Nonlinear Processes
in Geophysics
Discussions

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**Interactive
comment**

Interactive comment on "On the interaction of short linear waves with internal solitary waves" *by* Chengzhu Xu and Marek Stastna

Anonymous Referee #2

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This paper investigates the interaction of short linear waves with internal solitary waves numerically. The interaction mechanism and energy transport during the interaction is provided in detail. The results are new and interesting, which provided a view for the further study of nonlinear internal wave dynamic. Overall, the paper is well organized and written, including sufficient experiments and reliable discussion. The topic, title, abstract and text of the paper are appropriate for the NPG Journal, the figures are of good quality. The conclusion is reliable and concise. Some minor comments are as follows.

1. In line 26 at page 6, the author said the amplitude of linear waves is set to 1mm for all cases, however, from the Figure 3 and Figure 4, the amplitude of linear waves is obviously higher than that value.

2. In section 4.2, the author describes the destruction of short waves in detail. According to the Figure 5, we can find the overturning significantly. The generation of this overturning is interesting, it possibly triggered by the weakening of stratification during interaction between linear waves and ISWs. It would be better to give some discussions on its generation mechanism, some values of Richardson number or Froude number could also be provided.

3. The destruction of short linear waves is subject to a modified stratification and a velocity shear. It would be interesting to provide a more detailed discussion about the adjustment of waves caused by a modified stratification.

4. According to the section 4.4, the phase speed of linear waves was modified by the interaction. The Froude number could be introduced to analyze the nonlinearity changing during interaction.

5. In lines 12-19 at page 18, the KE of ISWs increased by at least 1% after the interaction with the linear wave with a wavelength of 0.2m, however, for waves with a wavelength of 0.6m, the KE of ISWs didn't increase significantly. More discussion of the relationship between the wavelength of linear waves and the increasing energy of ISWs should be provided since this transport process is an interesting point to the readers.