

An MJO Index for the Eastern Pacific

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Motivation

Development

Evaluation

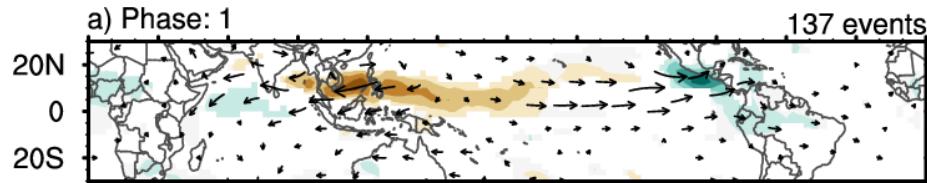
Summary

monitor.cicsnc.org/mjo

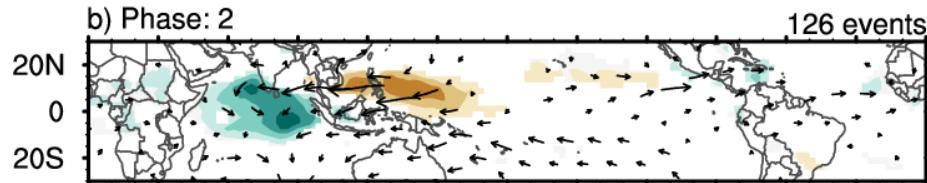
Summer MJO Composite

MJJASO

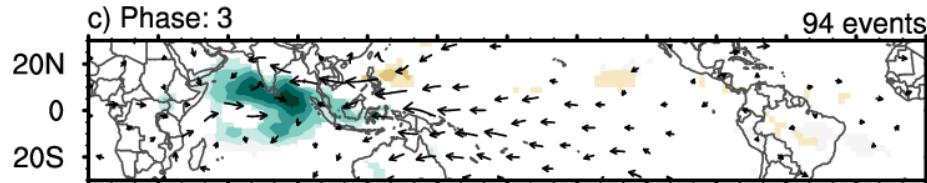
a) Phase: 1



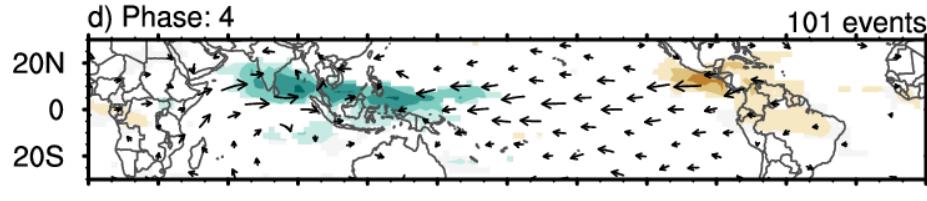
b) Phase: 2



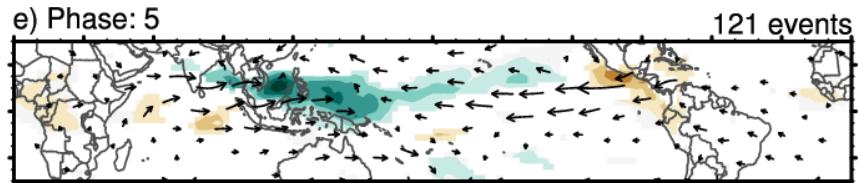
c) Phase: 3



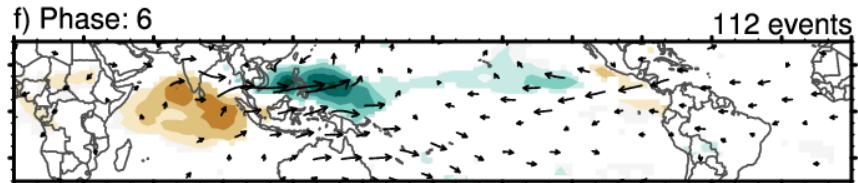
d) Phase: 4



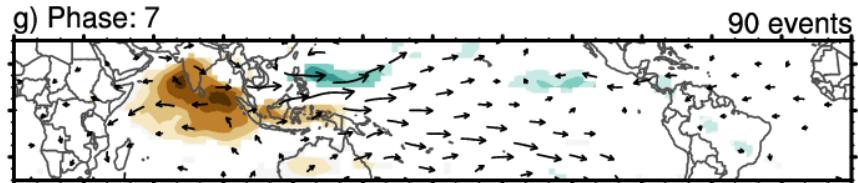
e) Phase: 5



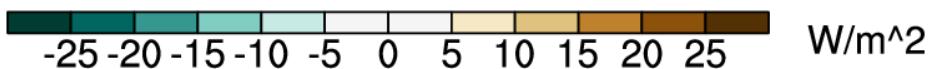
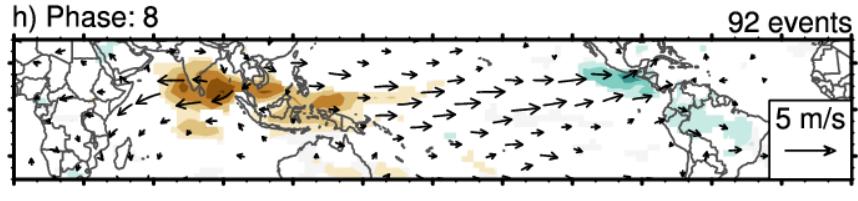
f) Phase: 6



