

Ocean Sci. Discuss., referee comment RC2
<https://doi.org/10.5194/os-2021-57-RC2>, 2021
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Comment on os-2021-57

Anonymous Referee #2

Referee comment on "Currents generated by the sea breeze in the southern Caspian Sea" by Mina Masoud and Rich Pawlowicz, Ocean Sci. Discuss.,
<https://doi.org/10.5194/os-2021-57-RC2>, 2021

Overall an interesting set of observations worthy of publication in Ocean Sciences. My only real hesitance is I think the presentation of the work needs to be much more focused on the key results, as at present there is too much unnecessary detail obscuring the key results. In particular, it is not clear to me how the new theory presented differs from previous work on inertial oscillations in coastal settings. What new (generic) incites does this work give to the understanding of inertial oscillations in shallow seas? At present the paper gives the impression that the results are only really relevant to the Caspian Sea which is not the case. As such I recommend the paper to be more clearly focused on the key results (and new incites).

I also have a few minor points:

19: "However, it is often difficult to separate tidal, inertial, and sea-breeze effects in the coastal ocean response, since the time scales are very similar." Is this statement correct? I you need to be more precice?

43-46: "The large-scale stratification in the Caspian's water column varies seasonally, with warm salty (20-30C, 12 PSU) waters in a relatively well-mixed layer about 40-100 m deep in summer and fresher, less warm (10C, 11 PSU) surface waters in winter (Zaker et al., 2007), above more stratified waters at depth." In terms of the modal structure of the inertial oscillations, the stratification, and it's evolution over the seasonal cycle is key. As such a more accurate description needs to be provided.

56: "However, in other months when the temperature gradient between the sea and land surfaces is low, strong winds towards land at sea level can strengthen the sea breeze and generate precipitation." I found this section a little confusing. You need to be clear as to how the sea breeze evolves

through the seasonal cycle.

76: "Weather Research and Forecasting (WRF) model". A key wind characteristic in terms of generation and damping of inertial oscillations is the wind direction. You need to discuss the accuracy of the model wind predictions in these type of coastal situations at some point.

451: "This pressure gradient is anti-phase to the surface wind stress and so transfers the forcing to the whole water column with a 180 phase shift that leads to anti-phase motions in the lower layers." This is not strictly correct - see Craig (1989). The phase shift is essentially a response to the presence of the coastline and the stratification.