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Interactive comment on "Turbulence observations in the Gulf of Trieste under moderate wind forcing and different water column stratification" *by* F. M. Falcieri et al.

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Drs. Falcieri and collaborators present an analysis of microstructure observations from the Gulf of Trieste. The fairly large data set was taken in early 2014 under "moderate" atmospheric forcing by winds of typically 10 m/s and oceanic heat loss. Stable vertical stratification remained despite the surface conditions owing to lateral density gradients in a ROFI setting.

The authors present an interesting and relevant set of observations. Their paper can eventually make a fine contribution to the literature. I have a generally favorable view of the analysis. However, while the analysis of circulation patterns and water masses

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are thorough and well done, I see significant problems with the analysis of the turbulent dissipation rates. In essence, although with modifications, the authors claim that "TKE dissipation rates follow closely the similarity scaling for wind stress generated turbulence and for the one due to bottom shear stress near the sea floor (Fig. 8)." However, in a substantial number of profiles, epsilon deviates by an order of magnitude or more from similarity scaling. Specifically, epsilon appears systematically elevated over similarity values toward the surface (upper 7-12 m). Some of these instances are not addressed by the authors. The analysis is carried out solely in terms of boundary forcing with modifications due to stable stratification. The text is also somewhat hard to follow.

In my view the analysis of the turbulent mixing is not very statisfactory and insufficient. I recommend a wider perspective that should include the effects of surface waves, Langmuir cells and internal wave-driven forcing. With respect to the latter, the work of MacKinnon and Gregg needs to be considered.

Nittygritty (notation based on the "print" version):

- Abstract, line 9: "ensembles" - not "enables". The need for ensembles is not universal. Just consider the single-cast deep ocean microstructure profiles.

- Abstract, near Line 15: Attempts at reducing vertical smearing in averages have been done many times before, typically using potential density (or Thorpe-sorted pot. density). This works well in data with vertical displacements due to internal waves. It does not work so well in the presence of lateral water mass variations. I leave it up to the authors to comment on my note or to ignore it.

- Introduction, first paragraph: While I agree with the last sentence, the remainder of the opening of the paper is pretty much off the mark. Turbulence observations have become rather common. And from the 1980s microstructure measurements have been accompanied by the necessary ancillary measurements.

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- Page 1734, line 27: What is the "NIB-MBS" profiler?

- Fig. 3: The red line i (d) is hard to see.

- Fig. 6: As there are only small vertical variations in T, S and turbidity, a set of "waterfall plots" might show more detail of the data. – The contour interval in epsilon obviously is 1 in log(epsilon/(W/kg), notin epsilon itself (ditto in later figures).

- Fig. 8: The measured dissipation rates of Yoyo Y01 are described as "in agreement with the local forcing". Yet epsilon is systematically and strongly elevated above the wind-related similarity scaling in the upper 7-9 m. This needs an explanation or modification of the text. The elevated epsilon near the surface is even more pronounced in later Yoyos. See text above for other parts of the data set.

- Fig. 8: Why not plot the surface buoyancy flux as vertical lines?

Interactive comment on Ocean Sci. Discuss., 12, 1729, 2015.