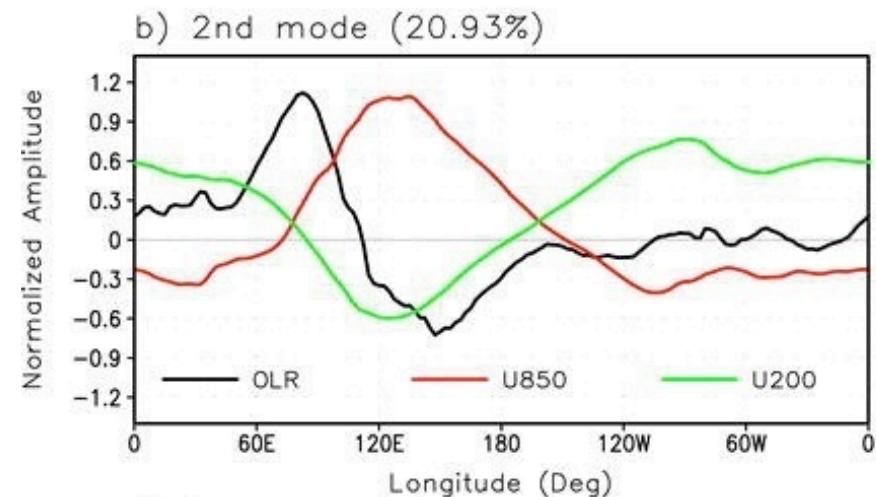
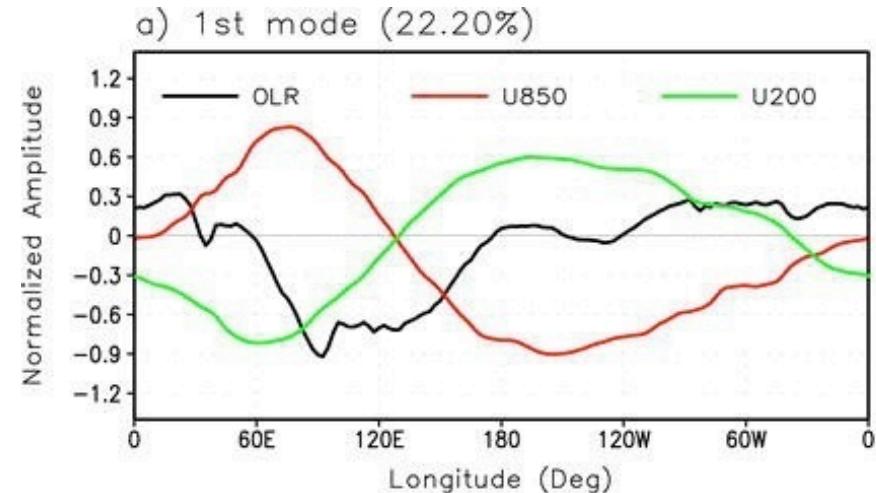
