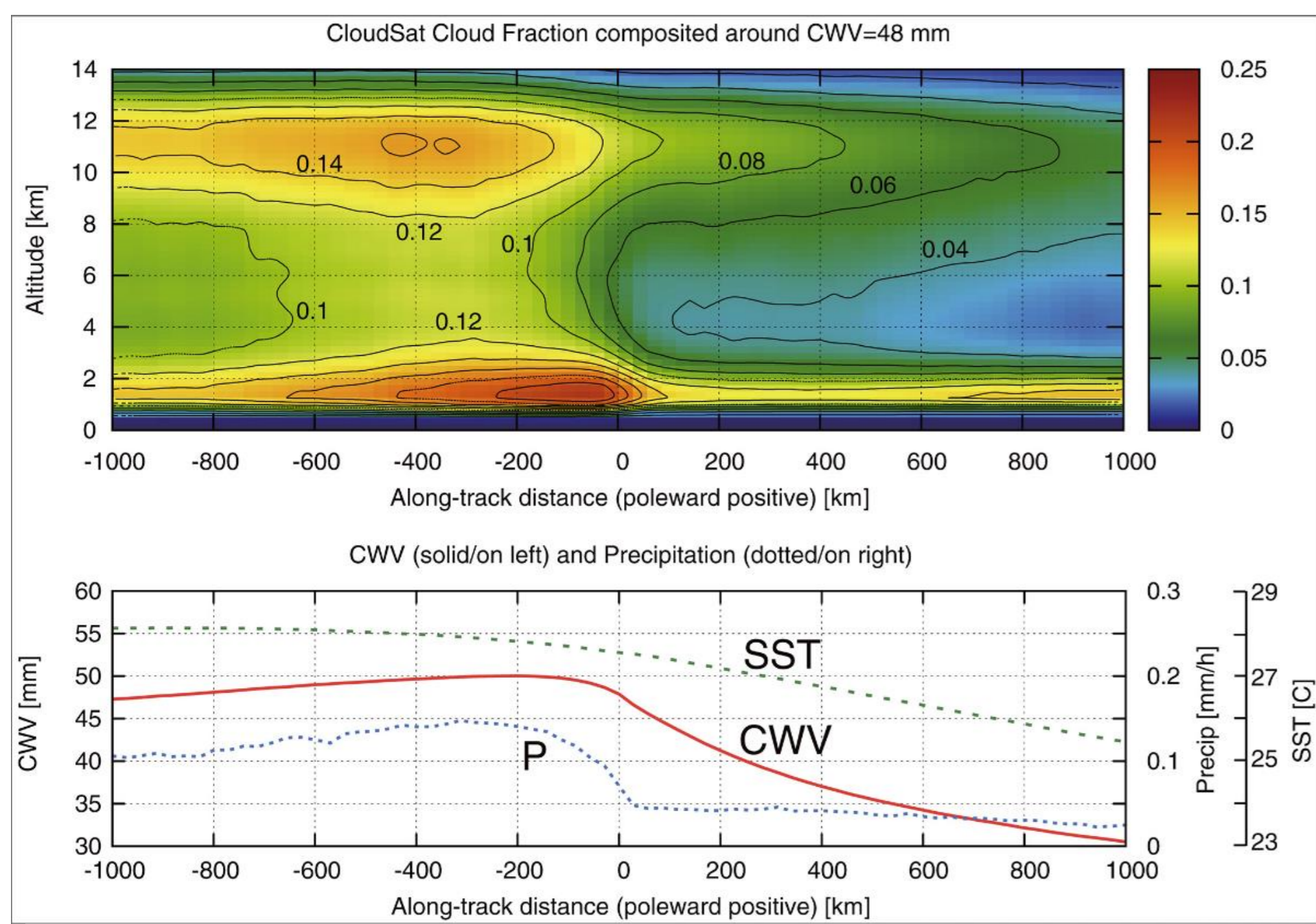


Introduction

The tropical moist margin is a meandering margin of a synoptic scale moist regime which contains the smaller scale convective activities (Mapes et al., 2018).



