Clustering Intraseasonal rainfall patterns in the western Tropical Pacific

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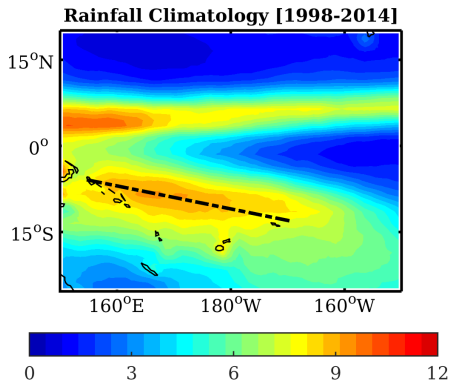
EOF Analysis

- Daily TRMM 3B42 rainfall data from 1998-2014
- Dialy anomalies - 10 to 90 day band pass filter
- Winter Season (Nov-Apr)
- Daily Era Interim data – MSLP, 850hPa wind



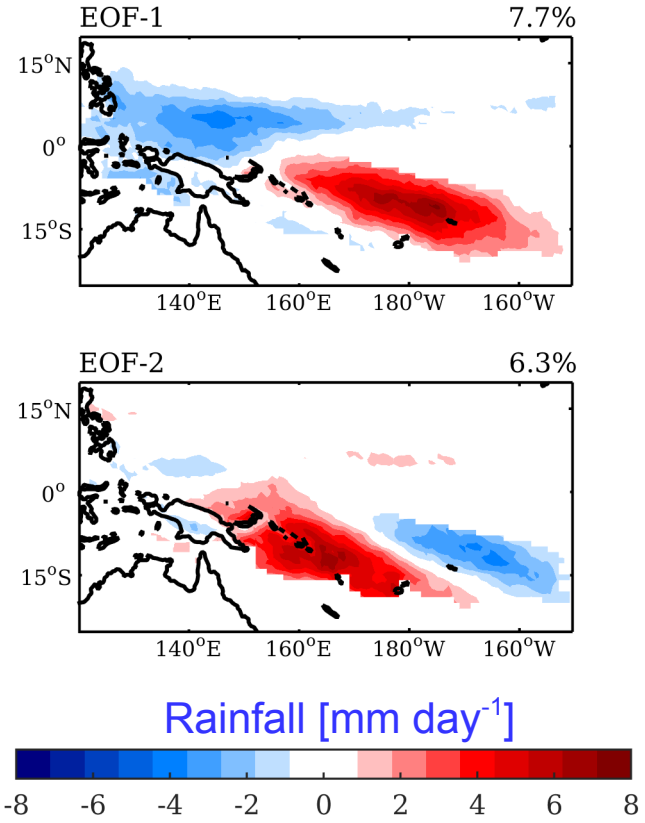


Fig. Spatial patterns of EOF 1 and EOF 2

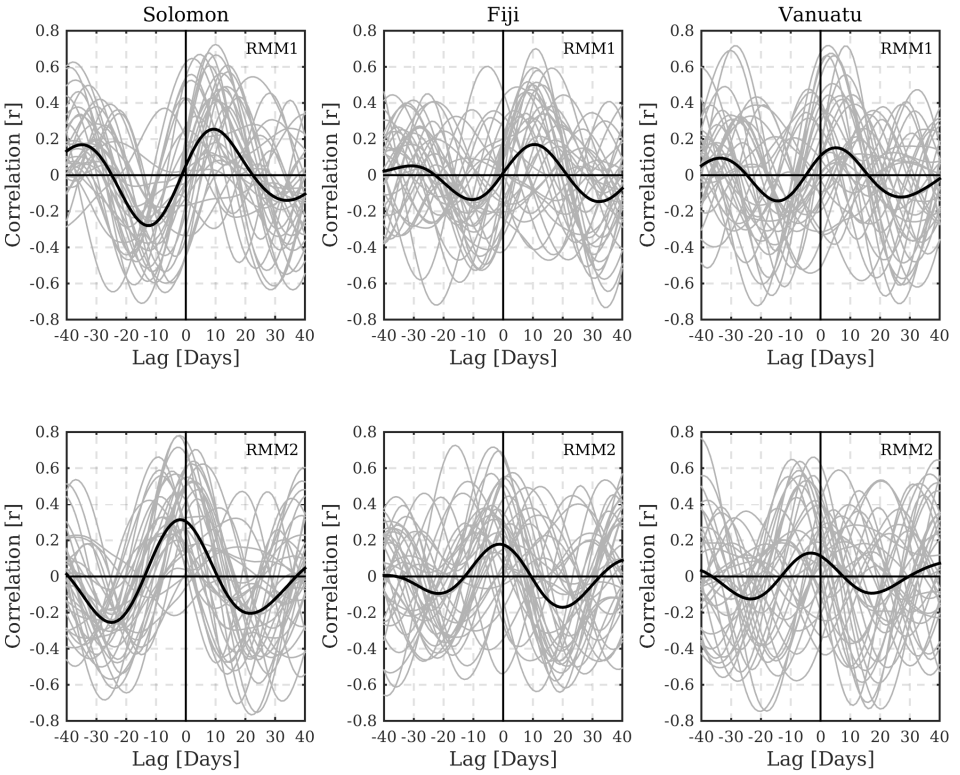


Fig. Lag correlation with RMM1 and RMM2

First two modes explain about 15% of total intraseasonal rainfall variability

Cluster Analysis

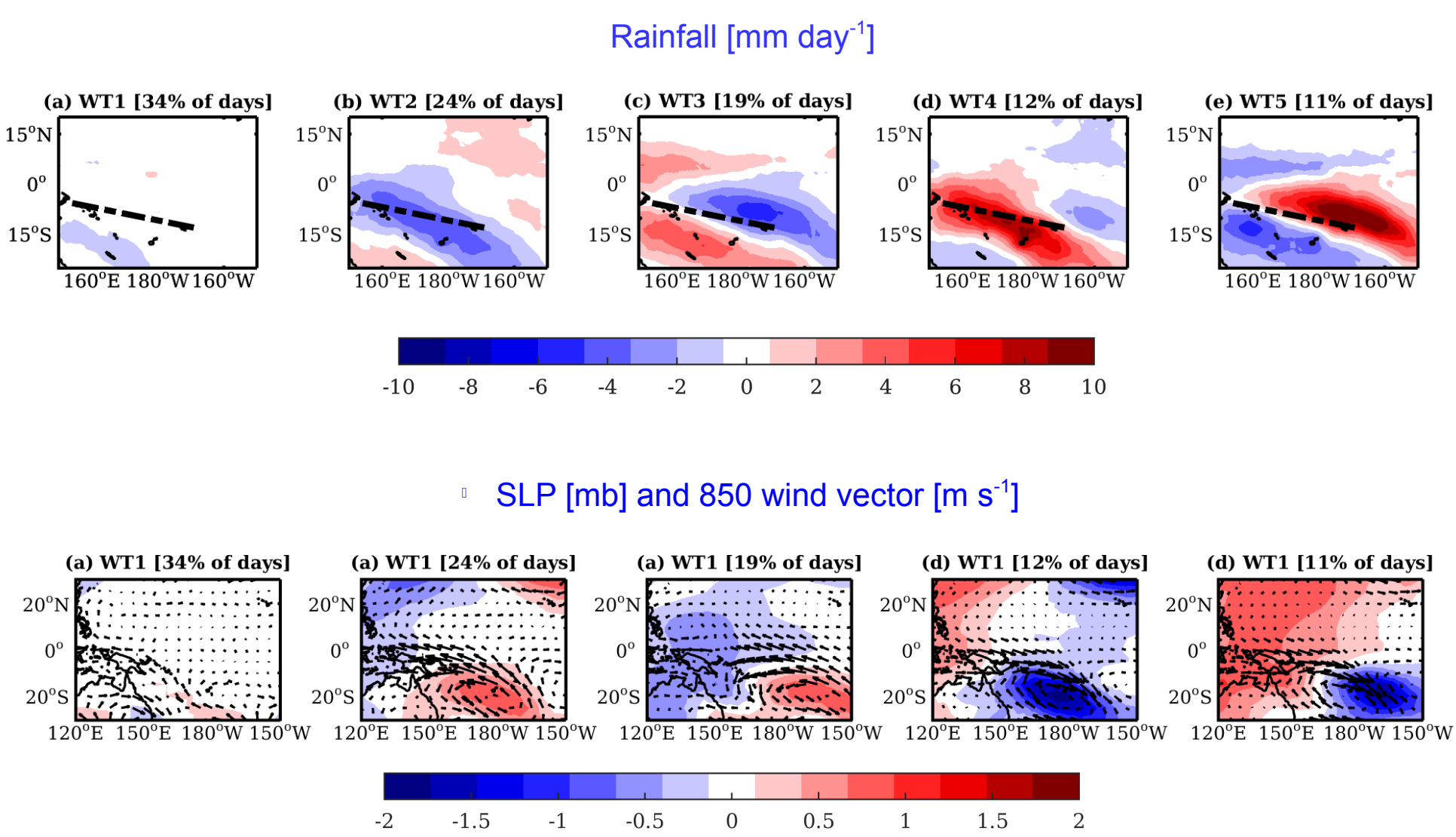
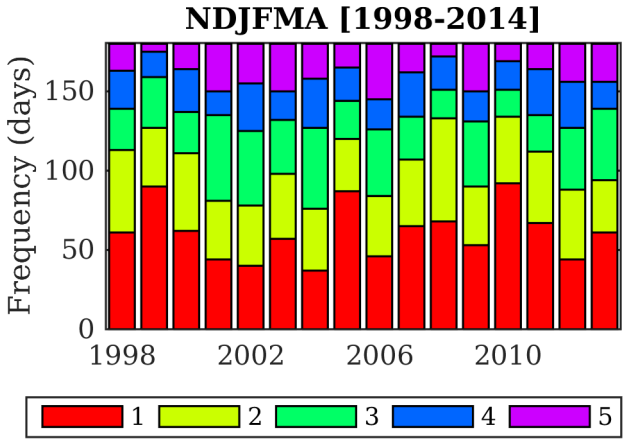
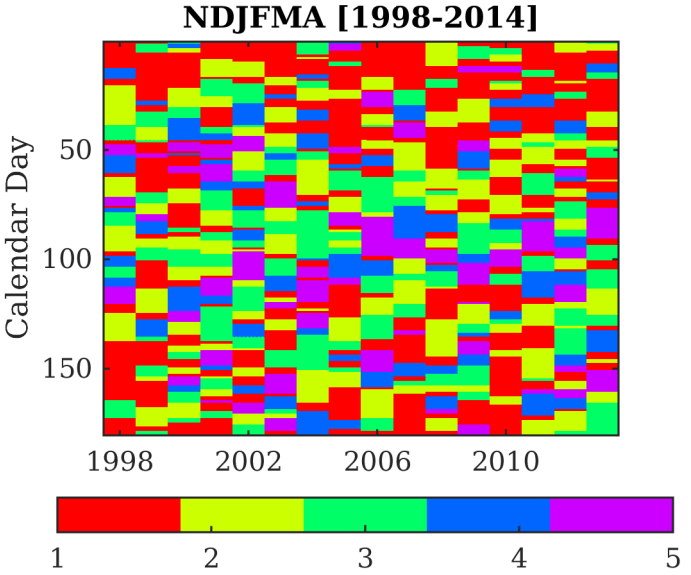


