Reply to comment on "Current separation and upwelling over the southeast shelf of Vietnam in the South China Sea"

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[1] *Dippner et al*. [2013] have raised questions about the physical mechanism for current separation and upwelling proposed in our JGR-Ocean article "Current separation and upwelling over the southeast shelf of Vietnam in the South China Sea." We have read their comments closely and found some misinterpretation of our statements and a detailed description of other mechanisms that also produce current separation and upwelling in our study area.

[2] First, the authors stated that "*Chen et al*. [2012] argued that the current separation only occurs during summer." Physical mechanisms for current separation occurring in different seasons in the southwest South China Sea (SCS) have been studied numerically in previous literature [e.g., *Gan and Qu*, 2008]. Our paper proposes a new alternative mechanism specifically for the summer case: "The process-oriented numerical experiments with the high-resolution China coastal FVCOM suggest that the offshore current separation *in summer* can be caused by the meeting of a buoyancy-driven southward along-shelf quasi-geostrophic coastal current from the north and a northeastward buoyancy-driven and stratified tidal-rectified current from the southwest. In this case, tidal rectification, river discharge and local bathymetry all play critical roles in intensifying these two coastal currents during summertime stratified conditions." Our experiments show that *in summer* "the southwesterly Monsoon wind forcing is a key physical process to *generate* upwelling, but it is not a *prerequisite* to cause a narrow offshore current separation in that area." This means that in summer, current separation could occur without wind forcing, but does not mean that wind forcing could not cause current separation. In addition, our experiments show that the upwelling could be caused by spatially uniform wind forcing (without a dipole wind stress curl). It is misleading to extend our statements (which only apply for summer) to the other seasons.

[3] Second, the authors discuss how important the wind could be in upwelling observed in field measurements made in 2003 and 2004. Our impression of their results is that the strong Monsoon wind provided strong upwelling and then current separation with an emphasis of the role of interannual variability in wind forcing associated with ENSO. They stated that upwelling was evident in the 2004 survey but not in the 2003 survey, because the wind was weak during the ENSO year of 2003. In Figure 2 in Comment, we see a weak colder water zone along the coast in VG-3, July 2003, which could be caused by upwelling. MODIS SST data described in Comment are good to show upwelling, but these data cannot alone demonstrate that the current separation is driven only by the wind forcing. Coherences between "upwelling" events and wind variability are not sufficient to prove that no other mechanisms (like we have proposed) could cause the current separation and upwelling found in that region in summer. It is not surprising to see good coherence between the wind and MODIS SST-shown upwelling events, since we agree that the wind plays a key role in causing upwelling in that region. Our paper focused on examining the contributions of near-shore physical processes (like river-tidal interactions under stratified summer conditions and southward buoyancy currents) to the current separation and upwelling in that region. These processes were not considered in Comment and the authors' analyses did not attempt to resolve these processes.

[4] Third, the data and analyses described in Comment provide us with new insight into the importance of the interannual variability of the large-scale wind field to upwelling in that coastal region, which was not included in our paper. The results shown in Comment are not contrary to our work, since the authors have focused on different aspects.

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