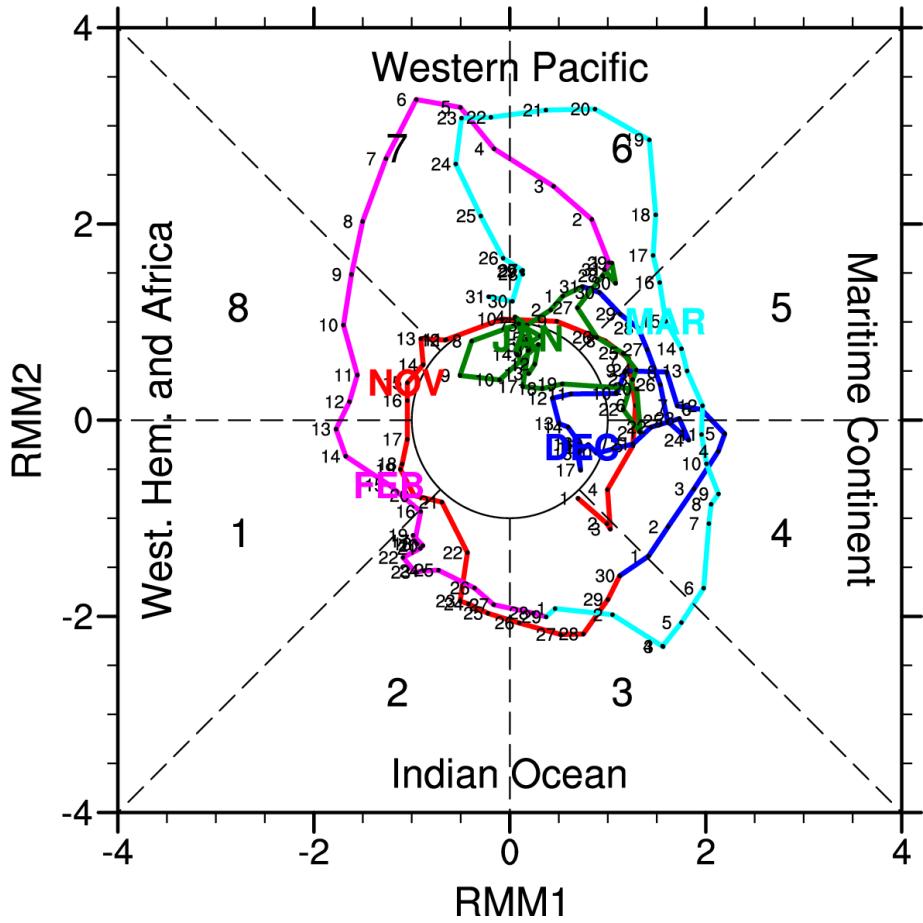
g) Phase: 7



