CPAESS Discovery Seminars

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The Origin and Structure of the Arabian Sea Monsoon Onset Vortex

DATE: **Wednesday, September 18, 2024**

TIME: **11:00 AM - 12:00 PM MT** (VIRTUAL)

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In certain years, during the onset of the Indian Summer Monsoon, a synoptic scale vortex, known as the Monsoon onset vortex (MOV) forms in the Arabian Sea within the seasonal northward propagating region of precipitating convection. Many MOVs intensify into tropical cyclones and significantly impact the onset and advance of the Monsoon.

Past studies have highlighted the role of hydrodynamic instability of the Somali Jet in the formation of the MOV. However, the role of precipitating moist convection in MOV formation remains unexplored.

This study examines the composite of 23 past MOVs using reanalysis data. Vertical alignment of a low-level and a mid-level vortex is found to be the most common pathway to MOV formation. A potential vorticity budget is used to clarify the leading physical processes during the MOV formation stage. It shows that the observed structure of the MOV is governed by diabatic heating and vertical advection to a leading order. Both the low and mid-level vortices in the developing MOV are attributed to moist convection.

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