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Interactive comment on "The near-inertial variability of meridional overturning circulation in the South China Sea as shown by an eddy-resolving ocean reanalysis" *by* J. Xiao et al.

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Overview: The Kuroshio intrusion plays an important role on driving South China Sea oceanic circulation on different spatial and temporal scales. Such a phenomena has gained increasing attention in the past decades (Nan et al., 2015). The authors investigate the high-frequency variations of Kuroshio intrusion and their influence on South China Sea (SCS) oceanic circulation. By analyzing large amount of high-resolution oceanic reanalysis data and high temporal resolution mooring data, the present study shows the characteristic of near-inertial variation of SCS meridional overturning circulation (MOC), and suggest that this near-intertial variation is triggered by high-frequency

wind energy input near Luzon Strait through near-inertial gravity waves. In general, the results of this study are interesting, and worthy to be published in Ocean Science.

The authors only use 120 day data in 2010 to analyze the near-inertial variation of SCS MOC (Figure 2), which seasons are these data from? But with mooring data, it is 120-day data since 1 April 2006. Can your model reproduce the near-inertial variations as you mooring data with the same time period? Do these phenomena also exist in other seasons and any other years? Is there any seasonality of the near-inertial variations? I suggest the authors also include some analysis from other years, to demonstrate that the near-inertial variation triggered by Kuroshio intrusion is a common feature of SCS MOC, not a specific phenomenon in your selected period.

Comments: ******Titel**********

1. I suggest the author to revise the title of your paper, because the near-inertial variability of SCS MOC can also be observed in mooring data, which is shown in Fig. 7. And I am not sure whether is ok to call it near-inertial variability, which is a noise phenomena. My suggestion is “On the near-inertial variations of South China Sea meridional overturning circulation”.

******Abstract**********

2. Line 2-3: “The near-inertial variability of . . . has been analyzed based on . . .” should be “We analyze the near-inertial variability of . . .”. “has been analyzed” sounds like the work has been done by previous studies.

******Introduction**********

3. The introduction does not service very well. I cannot directly see what is you research questions? What is new? And why is important? I suggest the authors have a topic paragraph at the begging of the introduction.

4. Line 22-26: I do not agree with the authors that SCS circulation in reality as described in the introduction is consistent with a highly simplified theory. They are different in many details. Stommel-Arons theory from 1960s has been developed to explain

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Atlantic MOC and global MOC, it is a basic theory for the global deep ocean circulation, and the theory for the deep circulation has been further discussed by Marotzke and Scott (1999) and Munk and Wunsch (1998). I am not sure whether you can really use Stommel-Arons theory to explain SCS circulation which is externally mainly driven by Kuroshio intrusion and Asian monsoon system. The vertical structural of SCS MOC and Atlantic MOC are also different. The authors must be careful for your statements, which should be supported by our analysis or reference. ******Section 3. Characteristics of the near-inertial variability of the SCSMOC********** 5. Line 10: Why do you define the SCS MOC index as the streamfunction at a depth of 1500m at 14°N? How good is your index in representing SCS MOC variations? And will other index of SCS MOC change the conclusion of the present study?

6. Line 20-24: "The pattern of the near-inertial variability of SCSMOC is very similar to the near-inertial variability of the Pacific Ocean or Atlantic. And the period corresponding to the power peak of the AMOC is mostly at near inertial periods (Komori et al., 2008), which indicates that the near-inertial signal of the SCSMOC is not unique in nature." How can you make such a conclusion? The amplitude of the standard deviations are different, and the location of the maximum are different, and SCS MOC has two maximum center of the standard deviations, but Atlantic MOC only has one. As I said, your statements and conclusions must be drawn with evidence. Every phenomenon can be unique in nature by itself.

******Section 4. Discussion**********

7. Your analysis of mooring data (Fig. 7), which is shown in this section, should appear earlier. Do you also find similar result of model reanalysis data if you also use 120 days data since 1 April 2006 as the Fig. 7? Maybe the authors can also evaluate the reanalysis data with the mooring data.

8. Line 23: "However, the imprint of NIGWs on SCSMOC . . .". "However" should be deleted. The imprint of NIGWs on MOC in Atlantic and SCS are related to high-frequency winds.

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9. “An average of about 7 TCs (tropical cyclones) pass through the Luzon Strait from the Northwest Pacific Ocean each year. . ., including strong wind-induced near-inertial energy input into the ocean (Fig. 8c), so TCs could also be drivers of the NIGWs near the Luzon Strait”. How many TCs pass SCS in July 2010? You may put the pathway of TCs in July 2010 on Fig. 8c. Otherwise, I do not know how can you draw a conclusion on the influence of TCs.

Reference: Marotzke, J., and J. R. Scott, 1999: Convective mixing and the thermohaline circulation. Journal of Physical Oceanography, 29, 2962-2970.

W. Munk and C. Wunsch, 1998: Abyssal Recipes-II: Energetics of tidal and wind mixing, Deep-Sea Research I, 45, 1977-2010.

F. Nan, H. Xue, F. Yu, 2015: Kuroshio intrusion into the South China Sea: a review. Prog. Oceanogr., Vol. 137(A), 314-333.

Interactive comment on Ocean Sci. Discuss., 12, 2123, 2015.