Echo fraction detected by CloudSat radar is shaded and contoured. CWV (mm), precipitation rate P (mm/h), and SST (C) e

Methodology

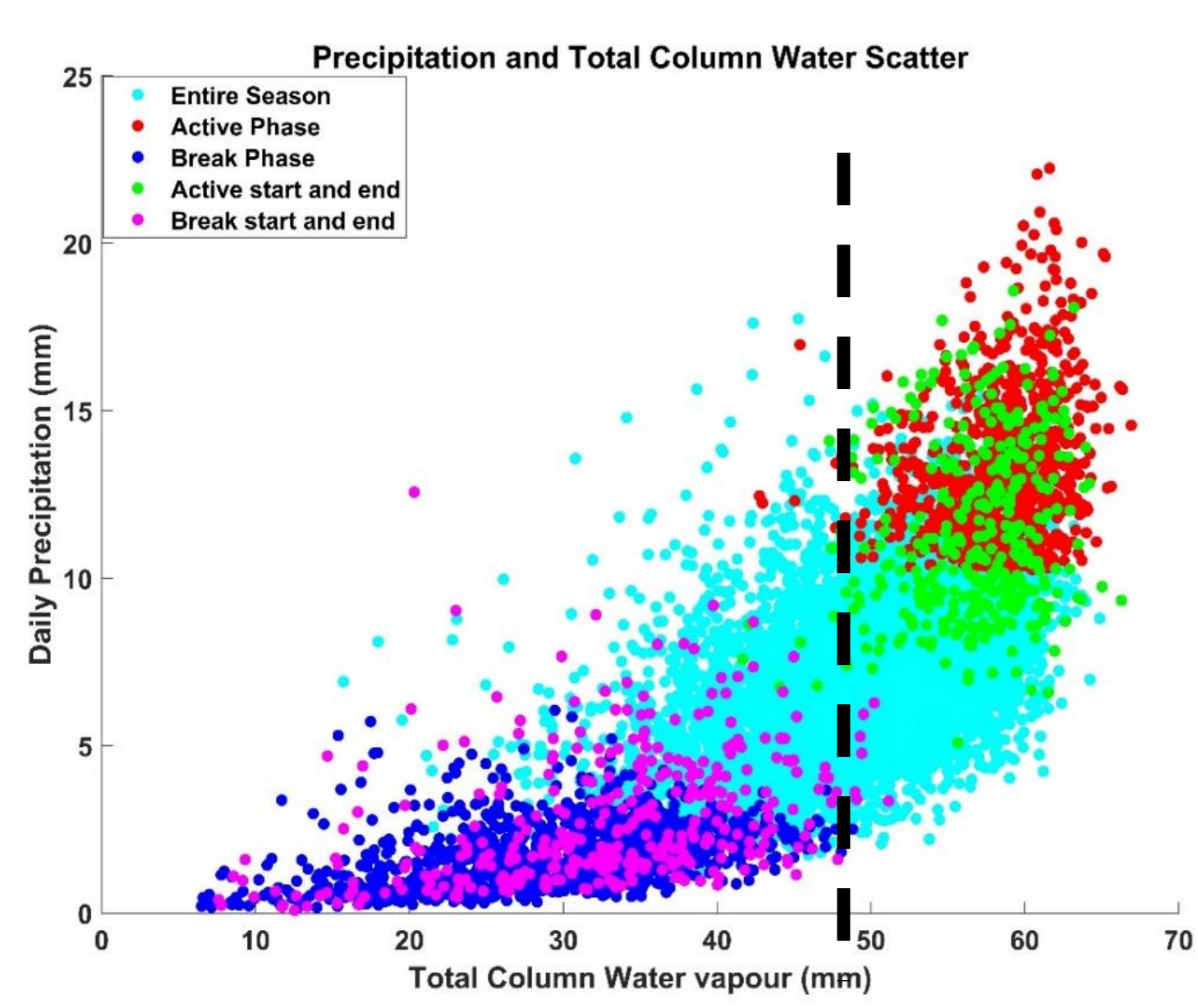
- **Identification of Active-Break Phase on TCWV and Precipitation Phase Plane:** The ERA5 dataset is used to make the precipitation and TCWV scatter over the monsoon core zone. For the active and break dates the methodology is taken from (Rajeevan et al., 2010) and ERA5 datasets are used to recalculate the active break dates due to dynamic consistency of the dataset.
- **Moisture Budget Analysis:** The moisture budget is calculated to analyse the physical processes regarding the synoptic movement of moist margins. The moisture budget equation balances the total (E-P) with Vertically Integrated Moisture Flux Divergence (Trenberth et al,2011).

