

Interactive comment on “The evolution of mode-2 internal solitary waves modulated by background shear currents” by Peiwen Zhang et al.

T. Talipova (Referee)

tgatalipova@mail.ru

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Review on “The evolution of mode-2 internal solitary waves modulated by background shear currents” by Peiwen Zhang, Zhenhua Xu, Qun Li, Baoshu Yin, Yijun Hou, and Antony K. Liu

The evolution of the mode-2 internal solitary waves in fluid with stratification in density and shear flow is studied numerically with use MITgcm software. It is demonstrated that initial solitary wave disturbance splits on several wave groups: forwarding-propagated long waves, amplitude-modulated wave packet (which is identified as breather) and oscillating tail behind of soliton. Such groups attenuate with distance due to transfer processes, viscosity and shear instability. Interesting moment of this study is also the

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difference in the location of pycnocline and shear flow. Obtained results are important for understanding processes related with mode-2 internal waves and I may recommend publishing given paper. Some comments: 1. In fact, the difference between oscillating tail and amplitude-modulated packet (breather) is not clear visible. For instance, the modal structure is discussed on Fig. 10, but it will be more useful to see modal structure on waves for different times. The first mode contributes in energy mainly, but what is a difference in amplitudes of modes in the pycnocline? 2. What is an origin of the forward-propagating long waves? Are they generated in the initial time only? 3. Usually oscillatory tail is generated behind solitary wave due to dissipation, and its energy is increased when soliton energy is decreased. Is it observed in numerical simulations?

Technical comments: i) Axis z is directed up. Looking on formulas (1) and (2) $z = 0$ corresponds to the fluid surface, but on Fig. 3 – to the fluid bottom. ii) Fig. 6. There is no vorticity scale.

I recommend publishing after minor revision.

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