Earth Syst. Sci. Data Discuss.,
https://doi.org/10.5194/essd-2019-166-RC1, 2020

Earth System Science Data Discussions

Interactive comment on "Reanalysis of vertical mixing in mesocosm experiments: PeECE III and KOSMOS 2013" *by* Sabine Mathesius et al.

Li Gang (Referee)

ligang@scsio.ac.cn

Received and published: 21 January 2020

Comments on the manuscript entitled "Reanalysis of vertical mixing in mesocosm experiments: PeECE III and KOSMOS 2013 (essd-2019-166)" by Sabine Mathesius et al.

This study developed a one-dimensional mixing model that confidentially reproduced the vertical mixing of the mesocosms of PeECE III and KOSMOS 2013, by comparing the observed and simulated temperature and salinity. Through this model the vertical mixing in mesocosms can be quantitively estimated. I appreciate the work of this study although I honestly am not very familiar with physical oceanography, because it is very useful not only for marine biogeochemical cycles but biological physiology, such as the

photophysiology of phytoplankton.

What I'm mainly concerned are as follows: In the Introduction part, authors just referred the vertical mixing affects the particular matters, nutrients and CO2 flux etc, on Page 2 Lines 12-14. In fact, the model is developed based on the data of PeECE III and KOSMOS 2013 mesocosms studies, one of the very important aspects of which is about the impacts of environmental changes (nutrients, CO2) on phytoplankton physiology. The vertical mixing drives phytoplankton up and down the water column, which affects phytoplankton-experienced light intensity and quality, thus the photophysiology, and ultimately influences marine primary productivity. I think as background the effects of vertical mixing on phytoplankton should be mentioned in the Introduction part as well as the future perspective in the end.

Page 11 Lines 20-21 indicate the temperatures varied from 4.8 to 16.8 oC; while Line 31 shows the mean temperatures ranged between range between 7.36 and 7.40 oC with a standard deviation of 4.49-4.53 oC. I'm confused with the data. If I understand properly, the mean temperature was obtained from all measured values (from surface to bottom, and from start to the end of the experiment). However, according to the first panel of Figure 4 the mean temperature should be close to the medium value of $\sim$10 oC. Moreover, there are big changes of temperatures from 4.8 to 16.8 oC. Averaging the temperature throughout the experiment period missed majority of information when comparing observed and simulated values as described in the text (Page 11 Line 33-35). So, I suggest comparing them day by day, in a temporal scale.

Format the references: Some titles of listed articles are capitalized each word (Page 9, Lines 3, 23 and 31; Page 20, Lines 9 and 14, and Page 21, Line 13), and the remaining ones just capitalized the first word.

Page 21 Line 18, remove the dot.

Interactive comment on Earth Syst. Sci. Data Discuss., https://doi.org/10.5194/essd-2019-166, 2019.