

Earth Syst. Dynam. Discuss., referee comment RC1
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Comment on esd-2021-41

Anonymous Referee #1

Referee comment on "ESD Ideas: A weak positive feedback between sea level and the planetary albedo" by Ben Marzeion, Earth Syst. Dynam. Discuss.,
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Reviewer's report on the manuscript 'ESD Ideas: A Weak Positive Feedback Between Sea Level and the Planetary Albedo' by Ben Marzeion

The author points out that the flooding of coastal areas due to the sea-level rise could result in a decrease of the planetary albedo, because the albedo of sea surface is smaller than the albedo of most land surfaces. Consequently, it may be expected that the global warming and related sea-level rise will result in a further warming and sea-level rise, etc. - hence, a positive feedback. The mechanism is shown to be weak but is of sufficient interest to warrant publication.

My main concern is that for the land-surface albedo a zonally averaged value is used (lines 29-31) whereas it could be expected that what actually matters is the albedo of coastal areas. Because the albedo considerably differs between the various types of land surfaces, the difference between the zonally averaged and coastal values is not necessarily negligible. This certainly merits discussion.

Another point is the lack of interpretation of the results obtained. Non-expert readers would be intrigued by the small differences between the land and ocean albedo at high latitudes (Fig. 1a), by the pixel-including-coast albedo being smaller in subtropics than in the equatorial region (Fig. 1a), and by the radiative forcing that is larger in the northern hemisphere than in the southern hemisphere (Figs. 1c and 1d). This, I guess, could be related to the influence of snow and ice cover, to the effect of clouds, and to the distribution of land and ocean between the two hemispheres. Again, a discussion would be of interest.

There are just a few technical corrections: 'Meters' should be substituted by 'meters' (line 6), 'coast a line' should presumably be substituted by 'a coastline' (line 12), and 'know' should be substituted by 'known' (line 17).

