We thank F. Nan for his careful comment of our paper submitted to Ocean Science. We appreciate the thoughtful and constructive feedback on the paper, which has helped to significantly improve the manuscript. We have addressed all concerns in the revised manuscript, as documented in our point-by-point responses.

1. In the Abstract (lines 9-11), the authors said that the near-inertial signal in the SCSMOC is triggered by variability near the Luzon Strait where geostrophic shear always exists due to. To the high-frequency wind and Kuroshio intrusion, it is unclear which is more important?

Reply: The near-inertial variability in the ocean are mainly caused by wind variability through the resonance between the wind and the ocean current (Gill,1984).Although the Kuroshio intrusion is low-frequency process, it can provide the background field for the vertical propagation through the chimney effect(Lee and Niiler 1998; Zhai et al. 2005) because negative vorticity west of the Kuroshio in the Luzon Strait always exists. When the Kuroshio intrusion is from one state to the other state (looping state to leaping state for example, Nan et al,2015), the geostrophic adjustment will also trigger near-inertial waves. This similar process is well depicted by Takeyoshi et al(2015).The reviewer just provide a very important and interesting question of relative importance of high-frequency wind and Kuroshio intrusion which need more observational and simulated work in the future study.

Ref:

A. E. Gill, 1984: On the Behavior of Internal Waves in the Wakes of Storms. J. Phys. Oceanogr., 14, 1129–1151.

Lee, D. K., and P. P. Niiler, 1998: The inertial chimney: The near-inertial energy drainage from the ocean surface to the deep layer. J. Geophys. Res., 103, 7579–7591.

Zhai, X., R. J. Greatbatch, and J. Zhao, 2005: Enhanced vertical propagation of storm-induced near-inertial energy in an eddying ocean channel model. Geophys. Res. Lett., 32, L18602, doi:10.1029/2005GL023643.

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

Takeyoshi Nagai,Amit Tandon, Eric Kunze, and Amala Mahadevan, 2015: Spontaneous Generation of Near-Inertial Waves by the Kuroshio Front. J. Phys. Oceanogr., 45, 2381–2406.

2. The statement and the cited literature of the third paragraph seems not support the conclusion “SCSMOC variability spans a wide range of time scales”. The introduction is not well written.

Reply: The SCSMOC represents the connection between the deep circulation and the upper circulation in SCS. The Luzon Strait transport plays an important role in the SCSMOC, so we first depict the Luzon Strait transport in the first paragraph, and then we just describe the structure of the climatological SCSMOC. Finally, we just state the variability of the SCSMOC from the decadal scale to seasonal scale, but there is no study for the more high-frequency variability of the SCSMOC. “SCSMOC variability spans a wide range of time scales” is just qualitative description, not the conclusion. Our study is inspired by the near-inertial variations of AMOC because near-inertial internal waves have been believed to be an important energy source for the diapycnal mixing in the ocean required to maintain the meridional overturning circulation (MOC) (Munk and Wunsch 1998; Blaker et al., 2012; Sévellec et al., 2013). We are just sorry for the sketchy statement in fourth paragraph in our introduction. And the fourth paragraph in our introduction has been revised.

Ref:
Munk, W., and C. Wunsch, 1998: Abyssal recipes II, Energetics of tidal and wind mixing. Deep Sea Res. I, 45, 1977–2010.
Blaker, A. T., Hirschi, J. J. M., Sinha, B., de Cuevas, B., Alderson, S., Coward, A., and Madec, G.: Large near-inertial oscillations of the Atlantic meridional overturning circulation, Ocean Model., 42, 50–56, 2012.
Sévellec, F., Hirschi, J. J. M., and Blaker, A. T.: On the Near-Inertial Resonance of the Atlantic Meridional Overturning Circulation, J. Phys. Oceanogr., 43, 2661–2672, 2013.

3. In section 2, the model results should be validated against the observations. I recommend you to verify the model output using the mooring observations shown in Fig. 7 in order to get credible conclusions.

Reply: Strictly speaking, the observational system in full depth used as the validation of the simulated SCSMOC should consists of some typical latitude section cross the South China Sea like Rapid Climate Change–Meridional Overturning Circulation (RAPID-MOC) at 26.58^{o}N in Atlantic. The previous study also suggest that the near-inertial AMOC variability is nearly invisible to AMOC-observing systems because of high-frequency observational sampling for near-inertial variation (Blaker et al., 2012 ;Sévellec,et al., 2013). Most of observational data focus on the 18^{o}N section in the SCS, and the observational depth is just shallow then 2000m. Especially, We have no such observation system for the monitoring of the near-inertial variations of SCSMOC. So we just use the mooring data in deep SCS to validate the model output, as shown in Figure A1.The power spectrum of the model output is similar to that of the observation data. And the model can produce the near-inertial variations in the deep SCS, which can validate the near-inertial variations of SCSMOC in our model data to a certain extent. We will replace Figure 7 with Figure A1 in the final manuscript.

