Barrier Layer in the Arabian Sea During Summer Monsoon

de Boyer Montégut, C[1], F. Durand[2], R. Bourdallé-Badie[3], and B. Blanke[4]

[1] *LOS, IFREMER, Brest, France*

E-mail: deboyer@ifremer.fr

[2] *LEGOS, IRD, Toulouse, France*

[3] *MERCATOR Océan, Ramonville Saint-Agne, France*

[4] *LPO, CNRS, Plouzané, France*

A Barrier Layer (BL) exists in ocean regions where the temperature immediately below the surface mixed layer is either the same or slightly higher than the temperature in the mixed layer itself. It received its name (Godfrey and Lindstrom, 1989) from its property of inhibiting turbulent and entrainment heat exchange between the atmosphere and the subsurface ocean. This is known to play an important climatic role in various regions of the tropics, such as the western Pacific Ocean for El Niño initiation (Vialard et al., 2001), or in the South-Eastern Arabian Sea for Indian monsoon onset (Masson et al., 2005). More controversial is the BL observed in the South Central Arabian Sea (SCAS) during summer monsoon (Tadathil et al., 2008, T08). These authors suggested that a thick (20 m – 60 m) BL forms there in June, and survives until September through a large scale advection mechanism. However, Mignot et al. 2009 (M09) results show that the SCAS does present a BL during summer monsoon, though of moderate thickness (less than 20 m on monthly average) and of low robustness as they define it. Hence, summer monsoon BL in the Arabian Sea is very intermittent and has small space scale variability (mesoscale). Its impact on climate through modification of the surface layer stratification are likely to be very small. The present study basically aims at reconciling the contradictory studies of T08 and M09. Specifically, we will answer the following questions: What is the seasonal evolution of the SCAS BL? What is its spatial structure? How does it vary from year to year? What is the mechanism that forms it? Can it play any climatic role? To do so, we make use of the latest observational database presented in M09 (including last argo dataset), and of an ocean model.