

Interactive comment on “Seasonal stratification and property distributions in a tropical estuary (Cochin estuary, west coast, India)” by A. Shivaprasad et al.

A. Shivaprasad et al.

shivaprasadnio@gmail.com

Received and published: 20 November 2012

Comment 1: Can the authors please provide a full explanation/appraisal (qualitative and quantitative) of PEA? The authors are presuming that readers will have a deeper understanding than may be the case.

Reply: Thank you for your comment. Potential energy arguments have been found to be an excellent means with which to study the competing influences of stratification and mixing. The method has proved crucial for quantifying the mixing efficiency in numerous stratification studies in coastal seas and estuaries (Nunes Vaz et al., 1989;

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5 Rippeth and Simpson, 1996; Lund-Hansen et al., 1996; Ranasinghe and Pattiaratchi, 1999). The spatial variation in the potential energy anomaly at low and high tides has been documented by Shaha et al., 2011. Simpson (1981) defined PEA as the amount of mechanical Energy (per m³) required to instantaneously homogenize the water column completely. As suggested by the referee, in order to provide a wider insight to the readers of HESSD, here we provide a simple brief description in the supplement to this comment which elaborates the physical meaning of PEA

The basic principle is that mixing increases the potential energy anomaly of the water column as kinetic energy has to be converted to potential energy.

(Please also note the supplement to this comment)

In the present study, we have used PEA as a proxy for studying the intra-tidal variations in stratification. According to the opinion of referee1, we have also computed PEA for longitudinal salinity survey which gives more robust information regarding the seasonal and spatial variations in stratification. The results are incorporated in the revised manuscript.

Please also note the supplement to this comment:

<http://www.hydrol-earth-syst-sci-discuss.net/9/C5289/2012/hessd-9-C5289-2012-supplement.pdf>

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 9, 8979, 2012.

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