Ref:
Blaker, A. T., Hirschi, J. J. M., Sinha, B., de Cuevas, B., Alderson, S., Coward, A., and Madec,G.: Large near-inertial oscillations of the Atlantic meridional overturning circulation, Ocean Model., 42, 50–56, 2012.
Sévellec, F., Hirschi, J. J. M., and Blaker, A. T.: On the Near-Inertial Resonance of the Atlantic Meridional Overturning Circulation, J. Phys. Oceanogr., 43, 2661–2672, 2013.

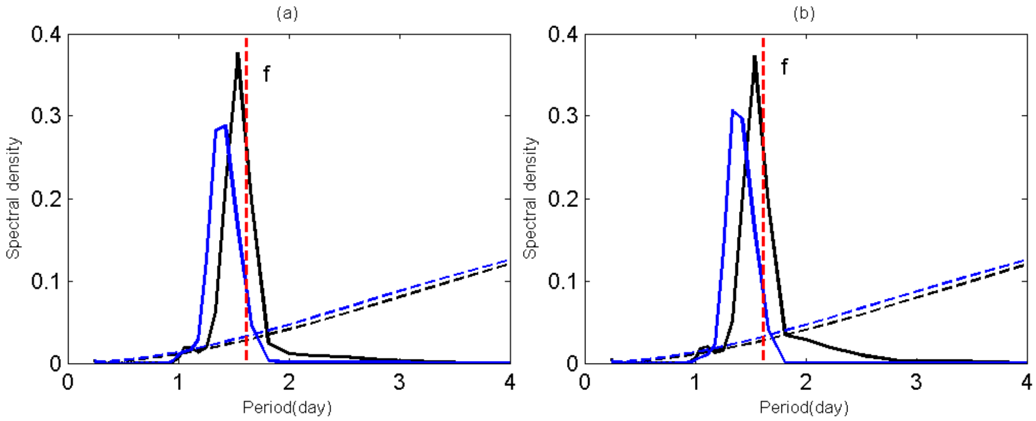

Figure A1 The power spectrum of zonal velocity (a) and meridional velocity (b) derived from the mooring (black line) and GLBu0.08 (blue line). The dashed black and blue line shows 95% confidence levels. The dashed red line represents the local inertial period. The tide effects have been removed in the mooring data.

4. It should be explained why GLBu0.08 product only in 2010 is chosen (see last sentence in Section 2)?

Reply: We also use model outputs of four typical month(January, April, July and October)in three years(2000,2006,2010) to show whether near-inertial variations of the SCSMOC also exist in other seasons and any other years, as shown in Figure A2(2000), Figure A3(2006), Figure A4(2010).Our results show that these near-inertial variations of the SCSMOC exists in other seasons and other years. The analysis of other months or years cannot change our conclusion significantly, so we just use the 2010 data to depict the near-inertial variations of the SCSMOC.

