

Interactive comment on “Scale-dependent analysis of in situ observations in the mesoscale to submesoscale range around New Caledonia” by Guillaume Sérazin et al.

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Thank you very much for your comments. Please find our response to your different points here.

1. We do think that providing the results found in other sea regions that used similar techniques are important in the introduction. The main reason is because we find different conclusions compared to those studies, thus highlighting the regional variability of submesoscale and internal wave processes in particular in the region around New Caledonia.

2. We agree that internal waves vibrate at tidal frequencies, but they do follow the same physics and the same dispersion relationship as internal waves. As the frequency of internal tides is fixed, so is the wavenumber for a given vertical mode. Please compare your statement with GFD lessons such as those found at this link https://gfd.who.edu/wp-content/uploads/sites/18/2018/03/lecture06_21356.pdf

3. In the two upper layers presented in Figure 4, only the lower confidence intervals are quite large for the divergent component but it means that in certain case the divergent component may be very weak, though the rotational components still dominate. We think it is better to focus on the upper confidence interval of the divergent component and the lower confidence interval of the rotational component. If they do not overlap, we conclude for a clean separation between the divergent and the rotational component. It becomes different in the interior layer where both confidence interval for divergent and rotational motions overlap, meaning that the two types of motions are important. For those reasons, we think the results are reliable and can still be interpreted as we do in the paper.

4. We should emphasise that we do not see any seasonal variation in the density variance but there are seasonal variations in temperature and salinity variance. Because we do not have enough data to look at the seasonality of velocity structure functions, it is hard to discuss the lack of seasonality of submesoscale motions in general. Perhaps there is none because we are here in the tropics and the seasonal variations are less marked than at midlatitudes. Perhaps there is some but we do not have any support to discuss it.

5. Thanks, we have homogenised the document to use only Fig.

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Discussion paper

