Anomalous cooling over the Arabian Sea during February 2008

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Satellite observations over the Arabian Sea (AS) revealed anomalous cooling in February 2008 associated with the anomalous north westerly winds from the continent. February 2008 was the coldest winter in the last 11 years (1998-2008) from TMI observations and the cooling was even higher than cooling associated with the south west summer monsoon over the AS in the last 11 years. It is further confirmed with Reynolds and HadISST and concluded that such a cooling occurred only twice (1984 and 2008) in the last 30 years. Land-sea air temperature contrast (relative humidity difference) between Arabia and Arabian Sea was 6-8°C (40%) during the cooling event. This condition supports a loss of heat flux (180-200 W/m2) from ocean to atmosphere via evaporation. Enhancement of biological activity associated with the cooling is also confirmed. Deepening of the mixed layer via convective and wind forced mixing is observed. Advective heat flux analysis deduces that heat gain via Ekman flow is slightly higher at southern boundary but geostrophic meridional overturning (diffusion of heat flux) is close to the climatic mean. Heat gains via Ekman flow oppose cooling. Thus resultant cooling is mainly due to loss of heat flux (65-95 W/m2) to the atmosphere; major contributor is latent heat flux.