

New technique to detect tropical cyclones earlier than satellites

New Delhi, June 9th (India Science Wire): Researchers at the Indian Institute of Technology (IIT) Kharagpur have developed a technique that could be useful in the early detection of development or strengthening of tropical cyclones in the atmospheric column prior to satellites over ocean surface in the North Indian Ocean region.

Researchers devise a novel method using Eddy detection technique to investigate the formative stages and advance detection time of tropical cyclogenesis in the North Indian Ocean region. This study has been conducted under the Climate Change Program (CCP) with the support from Department of Science and Technology, Government of India, an official statement said.

Early detection of Tropical cyclones has wide socio-economic implications. So far, remote sensing techniques have detected them the earliest. However, this detection was possible only after system developed as a well-marked low-pressure system over the warm ocean surface. A larger time gap between the detection and the impact of the cyclone could help preparation activities.

Prior to the formation of cyclonic system over the warm oceanic environment, the initial atmospheric instability mechanism, as well as the vortex development, is triggered at higher atmospheric levels. These cyclonic eddies are prominent features in the vertical atmospheric column encompassing the disturbance environment with a potential to induce and develop into a well-marked cyclonic depression over the warm ocean surface. They could be used for detection of prediction of cyclones

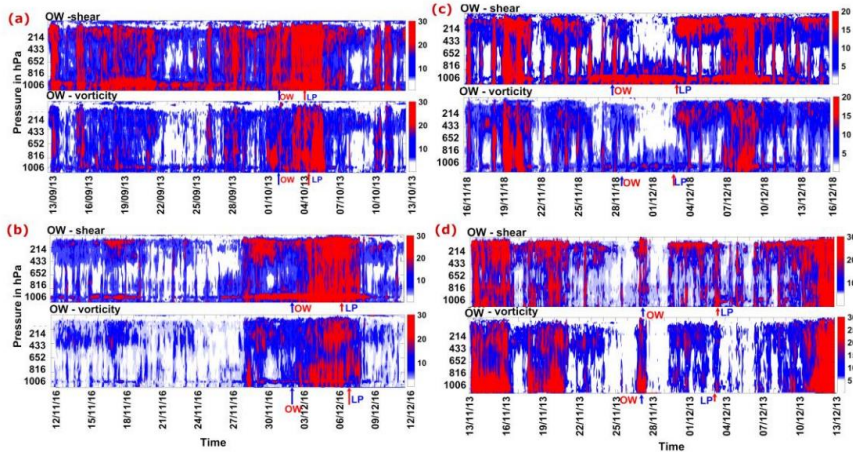
The method developed aims to identify initial traces of pre-cyclonic eddy vortices in the atmospheric column and track its spatio-temporal evolution. They used a coarser grid resolution of 27 kilometers for identification and a finer resolution of 09 kilometers to evaluate the characteristics of eddy vortices. The study was conducted with cases of four post-monsoon severe cyclones –Phailin (2013), Vardah (2013), Gaja (2018), Madi (2013), and two pre-monsoon cyclones Mora (2017) and Aila (2009) that developed over North Indian Ocean.

The team observed that the method could bring about genesis of prediction with a minimum of four days (~ 90 h) lead time for cyclones developed during the pre-and post-monsoon seasons. Initiation mechanisms of genesis of tropical cyclones occurs at upper atmospheric levels and are also detected at higher lead time for pre-monsoon cases, unlike the post-monsoon cases. The study made a comprehensive investigation on the behavior of eddies in an atmospheric column for non-developing cases and compared these findings with developing cases.

The research team for this study includes Jia Albert, Bishnupriya Sahu and Prasad K. Bhaskaran from IIT Kharagpur. Recently they have published their study in the [Atmospheric Research](#) journal. (India Science Wire)

Keywords: Indian Institute of Technology, IIT Kharagpur, Tropical, Cyclones, Atmospheric column, Satellites, Ocean, Indian Ocean region, Bay of Bengal, Eddy detection, Climate Change Program, DST, Department of Science and Technology, Remote sensing, MoES, IMD

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The blue marker represents atmospheric pre-cyclonic eddies detection using the OWZP technique, and the red marker represents satellite detection of low-pressure over the warm ocean surface.