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Ocean Science
Discussions

Interactive comment on "The mesoscale eddy field in the Lofoten Basin from high-resolution Lagrangian simulations" *by* Johannes S. Dugstad et al.

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This manuscript by Dugstad et al. presents a thorough analysis of the eddy field in the Lofoten Basin using a multi-variate wavelet ridge analysis. Doing so, they've increased the understanding of the formation regions and characteristics of anticyclonic and cyclonic eddies and their respective importance for the heat transport and water mass transformation in the basin. The approach is novel, the paper is very clearly structured and written and regarding the 15 criteria provided for *Ocean Science* reviewers, I agree with Sarah Gille that the paper is in excellent shape.

I would like to add three comments in addition to the issues already raised by Sarah

Gille that should be addressed prior to publication.

1. A discussion is missing on the sensitivity of your results to the spatial and temporal seeding distribution of the Lagrangian particles. You seed particles on a 40x40 rectangular grid, but what is the distance between two particles and how does that compare to the average radius of the eddies? In other words, how many particles generally reside in 1 eddy? Regarding the temporal scale, you only seed particles once every week. As you discuss that it is difficult for particles to 'enter' eddies due to high vorticity gradients, aren't you under-sampling the eddy field due to the relatively low seeding frequency?

2. You mention that you don't add any diffusivity, so the particle displacement is purely advective. As the Lofoten Basin is characterised by strong heat losses, there is quite some convection going on. How well can your particles describe vertical motions and temperature changes of water parcels if this convective behaviour is not included?

3. Some of the figures can be improved by adding more clear labels. Comments on the figures, and some other minor comments are marked in the supplement.

Please also note the supplement to this comment:
https://os.copernicus.org/preprints/os-2020-103/os-2020-103-RC2-supplement.pdf

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