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Usefulness of SSMI derived WV and WS

This paper brings out briefly the results of a case study conducted during June, 2002 to demonstrate the usefulness of SSM/I derived water vapour and wind speed for real time forecasting of heavy rains along the west coast of India.

Use of SSM/I derived products for real time forecasting of heavy rainfall along west coast of India- A case study

After the successful launch of IRS-P4 the first ocean satellite (OCEANSAT-1) by India in May,1999 using PSLV, India Meteorological Department started working in a new area i.e, use of Passive Microwave Remote Sensing data for meteorological applications using data from its own satellite. A Multifrequency Microwave Radiometer(MSMR) onboard this satellite provides observations in 8 Microwave channels for derivation of quantitative parameters like total precipitable water vapour and surface wind speeds over the oceanic areas.

A detailed validation exercise was conducted for evaluating the quality of MSMR derived water vapour and wind speed. After careful assessment of all data, it was concluded that these products are of good quality.

These data products were therefore used to monitor the onset of Monsoon for two consecutive years i.e; 2000 and 2001 and internal technical reports generated bringing out usefulness of the data products. One of the very important potential applications of total integrated water vapour and the surface wind speed derived from MSMR data over the Arabian Sea as brought out in these reports, was their use in forecasting of conditions leading to heavy rainfall along the west coast of India. Generally the moisture convergence taking place off the west cost of India can be depicted using these data sets.

With a view to monitor such events during the monsoon season of current year (2002) for providing guidance to the forecasters during real time applications, daily maps of wind speed and total integrated water vapour over Arabian Sea were prepared using SSM/I data. These were examined along with other conventional meteorological data. After the normal onset of monsoon over the Kerala Coast of India on 29 May,2002 for next few days generally weak winds were observed over Arabian Sea, though water vapour in the Arabian Sea was quite high. However, from 8 June, 2002 high wind speeds were observed over north western parts of Arabian Sea. This area of high wind speeds gradually propagated eastwards towards west coast of India from 8 to 12 June, 2002.

As high moisture conditions were already prevailing in Arabian Sea, it was therefore expected on 11 June that during next 48 hrs., heavy rainfall could occur along the west coast. This additional information was made available to the operational forecasters which was used. Subsequently it was found that heavy rainfall actually occurred along the west Coast of India on 13th June, 2002 (reported at 03 hrs UTC on 14 June,02). Figures 1 and 2 depict the day-to-day changes in SSM/I derived water vapour and wind speed over Arabian Sea during the period 8-13 June,2002. Heavy rains were actually reported on 14-15 June, 2002.

This case study clearly brings out the use of SSM/I derived products for meteorological applications.

