

Review report of “Data sets characterizing tide and current fluxes in coastal basins” by Elvira Armenio et al.

Major comments:

In this paper the authors proposed a framework aiming to be applicable in any coastal sites to study the hydrodynamics using the field measurement data sets, and then use the Mar Piccolo semi-enclosed basin as a study case. The paper presents the time history records of tides, currents and waves, reveals the tide asymmetry and relationships between the tide record and the current speeds at different levels of water column. The results could be useful for understanding the basin hydrology especially the water transport.

However, I have a big concern that a study case like Mar Piccolo is far not enough to support the aim of this paper, i.e. to set up a framework to study the hydrology at ANY coastal sites.

- (1) not many coastal sites have continuous measurements of 3D currents;
- (2) the currents at a coastal site are determined by many factors such as tides, winds, bathymetry and river discharge. A clear relationship between the amplitude of tides and the current speeds can only be found when two measuring stations are very close and impacts from other factors are small (as in the study case of Mar Piccolo). If the ADCP mooring station is far away from station B (for example in II Bay), the story will be totally different;
- (3) the data analysis methods and procedure used in the study case of Mar Piccolo such as data quality control, spectrum analysis and tide analysis, are general and traditional in coastal studies. It doesn't seem like a new study framework.
- (4) the shape of vertical current profile is supposed to related to the density stratification, i.e. the mode of internal waves determined by the vertical buoyancy frequency profile. This is not shown in the results.
- (5) the authors showed the monthly-averaged and some snapshots of current profiles, however no uncertainty is included in the results. So the results cannot be used reliably for forecast or management purpose.

So I would suggest the authors to re-organise the paper to focus just on the hydrodynamics in Mar Piccolo itself, or to include more study cases to support your research aim.

Another big concern is the writing of this paper. About half of the abstract and the conclusion are just repeating what have been included in the introduction. There are also many minor grammar and English errors. I pick up a few in next section 'minor comments'. But I recommend the authors to go through the paper to clean up the writing to make the paper more readable.

Minor comments (based on the last manuscript):

1. Abstract: most of the abstract is describing research targets and methods, but doesn't deliver the research results;
2. Page 1, line 29-33: grammar errors;
3. Page 2, line 3-4: grammar errors;

4. Page 2, line 14-15: although ocean models are usually with resolution of >100m, there are many numerical modelling studies at estuaries/coastal bays with spatial resolution lower than one hundred metres;
5. Page 2, line 26-28: the complexity of a numerical model is usually adjustable, you can choose 1D/2D/3D and different inputs/numerical schemes; numerical models are often overly simplified but not complex;
6. Page 2, line 29: the concept of “data-driven approach” is very general and the author need to be more specific of which approach to use in this study;
7. Page 5, line 26: typo, use “-“ instead of “÷”;
8. Page 8, line 37: typo, use “surface” instead of “superficial”;
9. Page 11, line 12 – 14: how does the fresh inflow change the current profile? i.e. the vertical buoyancy frequency profile will change according to density stratification, and therefore the vertical mode of current profile will change accordingly. Did you compare the vertical buoyancy frequency profile and the current profiles?
10. Page 11, line 31-32: if we want to extrapolate the results for prediction, uncertainty of prediction must be known but that is not included in the results;
11. Page 12, line 1-25: this part seems just simply repeating what has been included in the introduction.
12. Page 12, line 24: this paper doesn’t include the interactions of waves with tide and currents.