Comment on os-2021-86
Anonymous Referee #2

Referee comment on "Properties and evolution of a submesoscale cyclonic spiral" by Reiner Onken and Burkard Baschek, Ocean Sci. Discuss., https://doi.org/10.5194/os-2021-86-RC2, 2021

This paper describes the evolution of a submesoscale spiraling eddy as simulated by a multiple nesting configuration of a ROMS numerical model set up for the Baltic Sea. The paper provides exhaustive analyses of the simulation, proposing interesting dynamical interpretations of the vortex oscillations and specific investigations on their impact in terms of vertical transport (carried out through Lagrangian approaches). The paper is written clearly, but it is quite long and the organization of the sections not always optimal. As an example, the model set-up is both described in section 2 and discussed again in section 5, which leads to repetitions and makes the reading much less pleasant. I really suggest to significantly shorten it focusing on the most relevant findings and eventually removing at least some of the many details (and sometimes repetitions), also eventually moving some of the text to the figure captions (e.g.: "[...]The images are centered at the density maximum of the spiral, their meridional width is 2 arc minutes (=2 nautical miles ≈ 3704 m), [...]”). In many cases, instead of providing punctual descriptions of each figure within the text, it would be much more effective to directly focus on the relevant information the figure is giving, which would otherwise be missed by the reader.

My only concern about the scientific findings/discussion is related to the way eddy perturbations are identified as VRW. While I do agree that this is an absolutely plausible mechanism, some more comments would help to clarify how VRW can be distinguished by other vortex wave processes (e.g. inertial-gravity waves) and in case complemented by additional analyses that can reinforce the interpretation (e.g. by looking at propagation speeds predicted by VRW dispersion relation).

I would thus suggest a revision that could be classified between minor and major, but surely believe that the paper should be accepted for publication.