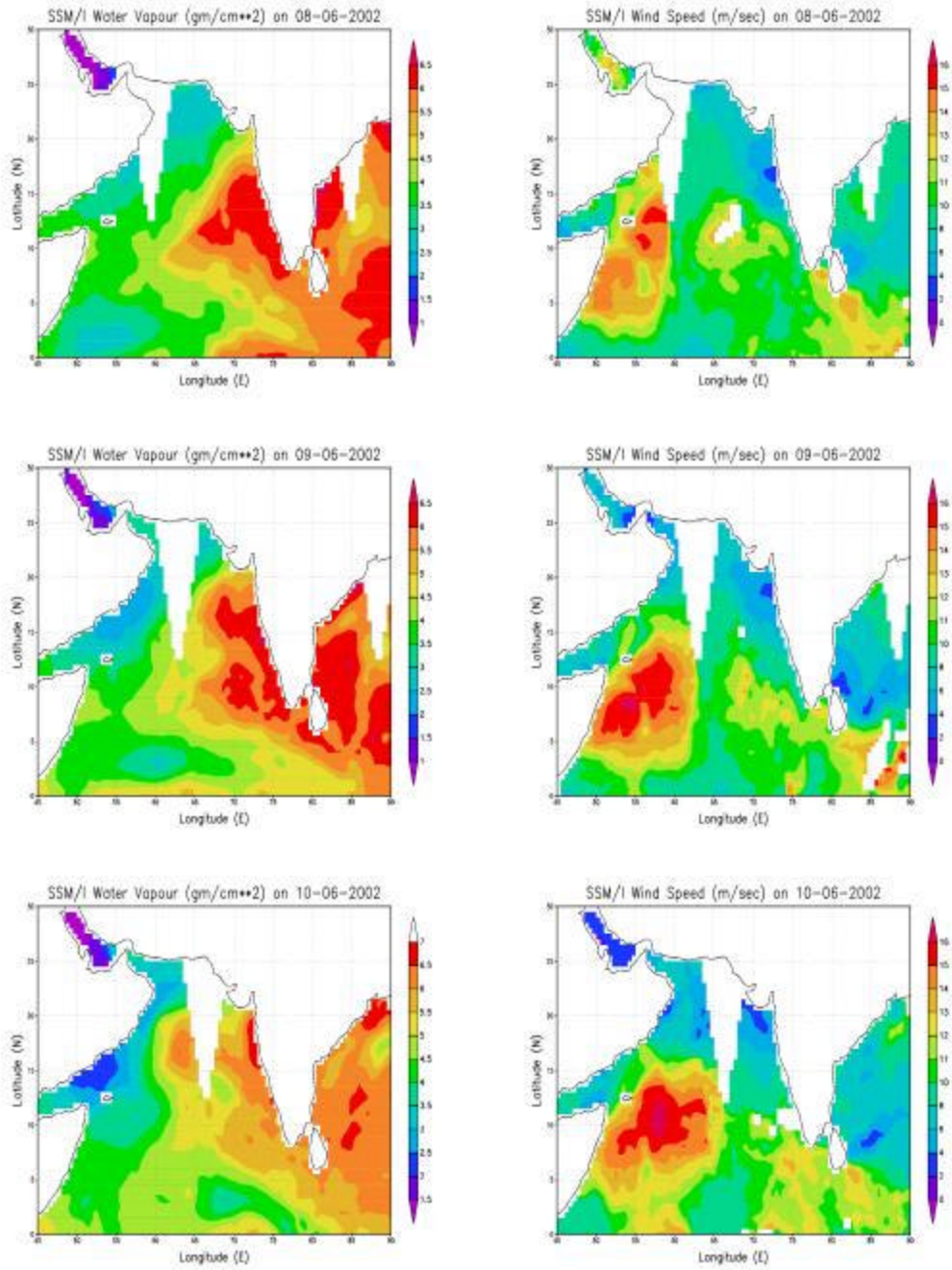


Fig-1

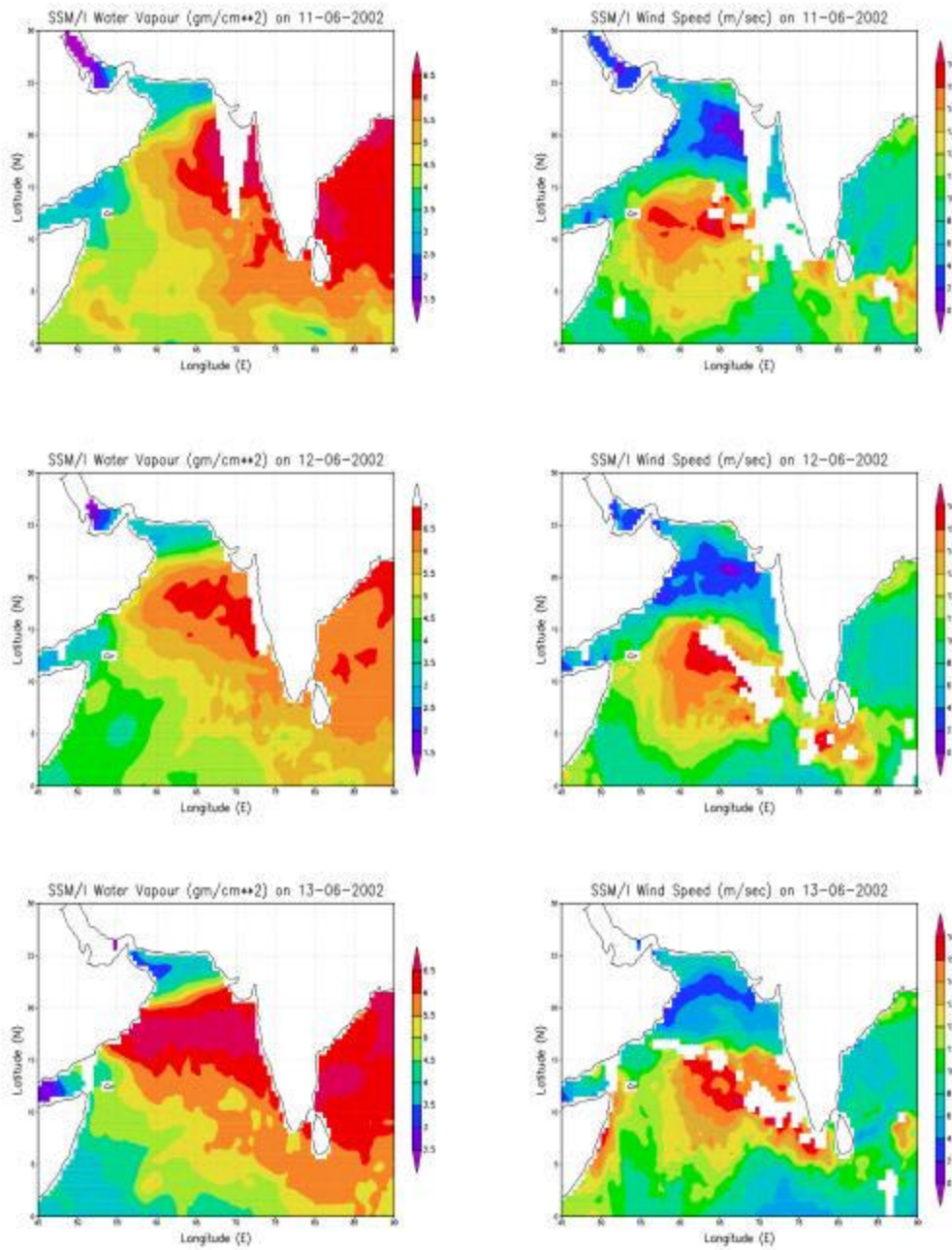


Fig-2