$$P - E + \frac{\partial P_w}{\partial t} + \nabla \cdot \left(\int_{p_t}^{p_s} \mathbf{V} q \frac{dp}{g} \right) = 0$$

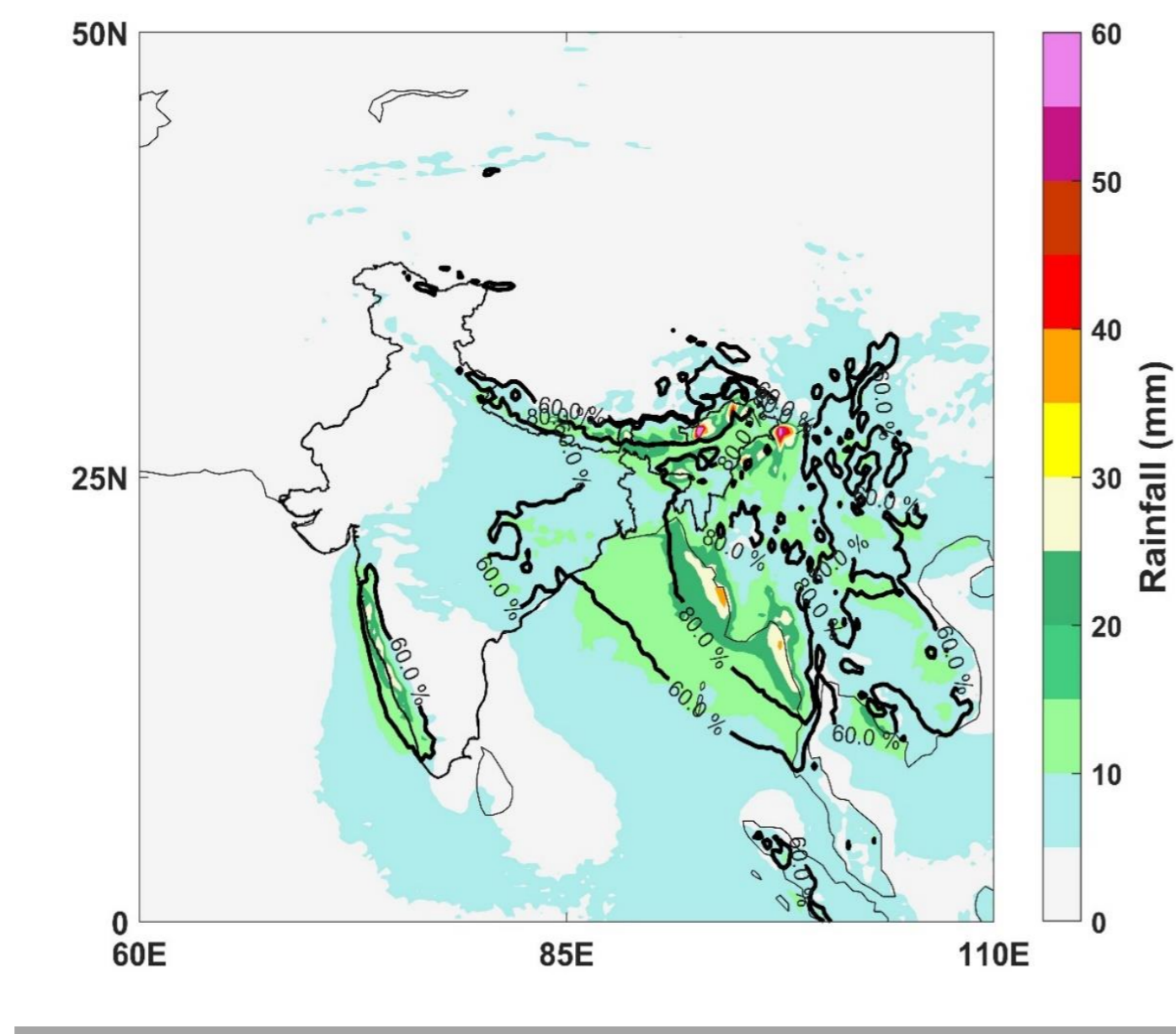
- **Moisture Advection and Divergence:** The physical processes of moisture transport can be viewed by further decomposing the VIMD term into moisture advection and divergence

$$F_{div} = \langle \mathbf{V} \cdot (\nabla q) \rangle + \langle q(\nabla \cdot \mathbf{V}) \rangle$$

