Reply to Reviewer 1:

This reviewer has not specifically requested any explicit changes to the article. We will reply below to the reviewer's comments, which are more general and descriptive.

Reviewer 1

1. The Rossby number is not small, but there is no evident secondary circulation. Kinetic energy wavenumber spectra are calculated from four long ship tracks. A fuss is made over the spectra being somewhat steeper at smaller wavenumbers and less steep at larger ones (down to a wavelength of 200 m). This is consistent with previous experience. The horizontal velocity is mostly rotational at smaller wavenumbers, consistent with geostrophic balance, and nearly equipartitioned with its divergent component at larger wavenumbers, the latter consistent with partly ageostrophic submeoscale motions or a modest presence of inertia-gravity waves.

   We agree that a transition is expected at some scale, when the rotational part dominates. The point we made was that the transition scale is small compared to the California upwelling region, which can be explained by the higher eddy activity. Because slope changes in wavenumber spectra of total kinetic energy are not easily identifiable in general see e.g. also previous studies (e.g. Rocha et al., Chereskin et al.), we were able to shed more light on the transition-scale with the Helmholtz decomposition and the distinction between along/cross track components.

2. The stated context is to identify submesoscale instabilities of several types. In my view this is not very conclusive. Patchy values of possible exceedance of stability thresholds are found, especially in the surface boundary layer where we can expect small-scale turbulence to be active, but otherwise there seems to be no systematic pattern. The authors claim stronger confirmation of instabilities than I think is justified.

   Our aim with the multi-platform approach was to connect the mesoscale processes with the submesoscales. We agree that the patchiness of the instability results might not necessarily be conclusive and that enhanced horizontal resolution and repeated sections in time would be preferable. We added in the Conclusions: "The EPV and instability diagnostics are sensitive to the resolution of the data. Likely, with higher horizontal resolution, density gradients and hence positive EPV would be enhanced, where it is barely positive with the resolution of the Scanfish. The patchiness of the instability analysis results illustrates the challenges associated with connecting mesoscale with smaller scale processes and enhanced horizontal resolution and repeat transects in time are preferable in future missions"