

Earth Syst. Sci. Data Discuss., referee comment RC1  
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## Comment on **essd-2022-115**

Anonymous Referee #1

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Referee comment on "DeepOWT: a global offshore wind turbine data set derived with deep learning from Sentinel-1 data" by Thorsten Hoeser et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2022-115-RC1>, 2022

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The paper presents a novel method to identify the location and development stages of offshore wind turbines, at a global scale, for the period 2016-2021, using radar imagery of the Sentinel-1 mission. The methods proposed employ deep learning based object detection, linking the SyntEO approach for automatic synthesis of large annotated training data and a cascade of two convolutional neural network models. This allowed the identification of, first, the offshore wind farm areas, and second, the offshore wind farm turbines. The detection of OWT development stages was realized by applying two consecutive peak finder algorithms to the swap profiles of the time series imagery.

The data generated and method used are new, the workflow is thoroughly documented and described with sufficient detail. The resulted DeepOWT data set is openly available in a readily usable format compatible with geo-spatial software like QGIS. One strong aspect is the comparison of the resulted data set with the OSM database and the GOWT v1.3 data set, which validates and emphasizes the advantages of the resulted Deep OWT data set. The identified locations of OWTs are also consistent with the data provided by other open-source data repositories such as EmodNET.

The research is highly relevant in the context of the accelerated energy transition, leading to the high scale deployment of offshore wind farms. The results can represent valuable inputs in large-scale environmental impact assessments of renewable infrastructure, at a global scale. This can contribute to a more coherent, strategic and knowledge-based decision-making process related to future deployments of OWFs, when considering potential impacts on the marine environment. Furthermore, an updated data-base of OWFs and their development status can refine the outputs of regional and global energy models.