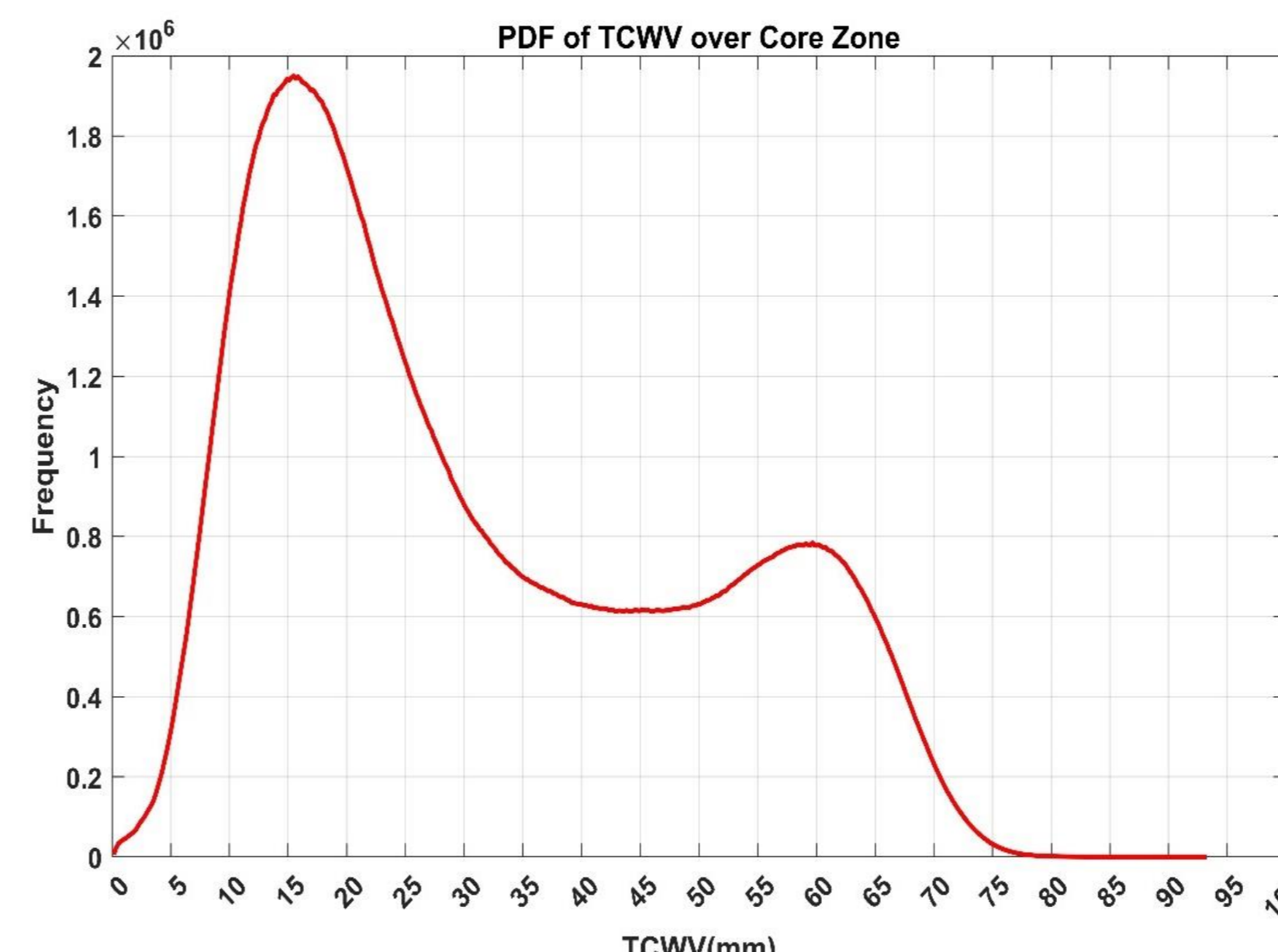
Results and Discussions