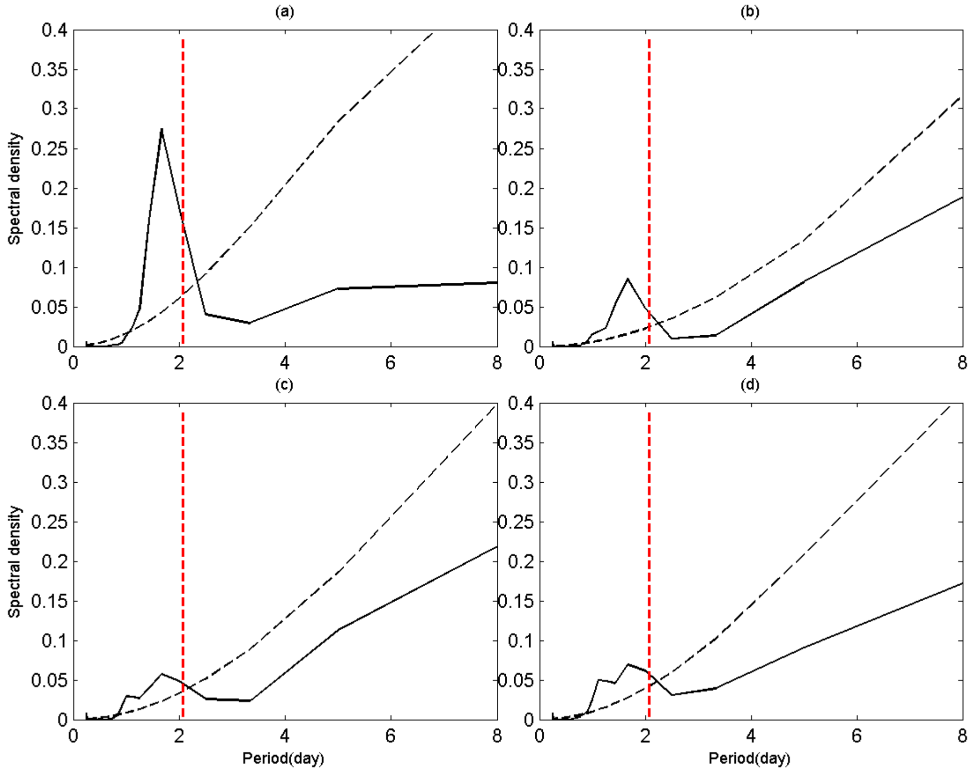

Figure A2 The power spectrum of SCSMOC at 1500m, 14^{o}N in (a) January,(b) April, (c) July and (d) October in 2000. The dashed black line and red line show 95% confidence levels and the local inertial period respectively.

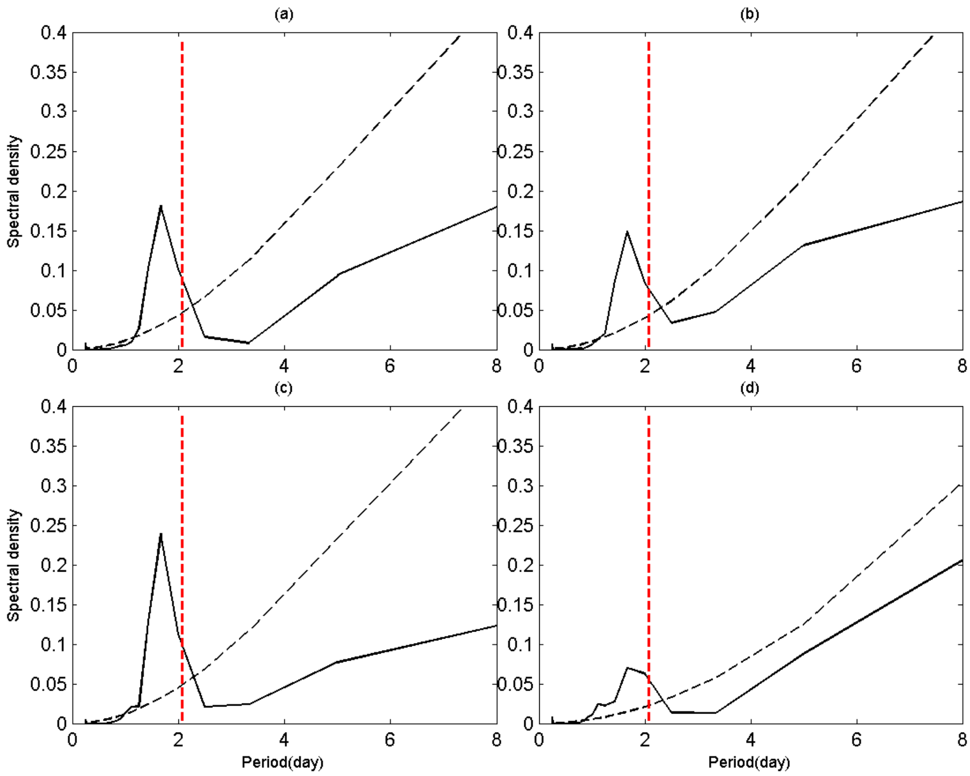

Figure A3 The power spectrum of SCSMOC at 1500m, 14^{o}N in (a) January,(b) April, (c) July and

(d) October in 2006. The dashed black line and red line show 95% confidence levels and the local inertial period respectively.

