Interactive comment on "An estimate of the Sunda Shelf and the Strait of Malacca transports: a numerical study" by F. Daryabor et al.

The authors would like to thank the anonymous referee for his/her critical review and valuable suggestions. Our amendments on the manuscript are listed as follows:-

Response to Referee #2: (in blue)

Interesting feature that could also be brought out more strongly: Coarser models seem to overestimate the volume transport. Why is this? Simply because the area of the straights is larger in a coarser model? You do expand on this later in the text - with the citation to Fang et al (2005), page 292 lines 12-14. **How would authors advise the Malacca Strait be represented in a coarser ocean model, could your work inform some kind of parameterization or a channel model?**

In response to your question, the following lines are to be inserted immediately after line 14 in page 292:-

As mentioned by Ye et al (1998), mass transport is a convection-diffusion-dominated process. This obviously affects the sensitivity of the turbulent flow in a coarse model. Perhaps, as suggested by Ye et al (1998), a more complex stress model, such as the Reynolds Stress Model/Scheme (Thyng et al., 2013), can be considered to obtain directly the unknown turbulent stress to overcome the overestimation problem.

References:

Thyng, K. M., Riley, J. J., and Thomson, J.: Inference of turbulence parameters from a ROMS simulation using the k-ε closure scheme, Ocean Model., 72, 104–118, 2013.

Ye, J., and McCorquodale, J. A.: Simulation of curved open channel flows by 3D hydrodynamic model, J Hydraul Eng-ASCE., 124, 687-698, 1998.

My only major criticism is in your description of figure 10, on page 292 "volume transport... decreases exponentially." With what? an arbitrary numbering system. **Don't say this. You could say that the volume transports decrease with increasing resolution.** The use of 'exponentially' implies there is a dependent relationship, but you have just chosen to arrange the models on the x-axis of your plot.

Done as suggested.

Other minor comments

Page 276 lines 21-23 is a very long sentence, please divide into 2 / clarify.

Recast as follows:-

"The southern region of the South China Sea (SSCS) has complex bathymetry. In particular, the monsoon plays a dominant role towards the water circulation near the equator (Daryabor et al., 2010, 2014, 2015)."

Page 278 line 15: "Sect. 5" please expands to Section.

Done as suggested.

Page 284 line 7: form should be from.

Done as suggested.

Page 284 line 17: "modeld" should be modeled.

Done as suggested.

Page 290 line 12: replace Auguest with August.

Done as suggested.

Page 291 line 3: ROMS and SODA estimate(s) are also in good agreement

Done as suggested.

Page 292 lines 17-19: " In consistent with the seasonal cycle of transport in Fig 9, the ROMS and SODA estimate of various estimates are very much in good agreement with each other" I have no idea what you are trying to say here.

Deleted from the text.

Page 294 lines 2-3 "due to rapid changes by interaction with bathymetry and topography" Perhaps change to: complex bathymetry in this region, unresolved at coarse resolution?

Amended as below:-

"This could be due to the inability of the coarse global ocean model to resolve the complex bathymetry in the SSCS region."

The key figure for me is Figure 10. This could do with being more clearly linked with table 4 (through the legend or caption).

Recast as follows:-

Figure 10. Results of different models for the mean volume annual transport (in 1 Sv= 10^6 m^3/s) for the SSCS through the Sunda Shelf into the Java Sea. The reference numbers representing respective models (see Table 4) are embedded in the figure as a yellow box.

Page 284 lines 20-23 Description of the cold tongue, could do with labelling on the map? Maybe a separate figure with annotations of the acronyms used (SSCS / PMECS) could help clarity.

Figure 2c-d is re-plotted by using thick yellow contour line to outline the area of the "cold tongue" along the PMECS.

Table 4. The ocean model configurations and specifications used in the previous modeling studies.

No:	References	Model	Range of Domain	Topography	Horizontal Resolution	Vertical Levels	Surface Forces
1	Fang et al. (2003)	MOM2.0	Outer domain: the global ocean. Inner domain: the SCS, ECS and JES.	NA	Outer domain: 3^o Inner domain: $1/6^o$	15 levels	Forced by Hellerman and Rosenstein's (1983) wind stress climatology.
2	Cai et al. (2005a)	LICOM	75° S and 65° N	NA	$1/2^o$	12 levels	The net heat flux and the sea surface wind stresses from ECMWF reanalysis.
3	Fang et al. (2005)	MOM2.0	Outer domain: the global ocean. Inner domain: 20^o S-50^o N and 99^o E-150^o E	NA	Outer domain: 2^o Inner domain: $1/6^o$	18 levels	Forced by Hellerman and Rosenstein's (1983) wind stress climatology.
4	Qingye et al. (2009)	HYCOM	76^o S and 70^o N	ETOPO5	$1/6^o$	20 levels	NA

NA: Not Available

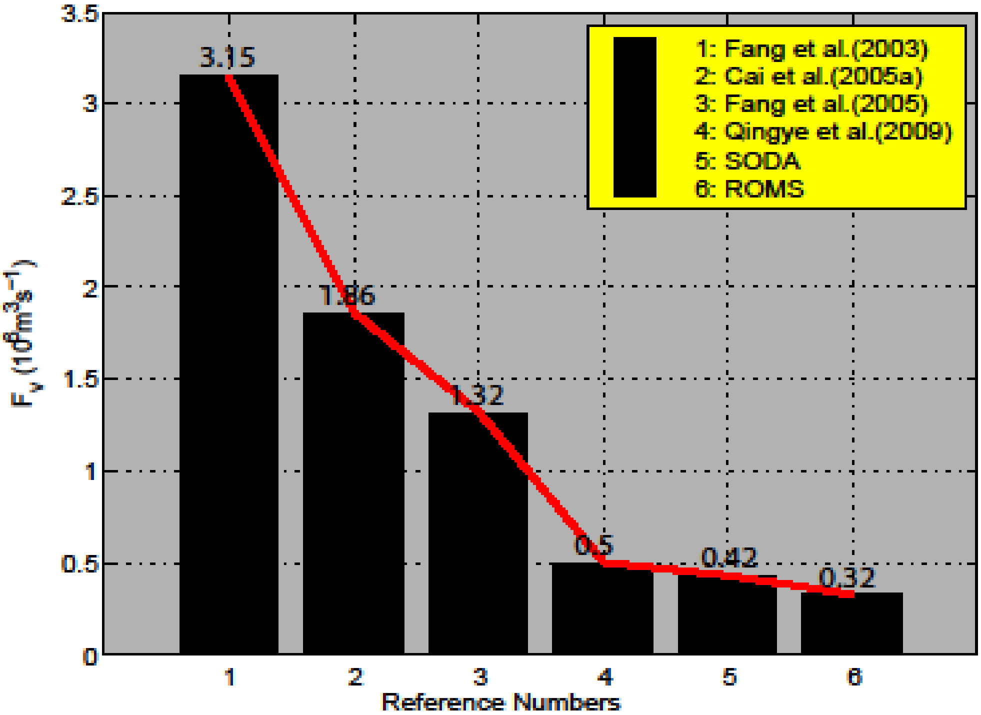

fig10

Figure 10. Results of different models for the mean volume annual transport (in 1 Sv= 106 m3/s) for the SSCS through the Sunda Shelf into the Java Sea. The reference numbers representing respective models (see Table 4) are embedded in the figure as a yellow box.