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Interactive comment on “Imbalance of energy and momentum source terms of the sea wave transfer equation for fully developed seas” by G. V. Caudal

Anonymous Referee #2

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Consistency of air-sea interaction formulations remains an important and topical subject. This paper addresses one aspect; balance of source and sink terms for wave energy and momentum under conditions where the spectrum has reached a near-steady state relative to forcing by wind of a given speed (its strength is a parameter that is varied).

The presentation is straightforward, well-structured and considers several formulations of source terms from the literature. The outcome seems disappointing to me in that, whilst inclusion of the proposed flux to smaller wavenumbers (on account of wave breaking) can bring consistency between the energy and momentum equations, the cost function using observationally-based wave spectra seems not to be decreased. The situation is improved by allowing also directional “diffusion” of spectral energy; the

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cost function is slightly decreased and the required flux rate to smaller wavenumbers is decreased to be much closer to independent estimates.

It seems to me that probably there remains some other deficiency either in the formulation of source terms or in the observational spectra as used here. The latter are rather taken as “given”. I think the paper would be improved by a little more discussion of where there may yet be scope to improve the source terms or the assumed observational spectra. Perhaps “figure Z” in response to Dr. Webb may give a clue.

NB. Apart from the last sentence, the above comments were written independently of the previous comments and responses thereto. It would appear that the exact calculation of non-linear transfers has improved the cost function, causing it to now to decrease with inclusion of the proposed flux. However, I think the third paragraph here still stands.

Interactive comment on Ocean Sci. Discuss., 9, 2581, 2012.

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