h) Phase: 8

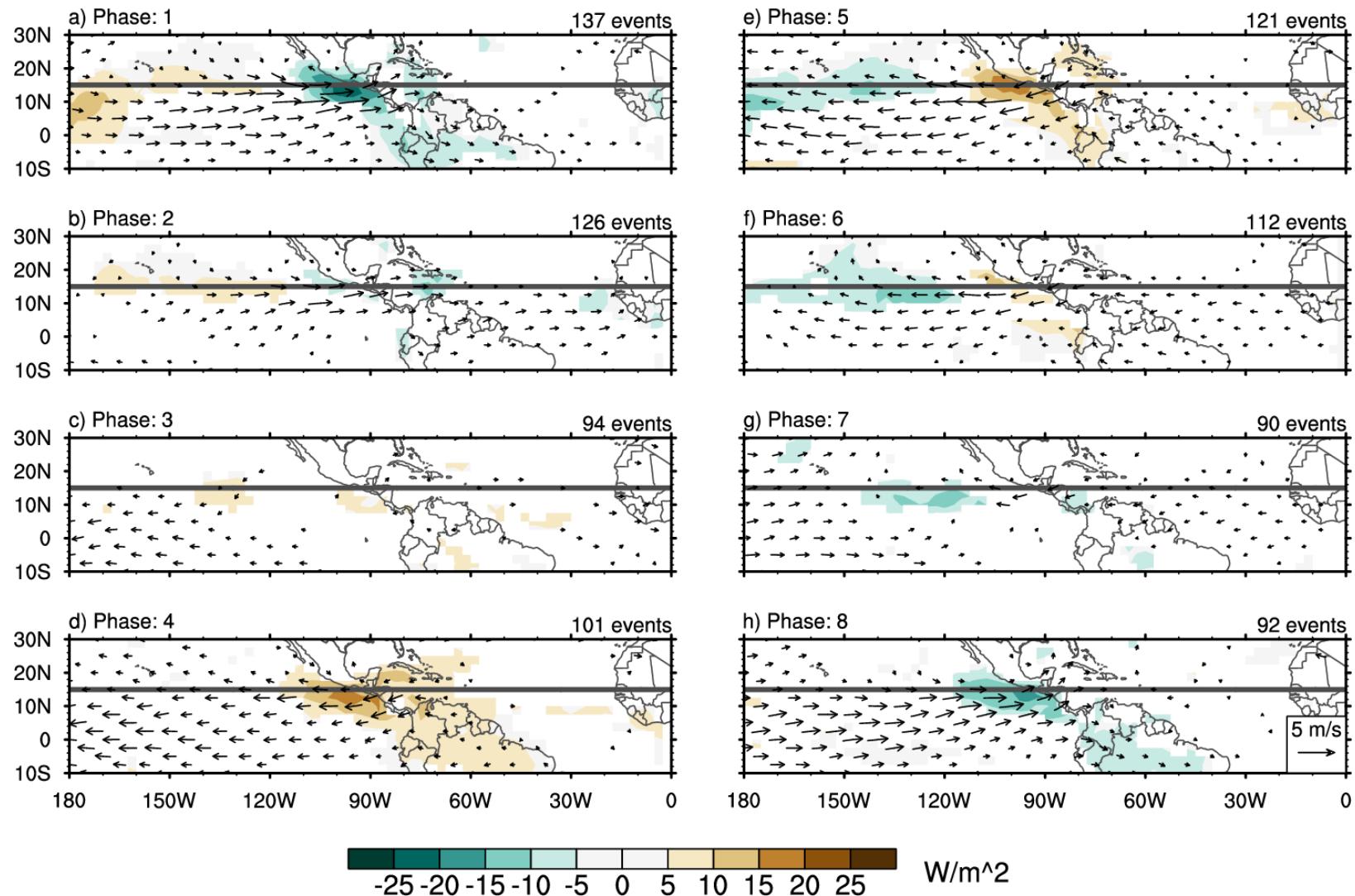


Wheeler–Hendon RMM Index



Eastern Pacific MJO Composite

MJJASO



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Motivation

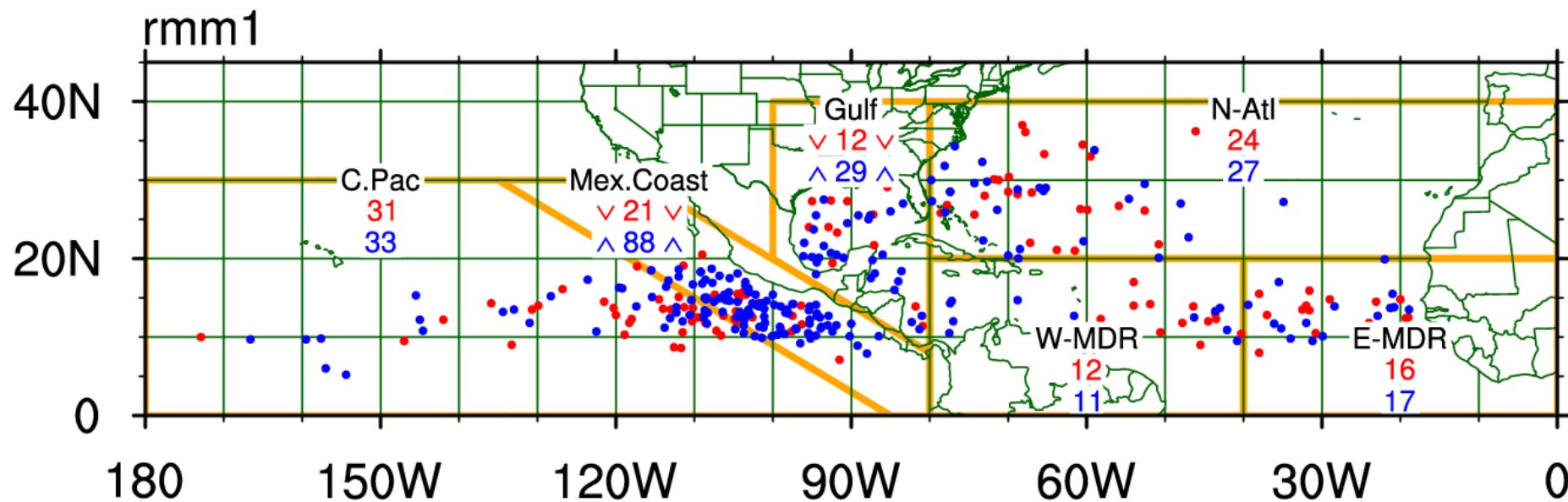
Development

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Summary

monitor.cicsnc.org/mjo

RMM & TC Genesis



Main Question

Do we need a separate MJO
index for the Eastern Pacific?



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Motivation

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Criteria for EP MJO Index

- Independent of RMM
- Independent of ENSO
- Dominated by intraseasonal time scale: 20–100 days
- Applicable in near-real time
- Strong modulation of hurricane activity
 - And other MJO-related phenomena?



