

## RESPONSE #2

to review of “ On modulation instability in a system of jets, waves and eddies off California” by Ivanov et al. (2014)”.

Thank you very much for your review and especially for additional references of Wang et al. (2013) and Qiu et al. (2013).

Thank you for your comments about improvements of Section 1 and 2. However we do not see any problems with using M-mode approach for interpretation of modulation instability in (M-mode,  $\omega$ ) space. M-modes are the same Fourier modes but generalized on non-rectangular areas only. We have published more than five papers for the analysis of satellite data where these modes were used. Your comments about non-commonly of M-modes seem to be surprise for us.

We argued that structures observed off California were weakly nonlinear during most time of their evolution only. The degree of nonlinearity depends on horizontal resolution which was larger than 50-100 km for the AVISO data. We argued that nonlinearity of observed structures changes with time. Most of the time wave steepness  $q < 1$  (that can be interpreted as weakly nonlinear structures) but for small part of time  $q > 1$  (these are nonlinear structures). Transitions from  $q < 1$  to  $q > 1$  were fast. Therefore, the time when  $q < 1$  was considerably larger than the same characteristics but for which  $q > 1$ .

Thank you very much for your comments relative to how baroclinicity can influence modulational instability. We give explanation for that in the revised manuscript.

We have interpreted oscillations from 4 months to 18 months as Rossby waves based on their property to propagate westward. But we do not use Rossby wave dispersion because we do not know dispersion relation and think that this relation does not exist for nonlinear Rossby waves.

Selection of triplets and quartets from SSH data was explained in details in the manuscript text.

Thank you very much for your minor comments. We have revised the manuscript text and added appropriate comments. Note that we exclude modes numbered from 1 to 30 from discussion because they do not participate in westward propagation of Rossby waves. See, for example, Ivanov et al., 2009 and Ivanov et al. 2010.

We are very thankful to you for detail reading of the present manuscript and your comments relative to a possible mechanism of modulational instability in generation of quasi-zonal jets.