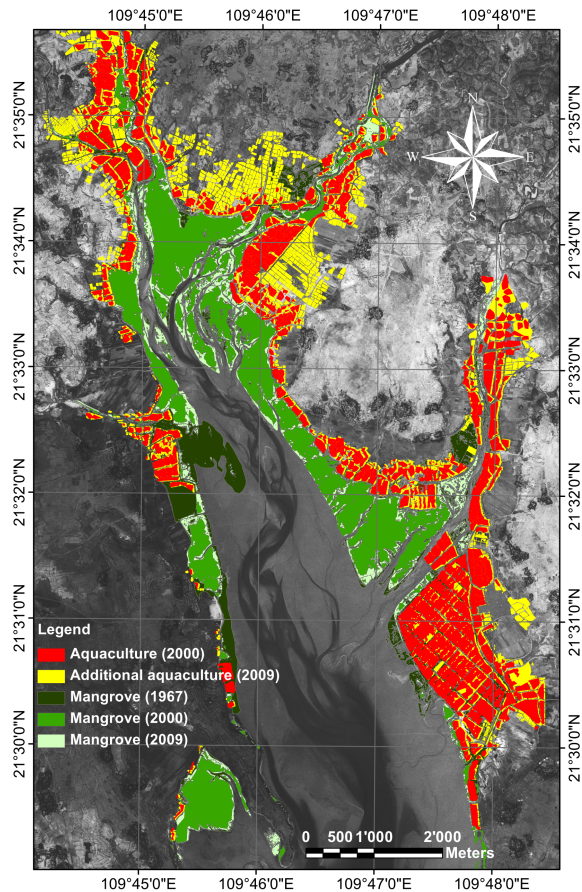
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**Fig. 1.**

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