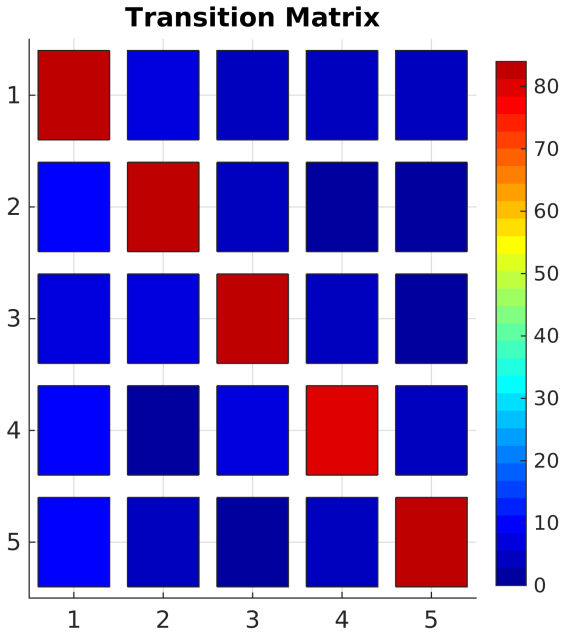
Fig. Spatial pattern of five weather types

Negative phase of WTs are more frequent than positive phase

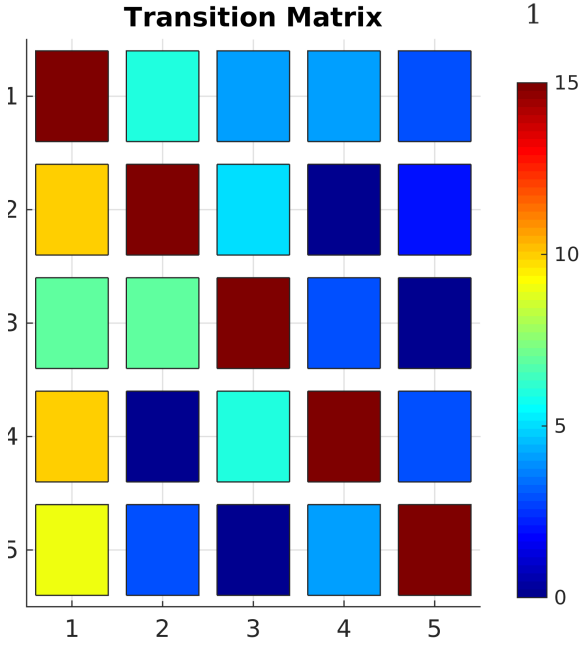
Frequency Distribution and Transition







Note: different scale..!



