

## ***Interactive comment on “FerryBox Data in the North Sea from 2002 to 2005” by Wilhelm Petersen et al.***

**Wilhelm Petersen et al.**

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R3-1: The manuscript is easy to read but could be better organized for example, by adding a sub-section for each parameter which will help the reader better navigate through the manuscript. A paragraph synthesizing the limitation of the dataset (e.g. temperature offset, uncalibrated chlorophyll a) as well as a complete description of the uncertainties associated with each measurement (as mentioned by reviewer #2) should be included.

AA1: Uncertainties have been described for each parameter as far as measurements were available.

R3-2: It's not clear why there are two turbidity and dissolved oxygen sensors. Are they

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agreeing well with each other? AA-2: For oxygen only the data from the Clark electrode were provided and for turbidity only the data from the Scufa sensor were shown. The reasons have been explained in the description of the parameter

R3-3: It's not clear what the collected water samples are used for? Could you provide example of laboratory analysis and quality measurements performed? AA-3: See description of the laboratory analysis of salinity

R3-4: The depth of the water intake of the flow-through system is close to 5 m: it varies with the load of the ferries and the sea state. It's not at a fix depth of 5 m as mentioned line 48. AA-4: Has been described in more detail in the text.

R3-5: Salinity measurements in a flow-through systems can be affected by bubbles going through the system usually manifested by spikes of low salinity values, was the data quality checked for this? Looking at the validation of the salinity (figure 2), it seems that there is a typo in the equation which shows an offset of -1.053 not present on the data plotted. AA-5: All data were quality checked (added in the text). RMSE error of salinity measurements was  $\pm 0.03$  PSU. The linear fit with right values is shown in the updated graph.

R3-6: How are the dissolved oxygen measurement affected by the bubbles entering the system and the debubbler? If it's affected could you QC times with bubbles? Was the oxygen concentration compared with in situ samples (not going through the FerryBox system, tubing and pump)? AA-6: See comment above. No in-situ samples available. Only the calibration of the oxygen sensor (Clark electrode) has been checked periodically.

R3-7: There is information missing concerning the quality control of the scattering data. If I understood correctly the turbidity measurements are derived from an empirical relationship with particulate backscattering. Again, bubbles in the system will introduce spikes in the signal that should be removed from the dataset either using manual QC or an automated script. However, this should be done with caution as some of the spikes

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could also be due to large particles such as aggregates or zooplankton. How was the SCUFA-II sensor mounted? Was there any wall effect of the box in which the sensor was mounted? If yes were those removed from the signal? Could you specify the calibration coefficients used? AA-7: As mentioned in the text turbidity measurements were checked against strong outliers in rough seas. Apart from that only the factor calibration has been used. This is also the reason the turbidity data are not part of the data set delivered to the Pangea database.

R3-8: Deriving total chlorophyll a from fluorescence is tricky has mentioned in the manuscript. It would be worth mentioning which correction are necessary and pointing the user to the data or documentation if available. Here is a non-exhaustive list of corrections that should be applied to retrieve a better estimate of chlorophyll a concentrations:

- Correct for Non-photochemical quenching during daytime using a modelled photosynthetically active radiation (PAR), mention that this is not needed most of the time as the ferry travels overnight.
- Correct for colored dissolved organic matter contamination (CDOM) if CDOM measurements are available (Xing et al. 2016) AA-8: CDOM measurements are not available and probably have no big influence in the open North Sea.

R3-9: - Is Total chlorophyll a derived from HPLC samples available or any other measurements of chlorophyll a concentration available? This would help to adjust the manufacturer slope factor converting from engineering units to ug of chlorophyll a / liters (Roesler et al. 2017) AA-9: Only occasionally total chl-a measurement derived from HPLC measurement were available which just demonstrate the well known seasonal change of the fluorescence yield due to different types of algae. As the yield differs about a factor of 2-3 a general factor for converting chl-a fluorescence to total chlorophyll cannot be given. Relationships (converting fluorescence into chlorophylls-a concentrations) from HPLC measurements are only valid for the time and location the

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samples have been taken.

R3-10: What type of pump is used with the FerryBox systems? If it's not a peristaltic or diaphragm pump phytoplankton will be damaged before taking measurements of chlorophyll a which should be mentioned in the description of the dataset. AA-10: Mentioned in the description

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