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Biogeosciences Discussions



# *Interactive comment on* "Mangroves facing climate change: landward migration potential in response to projected scenarios of sea level rise" *by* D. Di Nitto et al.

**Anonymous Referee #1**

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The manuscript is acceptable for publication in Biogeosciences pending two (minor) technical corrections and a few textual improvements.

General comment: This is an important scientific contribution to our understanding of the potential impacts of sea level rise on mangroves. The authors have done a great job in presenting a well-argued and compelling case of the likely consequences of rising sea levels on mangrove species distribution in Gazi Bay (Kenya) as a function of tidal range, which appears to be more complex than a simple landward shift of the different vegetation zones, with coastal squeeze of the inner landward zones. The paper is well-written, the arguments are well-presented, and the choice of SLR scenarios, statistical



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analysis, issues around errors & accuracy, and uncertainties of the predictions are all properly described and explained.

Two technical comments:

[1] The study area, Gazi Bay, is described as 'macrotidal'. However, its tidal range is reported as 3.5 m which classifies this as a mesotidal environment (e.g. see: K.R.Dyer (Ed.), 1997. Estuaries: A Physical Introduction, Wiley, p6). I suggest this is corrected throughout the manuscript.

[2] The discrepancy (<12% for all but one sp.) between the expected mangrove species distribution areas on the basis of inundation classes (TMAI) and the observed mangrove species distribution areas in the field (TMA) is explained by mapping classification errors and errors in the topographical measurements. I recommend the authors consider adding two additional explanations: [a] the inundation classification according to Watson (1928), which is based on inundation frequency, may not always yield fully satisfactory results, esp. in regions with an irregular tidal regime and/or irregular elevation profile, where the duration of inundation seems equally important (see Van Loon et al. 2007; Hydrological classification in mangrove areas: A case study in Can Gio, Vietnam; Aquatic Botany 87: 80–82); [b] wind set-up (which may have affected the high water line measurements at spring tide).

Other (minor) comments:

[1] The paper talks about non-invadable areas at the inward land margin of the mangroves, and how sealevel rise would cause a decrease in the areas of landward Avicennia marina and Ceriops tagal due to the topographical settings at the edge of the (human-)inhabited area. I suggest the authors introduce the term "coastal squeeze" here, as this is a generally widely accepted term for this phenomenon (see Doody, J.P. (2004) 'Coastal squeeze' - an historical perspective. Journal of Coastal Conservation, 10/1-2, 129-138.)



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[2] when quoting multiple authors, please follow a chronological order, starting with the oldest reference...

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Interactive comment on Biogeosciences Discuss., 10, 3523, 2013.