

Interactive comment on “The role of wind in hydrochorous mangrove propagule dispersal” by T. Van der Stocken et al.

Anonymous Referee #1

Received and published: 4 March 2013

This manuscript describes dispersal properties of four mangrove species in relation to currents versus wind, and does a fine job making use of both laboratory flumes and field studies. While the role that wind plays on propagule/seed/fruit dispersal is often mentioned in casual conversation, especially for shallow microtidal estuaries, the relative contributions of both are relatively undocumented. This is certainly related in part to the wide variation in these conditions among estuaries, and from day-to-day. While the theoretical modeling and empirical evidence are good to place together, it is difficult to know how truly critical such efforts are to the future development of individual based models. However, this is interesting work, and certainly makes a primary contribution that I think people will find interesting.

Specific comments:

C211

(1) Abstract. There are a few typos, including incorrectly identifying the number of mangrove species being studied.

(2) There are two locations in the manuscript where the scientific language is not correct: (a) P. 897, line 20. There are very few “established facts” in science, and none of those studies cited make that argument. Please re-word. (b) P. 910, lines 3-4. We do not prove hypotheses true, we simply fail to reject them. This may sound trivial, but it is an important distinction.

(3) Table 1 is excellent, but there may be a need in the text for a better description of the dispersal structures of these mangrove species. The authors did a great job canvassing a range of dispersal unit types available in mangroves globally. I would certainly spend more time making that clear. But also, the authors mention fruit, propagule, and seed. However, *Hertiera* disperses as a fruit (i.e., has an embedded seed) and while you may be able to argue that it is a form of a propagule, it differs completely from the propagule referenced for *Cerriops* and *Rhizophora*. Please spend more time explaining the biology to the readers.

(4) Along with dispersal, there is quite a bit of new research being dedicated toward facilitation. It may not matter as much that propagules (etc.) disperse to a new location, but rather the vegetative conditions encountered may be more important. From the perspective of individual based modeling, this is likely to be more important than dispersal but is not addressed.

(5) Discussion. I must say that stating “... [that] the influence of wind is more pronounced for dispersal units with a lower density” is fairly obvious. I like what you did to document how different, but I think that not discovering this would have been grounds to suggest that your experiment was flawed rather than this being a major study result.

(6) Discussion. In regards to Individual Based Models (IBM), do these authors have their own suite of IBMs? I cannot agree that knowing what propagules are likely to disperse to new areas based on incorporating wind into dispersal modeling will ad-

C212

vance mangrove IBMs at all. The scale is not right. IBMs are applied to small areas that have the suite of propagules already, and proper recruitment functions for propagules already on site become the limiting variable. Indeed, recruitment is so variable that IBMs are more limited by spatial variability in recruitment than they would ever be by knowing whether an individual species might make it to the simulated plot. There may be some instances where knowing something about dispersal would improve what species to include in specific model runs; probably not where the suite of mangroves are limited to three, for example. But, the key is that without the sensitivity analyses, such links should be toned down. Now, if you have your own IBMs, understand how they work, and do the sensitivity modeling that suggests that dispersal to a specific site is important relative to recruitment, early growth (along salinity, fertility, HS, light, etc gradients), self-shading, and disturbance gradients, then that would be a different matter. That does not seem to be the case though. It is too speculative.

(7) Discussion. What does "... this study may be a first step into the challenge to construct a model in which propagules can be followed as particles to which specific properties are being assigned" mean?

In summary, this is good empirical research which I like. I would tone down the justification for this in terms of needed information for modeling, which is a little hard to follow from the perspective of knowing a bit about how IBMs work. But, this tells us how much the morphology of mangrove dispersal units influence possible success in terms of dispersal alone. Good work!

Interactive comment on Biogeosciences Discuss., 10, 895, 2013.