

**August 26-September 2, 2006:** Lei Zhou from University of Maryland visited COAS/CIOSS (**Dudley Chelton**) as part of the NESDIS CI Summer Exchange program. A short report of his visit is below.

**Visit Report**  
**Lei Zhou**  
**CICS/ESSIC, UMCP**

I visited CIOSS at Oregon State University from Aug. 26 to Sep. 1, 2006. Prof. Chelton is my main contact. This visit was funded by the CORP CI Exchange Program of NOAA.

Right now, I am working on the intraseasonal oscillation in the southwestern Indian Ocean (SWIO) by examining model data. In addition, I plan to study the influence of Indonesian through-flow on the oceanic circulation and heat budget in the northern Indian Ocean by analyzing satellite data and model data together. In the first day of my visit, I made a presentation on my present work and research plan. Then Prof. Chelton selected some papers for me to read, which are closely related to my research. In the following days, I had fruitful discussions with Prof. Chelton almost every day. Prof. Chelton made many helpful comments. He emphasized the importance of model resolutions for the studies on meso-scale phenomenon. Especially, he suggested that I should be careful in using NCEP reanalysis wind data to drive the model, if I intend to study the meso-scale structure in the SWIO, because NCEP reanalysis data may not be able to resolve the wind fields with horizontal scales smaller than 800 – 1000 km (Milliff et al., 2004). He recommended ECMWF wind data is an alternative choice. However, if for any reasons I have to use NCEP reanalysis data in our model, Prof. Chelton suggested a ‘Poor Man’s Coupled Model’ to improve our model results. According to his research, there are persistent linear relations between small-scale wind stress and small-scale SST, between wind stress divergence and down-wind SST gradient, and between wind stress curl and cross-wind SST gradient (O’Neill et al., 2005; Maloney and Chelton, 2006), because the sea surface wind tends to accelerate over warm water but decelerate over cold water (Chelton et al., 2004). He pointed out that even if NCEP reanalysis data can hardly resolve the small-scale wind stress very well, the wind stress can be modified, where the small-scale wind stress is induced by small-scale SST. Thus, the NCEP reanalysis wind data may be modified during running the model. Actually Larry O’Neill, a graduate student of Prof. Chelton, is now working on the similar modification of the reanalysis wind data. I also

discussed with Larry about his present research. Moreover, Prof. Chelton suggested that I should check the properties of the westward propagation signals in our model data carefully before drawing the conclusion that the signals are Rossby waves, because he recently found out that many westward propagations over the global ocean may be caused by non-linear eddies rather than theoretical free Rossby waves. I am much appreciated that Prof. Chelton shared this unpublished research result with me.

I also learned some technical things about satellite data during the visit. Corinne James taught me the background knowledge of various satellites and the related products, such as PO, DACC and REMSS. She also taught me how to read the HDF data files in MATLAB. Larry O'Neill told me his experience on doing EOF analysis and gave me his MATLAB scripts for EOF analysis. Ricardo Matano talked with me about the inter-ocean exchange between the South Atlantic and South Indian Ocean circulation, on which he is working now.

I think this visit to CIOSS is really helpful to my future research. I have a better understanding of my research topic. I learned the necessary techniques to do my research. I am sincerely grateful for the help of Prof. Chelton, Dr. Matano, Dr. Song, Dr. James, and Larry O'Neill. I also gratefully acknowledge NOAA for providing me this wonderful opportunity.

### **References**

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