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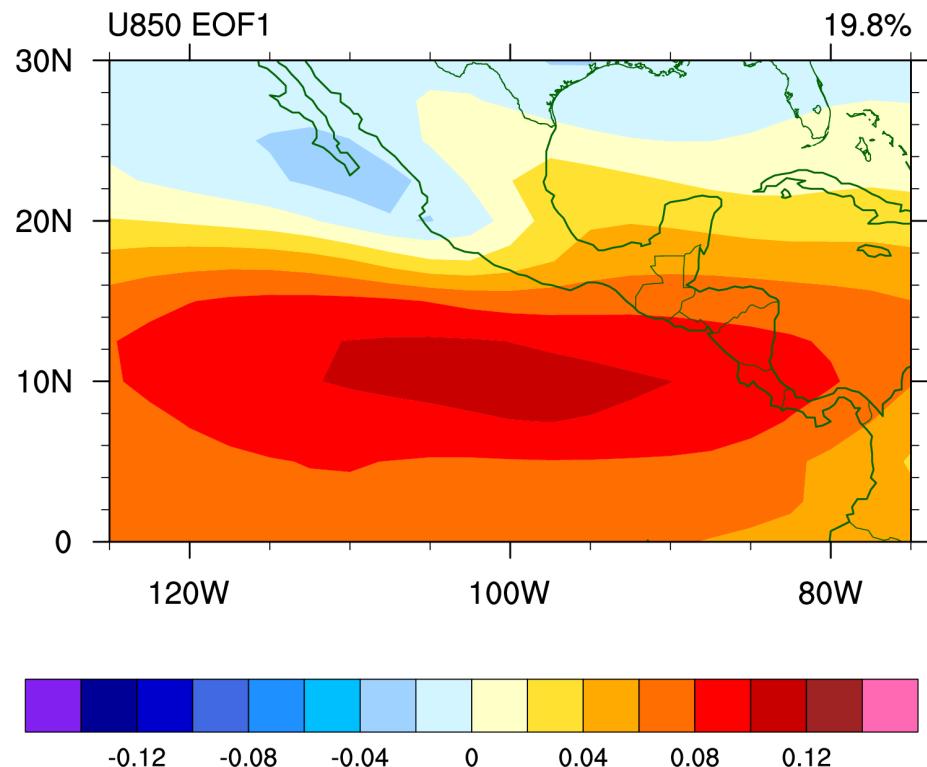
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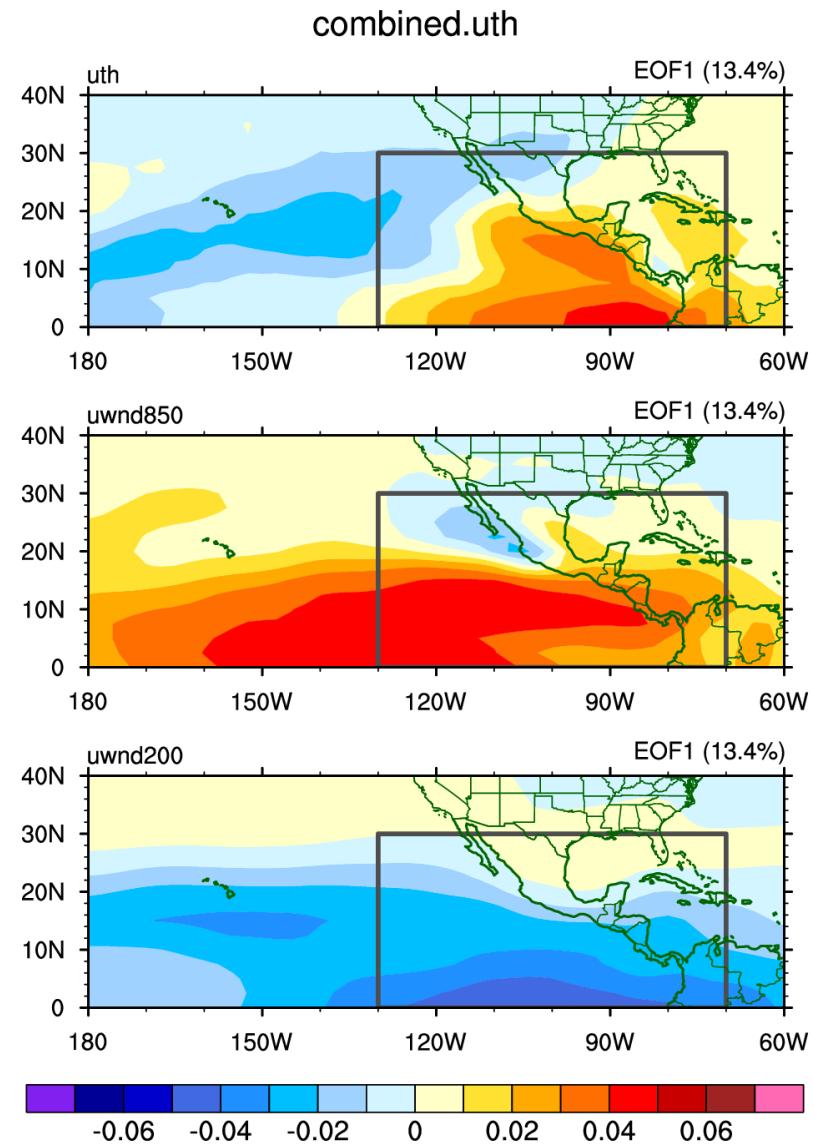
Maloney and Hartmann (2001, JAS)

- First EOF of U-850 near Mexico
- Originally pentad, but using daily data here
- May–November



