Impact of Different suface winds on SST in the north Indian Ocean

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Introduction

The annual reversal of the monsoon wind changes the behaviour of the upper north Indian ocean. The strong southwesterly winds during the monsoon season plays an important role in cooling the sea surface. The small change in SST may cause large-scale ocean-atmosphere phenomena similar to that in the tropical pacific. The different surface forcings also produce some changes in the simulation of the SST. Therefore an attempt is made in this study to simulate SST using thermodynamic ocean model with two different wind stresses.

The Model and input

In the present work 2½ layer thermodynamic ocean model over the region 35 °E-115 °E, 30 °S - 25 °N is used which is fully described in McCreary et al.(1993, MKM) and Behera et al.(1998). The model has two active layers overlying a deep motionless layer of infinite depth. The surface layer seperates into two sub-layers i.e. a well mixed upper turbulent layer and a non-turbulent fossil layer through entrainment and detrainment. The uppermost sub-layer is considered as model mixed layer and its temperature is considered as the representative of model SST. For details of the model readers may refer to MKM. The model is spun up for ten years to reach steady state using ten years monthly mean climatology (1983-1992) of NCEP and COLA T30 L18 AGCM winds(Center for Ocean-Land-Atmosphere). The model integration is further carried out with inter-annually varying monthly winds of NCEP and COLA . In both cases the NCEP heat flux is used as a thermal forcing.

Results and discussion

The simulated SSTs in both the wind cases are in the range of 21°C to 30°C. The difference between the reynolds SST and the model SST in NCEP case is 0.5°C in all the months and are in agreement with Behera et al, 2000. The simulated SSTs for the year 1985 (Fig. not shown) which is a bad monsoon year in both the cases differ less as to that of year 1986 . Figure 1 shows the difference between the SSTs simulated in both the cases for the year 1986 at bimonthly interval. The comparison of model SST from COLA wind and that of NCEP wind shows difference of about 1°C to 2°C during May to August north of 10S. This suggest that the heat fluxes are more dominant in simulating the SST south of 10S. The cooling of about 1-2°C is found in western equatorial Arabian Sea and western Bay of Bengal in COLA wind case suggest strong wind stress during May to August.

References

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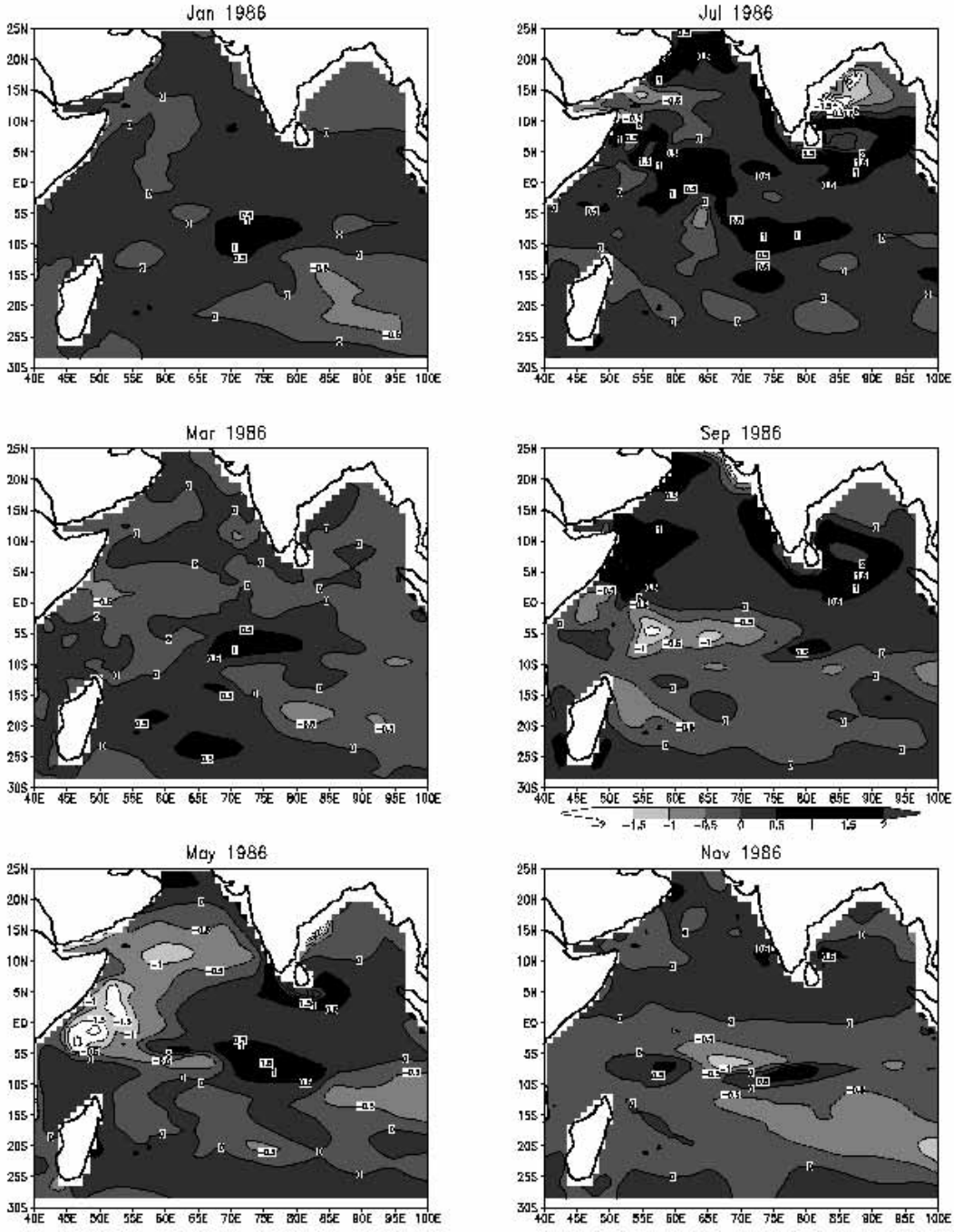

Fig.1 Difference between model SSTs using COLA & NCEP winds