

Earth Syst. Sci. Data Discuss., referee comment RC1
<https://doi.org/10.5194/essd-2021-149-RC1>, 2021
© Author(s) 2021. This work is distributed under
the Creative Commons Attribution 4.0 License.

Comment on essd-2021-149

Anonymous Referee #1

Referee comment on "Climatological distribution of dissolved inorganic nutrients in the western Mediterranean Sea (1981–2017)" by Malek Belgacem et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2021-149-RC1>, 2021

General comments

The article shows the exhaustive work of data validation and quality check performed before the analysis and climatological fields computation. Explanations are easy to follow and the entire work could be replicated by other people in other marine areas. The analysis of results brings out the main differences and agreements between this new computed climatologies and the existing ones (WOA2018, medBFM) with carefully explained details level by level and basin by basin.

The lack of data in certain areas is a well-known problem in the Mediterranean and researchers have to face it when they try to find complete descriptions or intermediate and deep sea layers behaviors. The problem is greater when they want to obtain information about nutrients at intermediate or deep water measurements. In this sense, these climatologies could help in future works to partially palliate this lack of data by offering reference values and error fields. Future updates and re-evaluation of these climatologies will be welcomed by the scientific community.

Specific comments

Regarding the GEBCO-30sec (approx 920mx920m grid) dataset used by the authors, I would put forward that the current EMODnet Digital Terrain Model (DTM), released in Sept2018 has a grid resolution of 1/16 minute x 1/16 minute (=115m x 115 m) and new DTMs are planned to be published in short. As GEBCO, it is freely available to any interested people. Note also that from the start of the EMODnet Bathymetry projects, the followed approach is based in the pre-gridded DTMs. They have been locally computed by the data providers according to the chosen grid and origin. This facilitates the precision of the final computed DTM. This bathymetry, perhaps, could improve the presented climatologies at some levels and can be is a line to explore in future works.

In relation with the Deep Water formation in the Gulf of Lion, the importance of Tester's team and work (line53) must be recognised, and the great impulse to the knowledge of this phenomenon achieved with the new instrumental advances, but I would like to draw the attention of the authors to the extensive bibliography published along the time, to which they could also refer. I mention some articles as an example below, but they are not the only ones.

- MEDOC Group. Observation of formation of Deep Water in the Mediterranean Sea. *Nature*, 227 (1970), pp. 1037-1040
- Canals, P. Puig, X.D. de Madron, S. Heussner, A. Palanques, J. Fabres. Flushing submarine canyons *Nature*, 444 (2006), pp. 354-357, 10.1038/nature05271
- Durrieu de Madron, L. Houpert, P. Puig, A. Sanchez-Vidal, P. Testor, A. Bosse, C. Estournel, S. Somot, F. Bourrin, M.N. Bouin, M. Beauverger, L. Beguery, A. Calafat, M. Canals, C. Cassou, L. Coppola, D. Dausse, F. D'Ortenzio, J. Font, S. Heussner, S. Kunesch, D. Lefevre, H. Le Goff, J. Martín, L. Mortier, A. Palanques, P. Raimbault. Interaction of dense shelf water cascading and open-sea convection in the northwestern Mediterranean during winter 2012: Shelf Cascading and open-sea convection. *Geophys. Res. Lett.*, 40 (2013), pp. 1379-1385, 10.1002/grl.50331

In the QC of the analysis fields (line 339) the authors refer that the residual values are NaN. This could be a computational output, but it could be explained in another way. It will be preferable if they explain that these computational points are not considered by different reasons (out of domain, or whatever). In my humble understanding, NaN is merely the way in which the computational tool used (julia) encodes the criteria adopted by the authors. It will be very welcomed if the authors consider to reformulate the paragraph.

Technical corrections

line 226. Please add the link / reference to Diva User Guide

line 697. Please type Western Mediterranean Transition (WMT)

line 779. Please, add the corresponding DOI to reference