

Ocean Sci. Discuss., referee comment RC1
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Comment on os-2021-24

Anonymous Referee #1

Referee comment on "Western boundary circulation and coastal sea-level variability in Northern Hemisphere oceans" by Samuel Tiéfolo Diabaté et al., Ocean Sci. Discuss., <https://doi.org/10.5194/os-2021-24-RC1>, 2021

This manuscript examined interannual to decadal coastal sea-level variability associated the Kuroshio and the Gulf Stream variations. The authors showed that the first EOF modes of coastal sea level variability both in the North Atlantic and North Pacific are associated with the meridional shifts of the western boundary currents. In contrast, the second EOF mode in the North Pacific is related to the large meander of the Kuroshio, which is clearly different from the second EOF mode in the North Atlantic. The topic of the manuscript is important, and the quality of the analyses is good. I have two comments.

General comment:

The manuscript is well written, but the novelty of this study is unclear. In the abstract, there are only two sentences about the results of the present study (L6-10). As the authors cited in the manuscript, there are many studies that examined coastal sea level variability associated with the Kuroshio and the Gulf Stream variability. Also, recent review paper (Woodworth et al. 2019) compared coastal sea level variability between the Kuroshio and the Gulf Stream regions. What are the new findings in the present study? Please more clarify this point.

Specific comment:

As the authors pointed out in section 3.2.1, the sea surface velocity changes associated with the first EOF mode in the upstream region of the separation point is different between the North Atlantic and North Atlantic (L341-349). The Kuroshio was shifted on-shoreward, but the Gulf Stream was shifted off-shoreward in the positive phase of the first EOF mode (Fig. 5), although the corresponding coastal sea level anomalies are positive. However, the detailed difference has not been discussed in the manuscript. It is interesting to compare the sea level change in the across-shore direction between the two regions.