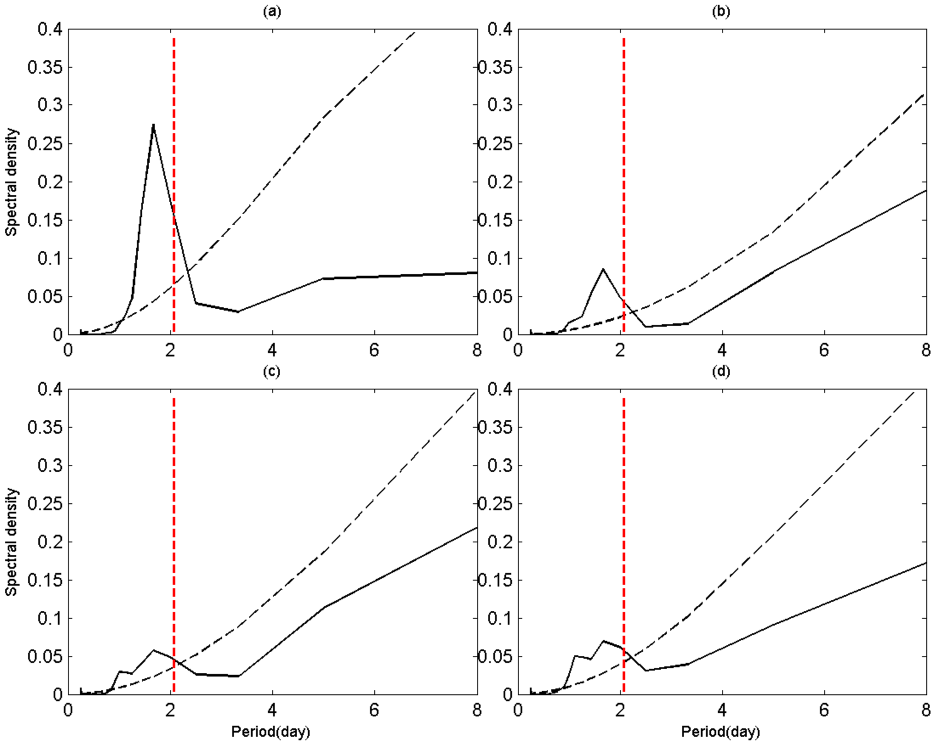

Figure A4 The power spectrum of SCSMOC at 1500m, 14^{o}N in (a) January,(b) April, (c) July and (d) October in 2010. The dashed black line and red line show 95% confidence levels and the local inertial period respectively.

5. Why 1500 m and 14°N are selected in Fig. 2 to investigate the deep SCSMOC?

Reply: We use SCSMOC index as the stream function at a depth of 1500m at 14°N, because this point is far away from the Luzon Strait. We have checked the SCSMOC index in the different latitude and depth, as shown in Figure A5 and A6. Actually, the analysis of the index of the SCSMOC in other latitude and depth is nearly the same to the stream function at a depth of 1500m at 14^{o}N for the near-inertial variations of SCSMOC, and cannot change our conclusion of the present study.

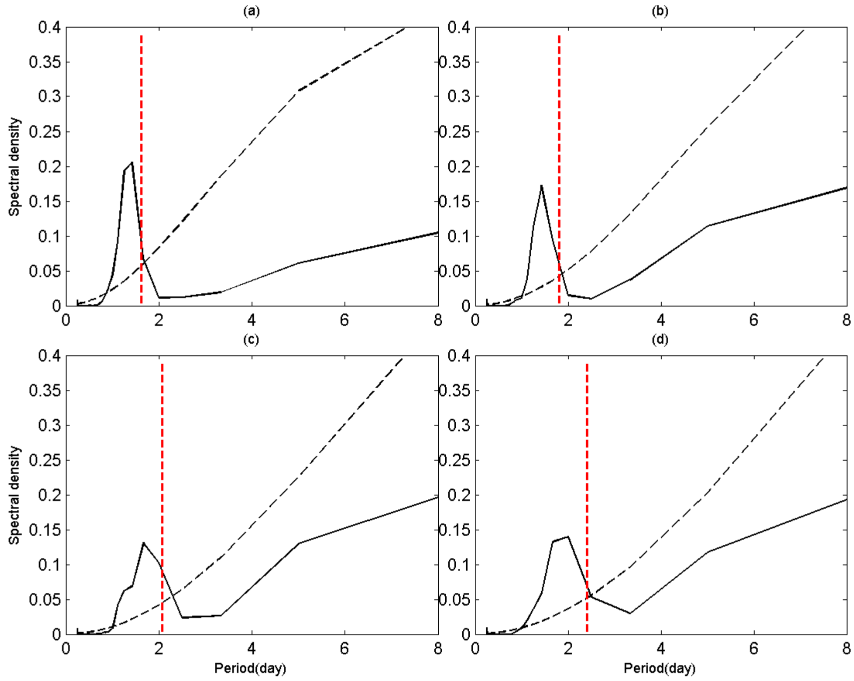

Figure A5 The power spectrum of SCSMOC at 1500m,**18°N**(a),1500m,**16°N**(b),1500m, **14°N**(c) ,and 1500m, **12°N**(d) during January in 2010. The dashed black line and red line show 95% confidence levels and the local inertial period respectively.

