

Interactive comment on “Annual hypoxia dynamics in an enclosed gulf” by K. Kountoura and I. Zacharias

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Dear authors,

One of the point put forward in this manuscript is that they describe a new way to ventilate deep water for enclosed gulfs where vertical mixing is somehow low. In their reply to reviewer 1, one of the author say:

"I agree with you that many fjords have well oxygenated bottom layer due to lateral intrusion, but with tidal range and connections, many times higher than what we have in the Mediterranean, the Baltic or in the Black sea. There is no information in the literature for such systems. Please inform me, if you know otherwise."

My point here is that it exists such information in the literature. Take for example the
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deep water renewal of the Baltic Sea (where there is virtually no tides). This mechanism occurs on a decadal time scale and it's description is very similar to what the authors have done from Amvrakikos. For reference, please see the review by Reissmann et al. (Vertical mixing in the Baltic Sea and consequences for eutrophication – A review, Progress In Oceanography Volume 82, Issue 1, July 2009. In the second paragraph of the introduction:

"In the Baltic Sea, a European semi-enclosed marginal sea (Fig. 1), turbulent mixing plays a much more complex role for the dynamics of the marine ecosystem. Due to its positive freshwater budget and the episodic events of salt water inflows through the narrow and shallow straits connecting the Baltic Sea with the saline North Sea, the central Baltic Sea is permanently stratified with a halocline located about 60 m below the surface. The Baltic Sea produces large amounts of organic matter sinking into the stratified deeper water where it mineralises and thus lowers the oxygen concentration in the water. Major Baltic Inflows (MBIs) (Matthäus and Franck, 1992) occurring on the decadal time scale are the main process which ventilates these depleted deeper water. During the stagnation periods between two MBIs the near-bottom water of the deeper basins typically becomes anoxic with the consequence that large amounts of phosphate are released from the sediments".

I don't think that what the authors observed is a new mechanism, but the description of it is worth on a regional scale: does it append every year? What are the consequences? etc. These are examples of questions that a revised manuscript should focus on.

Sincerely

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