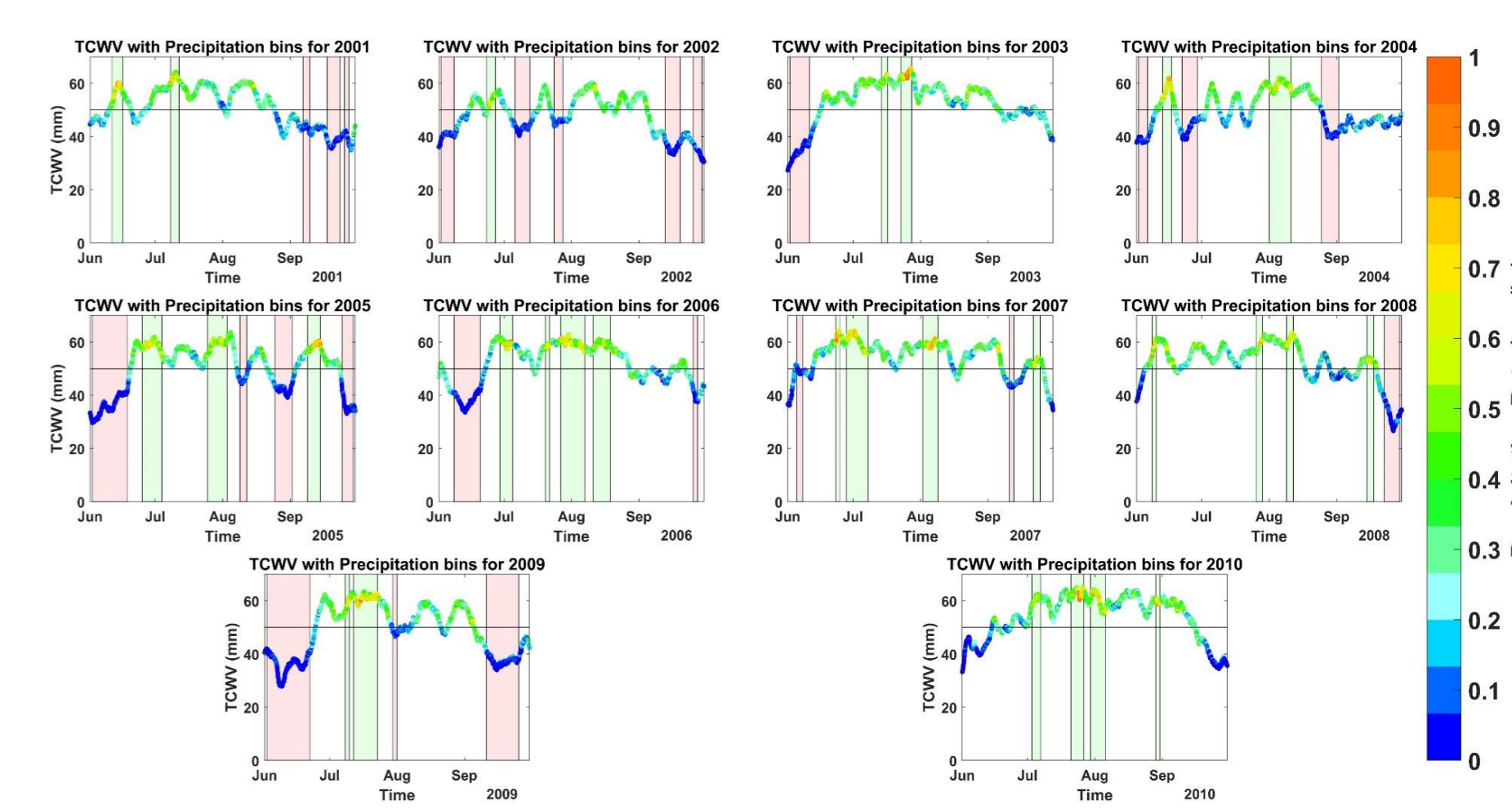
TCWV and Precipitation Scatter with Monsoon Active/Break Phase



