

Ocean Sci. Discuss., referee comment RC1
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Comment on os-2020-122

Anonymous Referee #1

Referee comment on "Impact of dense-water flow over a sloping bottom on open-sea circulation: laboratory experiments and an Ionian Sea (Mediterranean) example" by Miroslav Gačić et al., Ocean Sci. Discuss., <https://doi.org/10.5194/os-2020-122-RC1>, 2021

Laboratory experiments are used to investigate the effects of injecting fluid at various flow rates and densities on a sloping boundary into a two-layer stratification in a rotating system. The aim is to examine the effect of overflow waters into the Ionian Sea, and in particular how changes in the density or flow rate can affect the overall circulation within the basin. This is a substantial experimental effort, conducted carefully, and the work is mostly described well, with an analysis of the partitioning between eddy and mean flow KE, the resulting flow within the basin, and comparisons with numerical model output for the Ionian Sea, assimilating in-situ data for 2012. Overall this is a valuable piece of work. There are some aspects of the presentation that should be improved before the paper is published.

1 While I realise details are included in other references, you need to give some more details about how the velocities are calculated from the laboratory experiments. An image showing a velocity field earlier in the paper, to help explain the main features of the laboratory flow, would also be useful.

2 You mention viscous bottom draining (line 313) but there was no mention of this before – something on this should appear in the Introduction.

3 It would be useful to have a chart of the Ionian Sea sooner in the paper, and you should mark the locations of the main inflows and sketch the typical circulation(s).

4 You need to explain how you calculate MKE and EKE in more detail.

5 The English needs some attention – below I list a few corrections from the Abstract and Introduction by line number, but there are others, and throughout you often write “the experiment 24” or “the phase II” where “the” should be deleted.

30 Density records show

56 as happened in

69 these studies maintain that

80 of dense water in the

82 with observations

83 with a duration of

87 circulation of the open sea

91 of vorticity generation

Fig 1 (not to scale)