

# ***Interactive comment on “In situ observations of turbulent ship wakes and their potential implications for vertical mixing” by Amanda T. Nylund et al.***

## **Anonymous Referee #1**

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General comments. The paper is mostly descriptive and practically no physical analysis of the observations is performed. It looks mostly like a report on some routine observations, like “a pile of data”, and only methodological aspects of the work are described, although not clearly enough (see, some specific comments below). One cannot find in the text any new physical effects. The paper in its present form does not look interesting and informative from a scientific point of view. The aim/motivation of the paper is not clear.

Specific comments. 1. An error in formula (1) 2. A scheme of the ADCP deployment and recording of ship wakes has to be presented to understand how the ship wakes

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are recorded by the ADCP. For instance, the bubble wake manifestations similar to one in Fig.2 appear when the ADCP is towed across the ship wake, or if the wake is moving in the cross wake direction due to currents passing by the ADCP beams. How thus the record of a ship wake in Fig.2 could be obtained for a stationary looking upward ADCP? Was that due to a current moving a wake through a zone illuminated by ADCP? 3. Why the wakes appeared in the ADCP records for ships passed by at some distances from the ADCP? Because of the wake turbulent diffusion? If so, why not to analyze, e.g. the characteristic times of the turbulent diffusion, the diffusion spatial/temporal decay, etc.? 4. Line 301. I cannot understand how this can happen : “ . . . . .when two ships passed the instrument at the same time” 5. Categorization of the ships in the context of their turbulent wakes does not look physically justified. More reasonable would be to relate the wakes to the ship weight, draught, speed, possibly to the size/number of propellers. 6. line 331 “As the fraction of detected induced wakes at similar distances differ between ship types, it is an indication that the ship type impacts the characteristic of the turbulent wake” . I disagree with the statement and I think that the difference is determined mostly by the ship weigh and ship speed. 7. The paper is full of obvious, trivial statements, e.g. “in general the deepest wakes were caused by ships passing closer to the instrument, whereas ships passing at larger distances from the instrument (100–199 m) mainly caused shallower wakes . . .” (lines 369-370) “the maximum dissipation rates . . . in the core of the wake . . .are . . .much larger than what is usually observed in the core of, or below, the surface mixed layer” (lines 403-405), etc. etc.

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