Posterior

WT1 -> WT2
WT2 -> WT3
WT3 -> WT2
WT4 -> WT3
WT5 -> WT4

Prior

WT1 -> WT2, WT4
WT2 -> WT3, WT1
WT3 -> WT4
WT4 -> WT1
WT5 -> WT4, WT1

MJO Composite

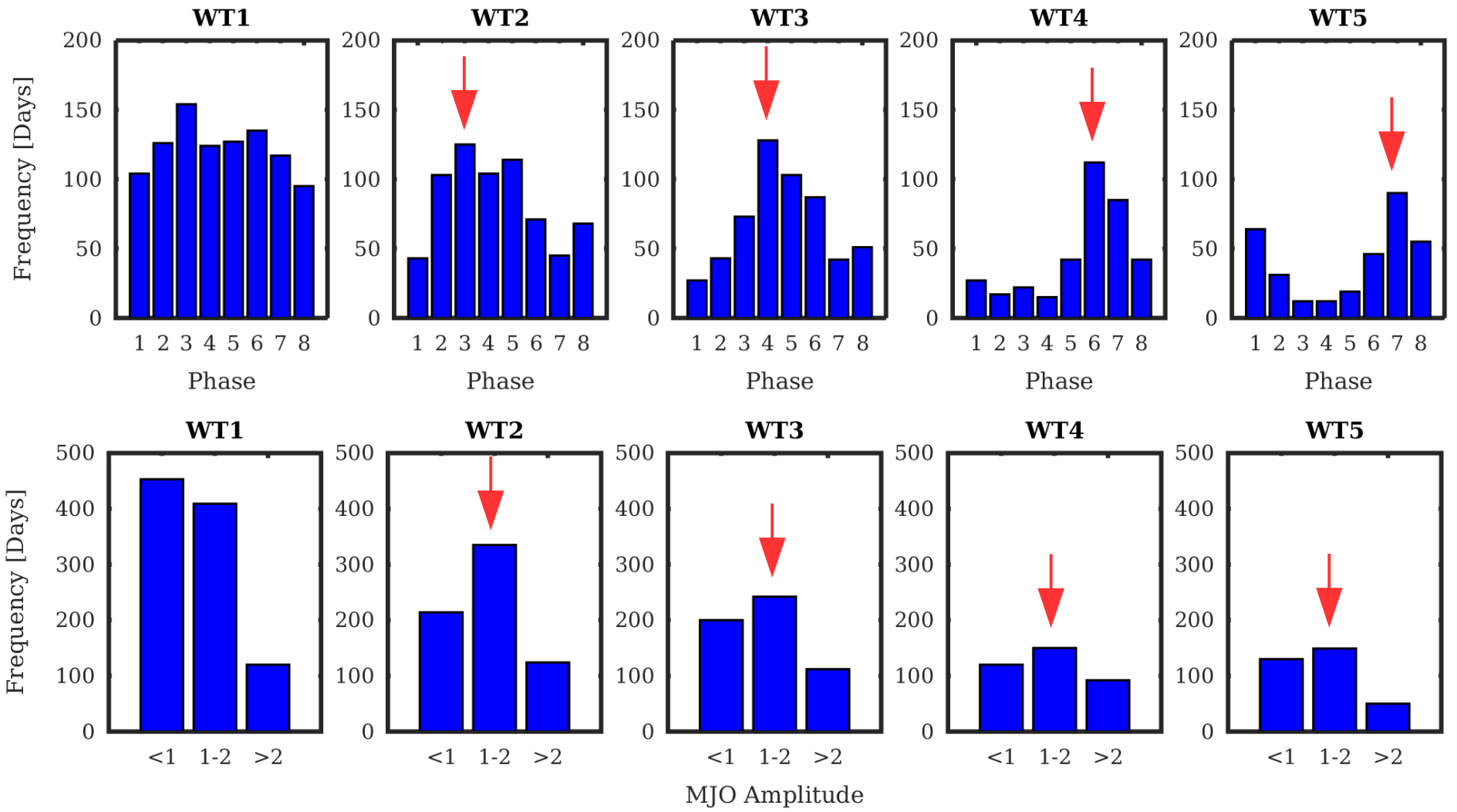


Fig. Frequency of WTs for different pases of MJO and different amplitudes

Frequency of WTs are related with both MJO amplitude and phases

MJO Phase Composite

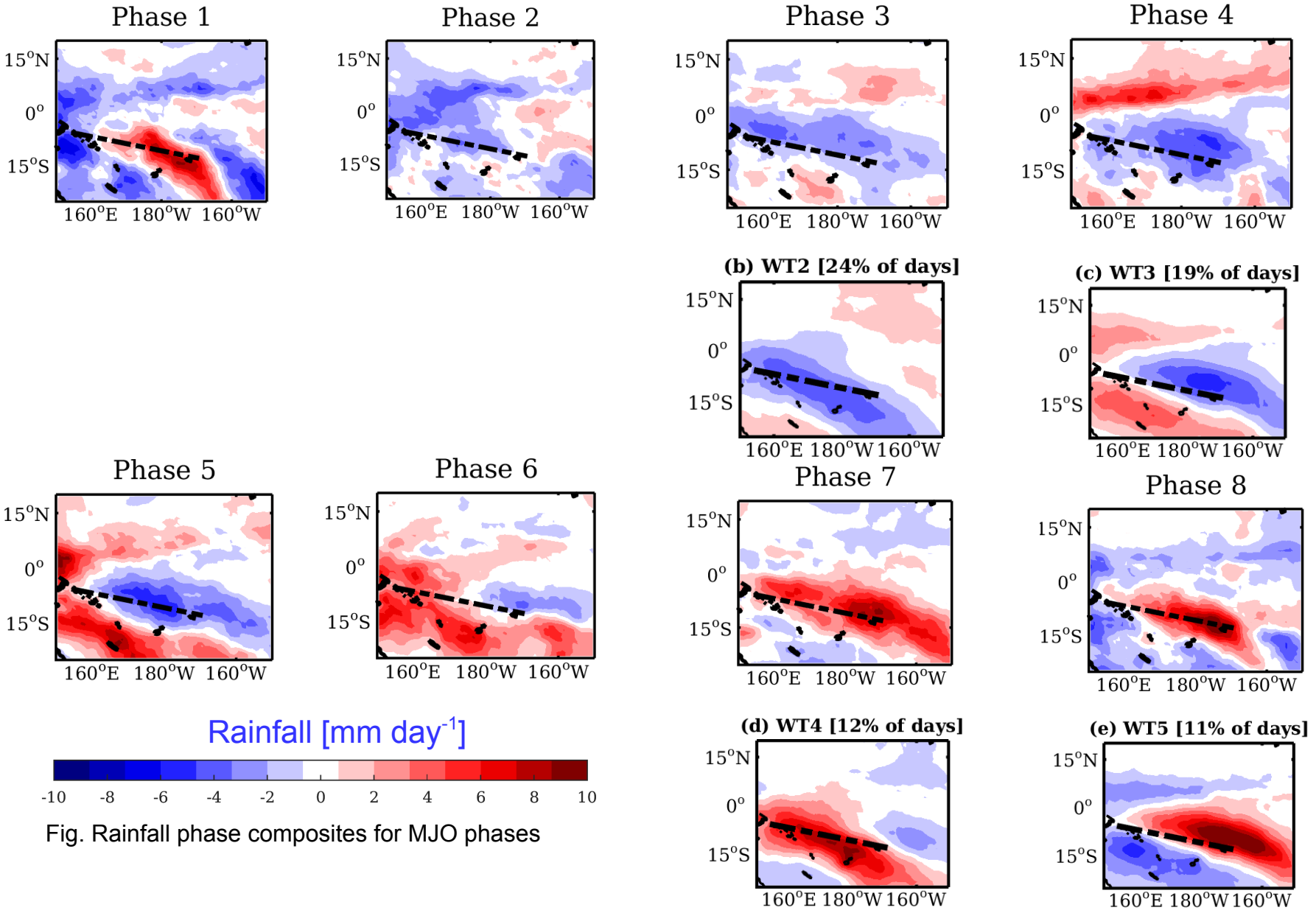


Fig. Rainfall phase composites for MJO phases

Rainfall spatial patterns of WTs are comparable with MJO phases

Summary

Five different WTs are identified

One pair of WTs: enhanced and supressed SPCZ

Another pair of Wts: shifted SPCZ pattern

WTs are more frequent during MJO phases of 3,4 and 6,7

Spatial structures of WTs are comparable with MJO phases [3,4 and 6,7]

Thanks to ICTP