

## ***Interactive comment on “Evidence of coastal trapped wave scattering using high-frequency radar data in the Mid-Atlantic Bight” by Kelsey Brunner and Kamazima M. M. Lwiza***

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The authors discuss a question that has hitherto proved difficult; scattering seems to be sensitive to topography in ways that are hard to predict from the form of topographic variation. The following comments are intended to help the clarity of the manuscript.

In the Abstract (and elsewhere in various forms) “A combination of velocity vector maps from real vector empirical orthogonal function (REOF) analysis and phase maps from complex empirical orthogonal function (C-EOF) analysis allow the identification of CTW scattering by assuming each EOF mode corresponds to a CTW mode”. I agree with “identification of . . . scattering” (Reviewer 1 has raised the question whether it is

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mainly CTWs). However, I don't think the authors need to “assume”. Rather, they make a comparison between the EOF modes and CTW mode structures to help the “identification”. EOF modes emphasise coherent aspects of the flow; where scattering occurs, EOF mode 1 (and possibly higher modes according to context) can be expected to include both the incident and scattered forms.

Towards the end of the Abstract “The simple methodology used here can be applied to observations of CTWs on other coastlines around the world.” True, except that the methodology does depend on having a good coverage of the current field over the continental shelf (and slope to some extent), probably from HF radar or a model. The authors were “lucky” in having such extensive HF radar coverage. Many places around the world would not easily obtain such data coverage.

Before and after equation (6). “. . . the ratio of CTW to total kinetic energy is calculated as . . . where  $u_c$  and  $v_c$  are the seasonal CTW velocities,  $u$  and  $v$  are the annual mean currents. . .” I think this cannot be correct. Much kinetic energy would surely be “lost” if “ $u$ ” and “ $v$ ” were averaged over a year before being squared. Surely the annual mean must be of the squared velocity.

Line 215. “. . . energy density,  $(u^2 + v^2)/2H$  . . .”. This is ambiguous with respect to whether “ $H$ ” is a multiplier or divisor. From figures 8 and 9 I guess the latter, but then this is not “energy density”. No factor  $H$  would be for energy density per volume, a multiplier  $H$  would be for energy density per area.

A personal gripe: the use of “Mid-Atlantic”. It is very unfortunate that “Middle Atlantic Bight”, meaning middle of the Atlantic Bight, has generally morphed to “Mid-Atlantic Bight” meaning a bight in the middle of the Atlantic – which is nonsense. Now it seems we have in MARACOOS (beginning of section 2.1) a coastal ocean in Mid-Atlantic (no mention of “bight”). I suppose the authors cannot do anything about this.