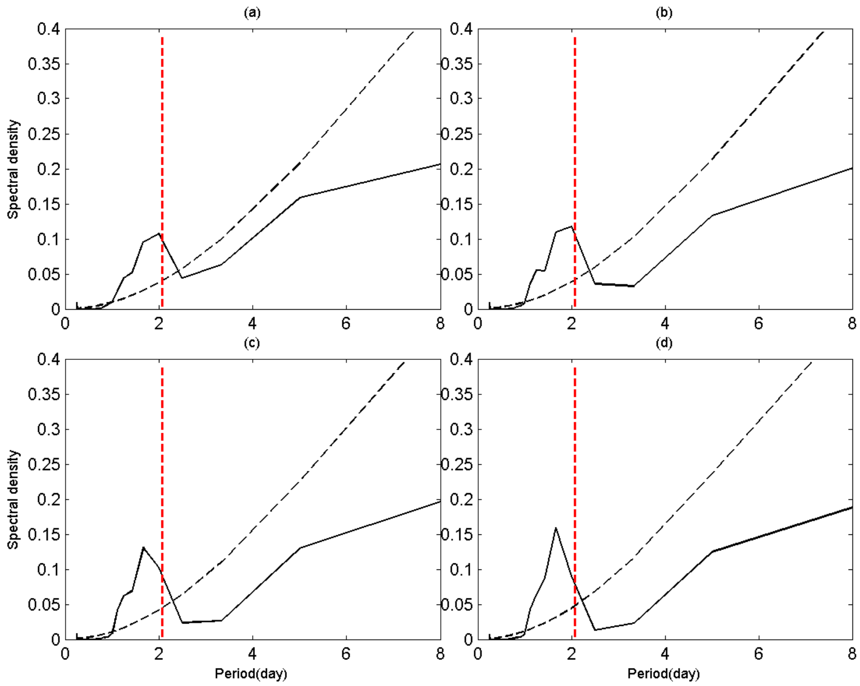

Figure A6 The power spectrum of SCSMOC at **500m**,14°N(a),**1000m**,14°N(b),**1500m**, 14°N(c) ,and **2000m**, 14°N(d) during January in 2010. The dashed black line and red line show 95% confidence levels and the local inertial period respectively.

6. "The pattern of the near-inertial variability of SCSMOC (Fig. 4b) is very similar to the near-inertial variability of the Pacific Ocean or Atlantic." (see third paragraph in Section 3). Any reasons?

Reply: The imprint of NIGWs in AMOC is also stacked with regularly alternating positive and negative cells in the depth between 500 to 4000m and within the latitude between 10 and 40^{o}N (Komori et al., 2008;Blaker et al., 2012; Sévellec et al., 2013). The period corresponding to the power peak of AMOC is at super-inertial periods, which is similar to that of SCSMOC. Actually , the imprint of NIGWs in AMOC and SCSMOC is equatorial propagation because of beta effect of NIGWs (Anderson and Gill, 1979; Garrett, 2001)

The another point is that the imprint of NIGWs on AMOC has been found mostly triggered by wintertime storm tracks which is in mid-latitude, so the near-inertial phase velocity is larger than that in SCS which is in the low-latitude.

Ref:

Blaker, A. T., Hirschi, J. J. M., Sinha, B., de Cuevas, B., Alderson, S., Coward, A., and Madec, G.: Large near-inertial oscillations of the Atlantic meridional overturning circulation, Ocean Model., 42, 50–56, 2012.

Komori, N., Ohfuchi,W., Taguchi, B., Sasaki, H., and Klein, P.: Deep ocean inertia-gravity waves simulated in a high-resolution global coupled atmosphere–ocean GCM, Geophys. Res. Lett., 35, L04610, doi:10.1029/2007GL032807, 2008.

Sévellec, F., Hirschi, J. J. M., and Blaker, A. T.: On the Near-Inertial Resonance of the Atlantic Meridional Overturning Circulation, J. Phys. Oceanogr., 43, 2661–2672, 2013.

Anderson, D. L. T. and Gill, A. E.: Beta dispersion of inertial waves, J. Geophys. Res.-Oceans,84, 1836–1842, 1979.

Garrett, C.: What is the “near-inertial” band and why is it di□erent from the rest of the internal wave spectrum?, J. Phys. Oceanogr., 31, 962–971, 2001.