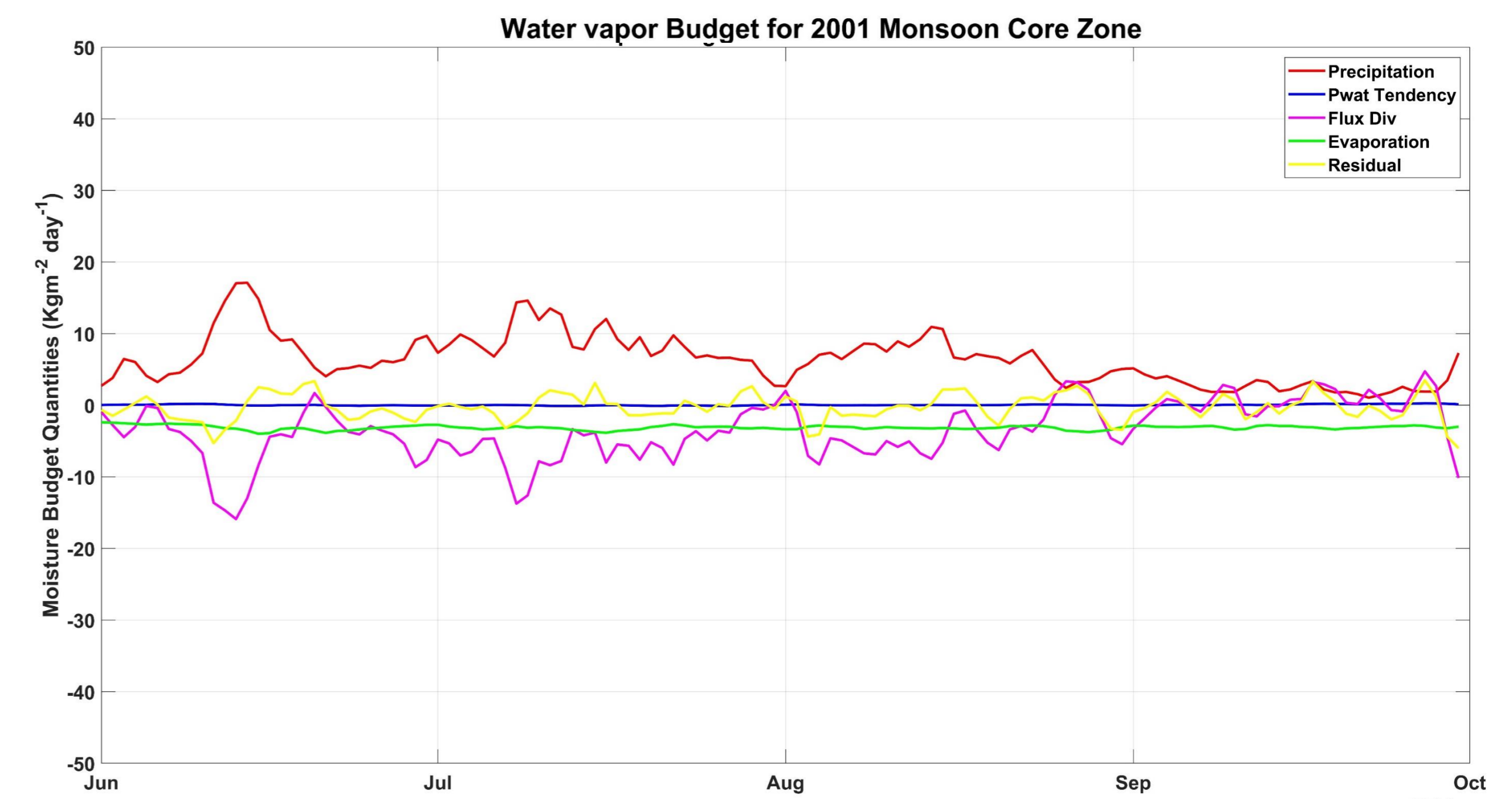
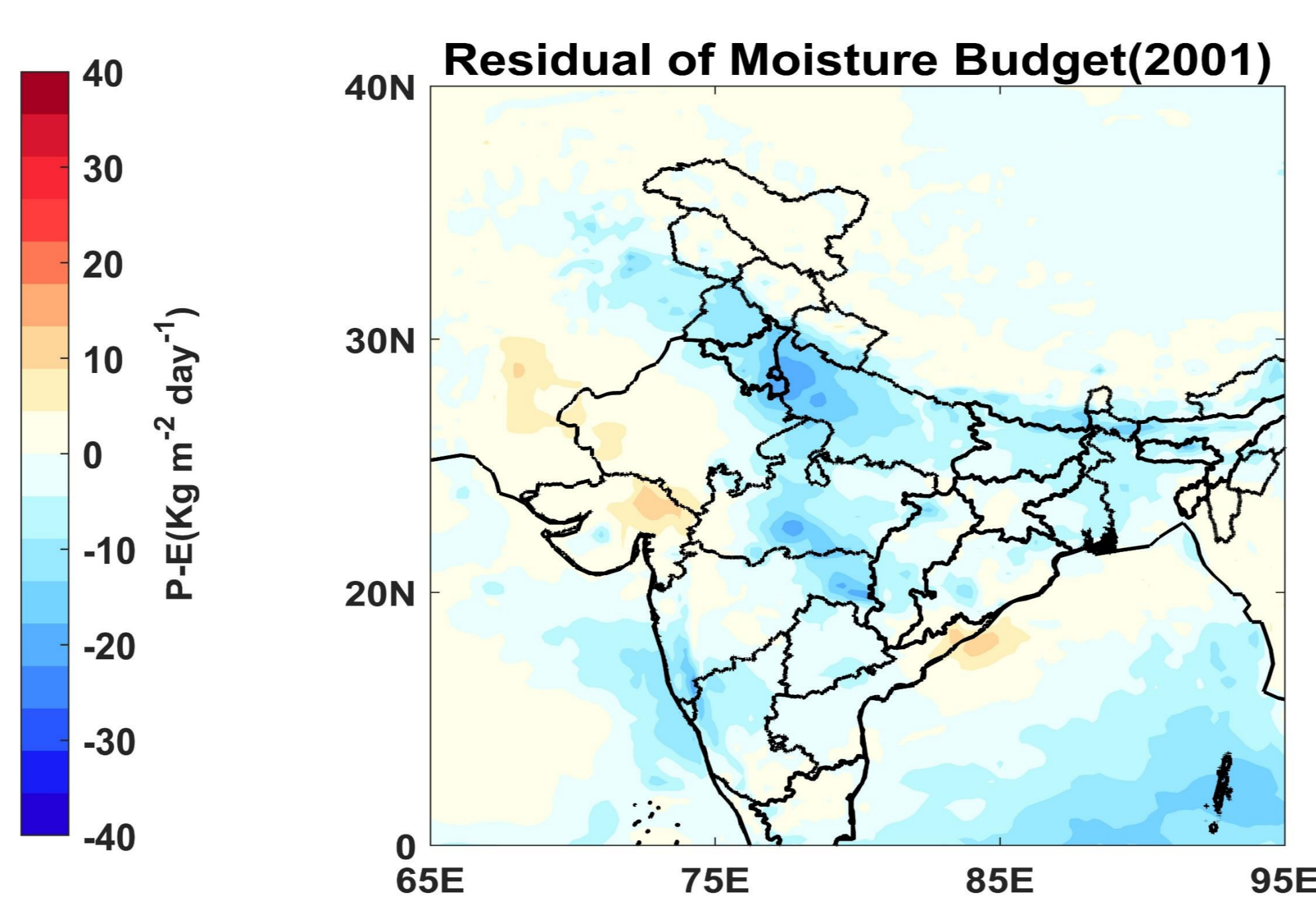
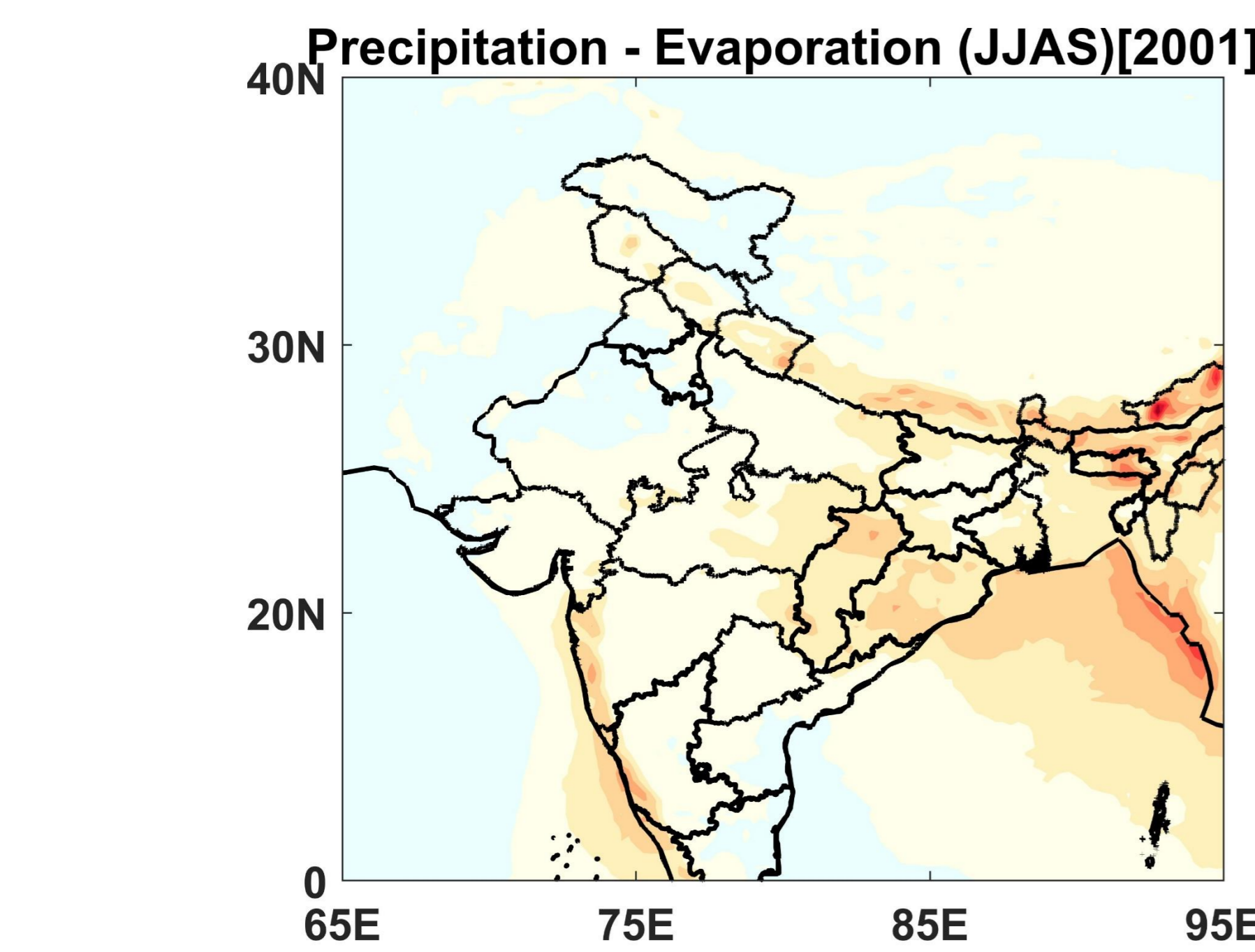
Frequency of Moist Margin occurrence (Labelled) and 75th Percentile Precipitation (shaded) for Monsoon months (2001-2010)



Histogram of TCWV over Monsoon Core Zone (2001-2010)



Domain Averaged TCWV time-series with colored precipitation bins. The green background shows active phase and the red background shows the break phased based on (Rajeevan, et al, 2010)



Conclusions

- The Tropical Moist margin shows promising results in segregating the monsoon active and break and can be a key to understand the monsoon sub-seasonal variability.
- The Identification of the moist margin can be crucial in understanding the synoptic mode of the monsoon disturbances and organized convection.
- A detailed moisture budget analysis is important to decipher the physical processes of moisture transport and the synoptic movement of Moist Margins

Acknowledgment

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