Combined EOF

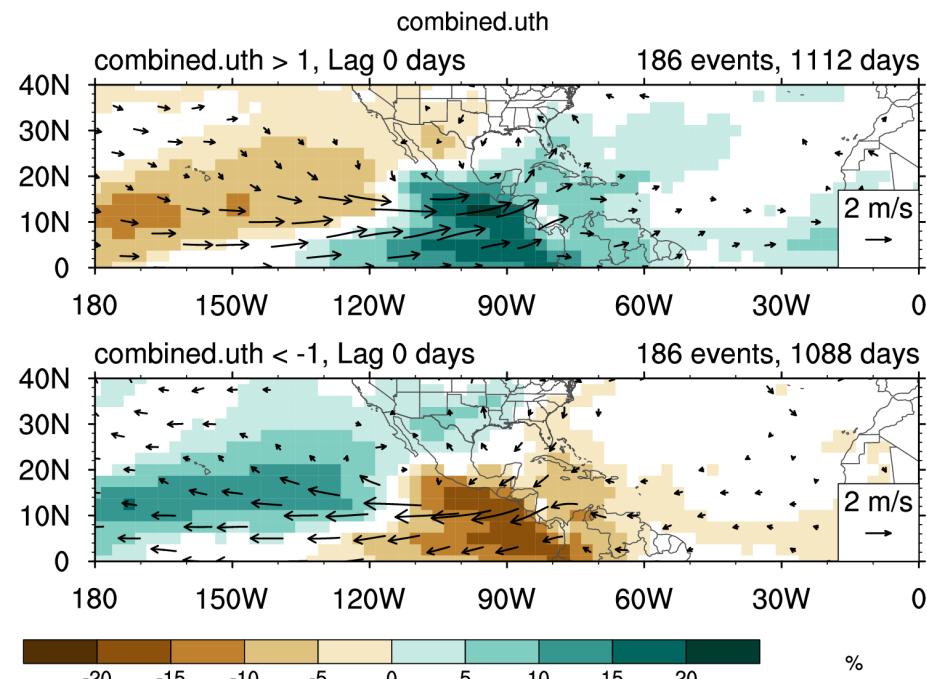
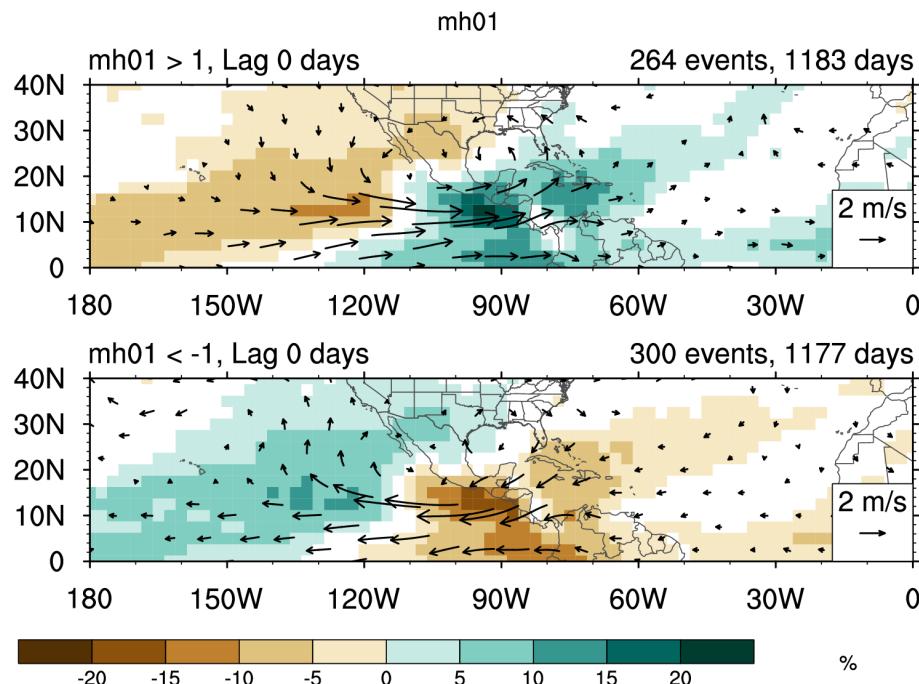
- First extended EOF of
 - Upper Tropospheric Humidity (UTH)
 - Climate Data Record from HIRS sensors on NOAA POES
 - U850
 - U200
- Larger domain
- May–November
- Input data are filtered for 20–100 days
- Projected onto unfiltered data to calculate PCs



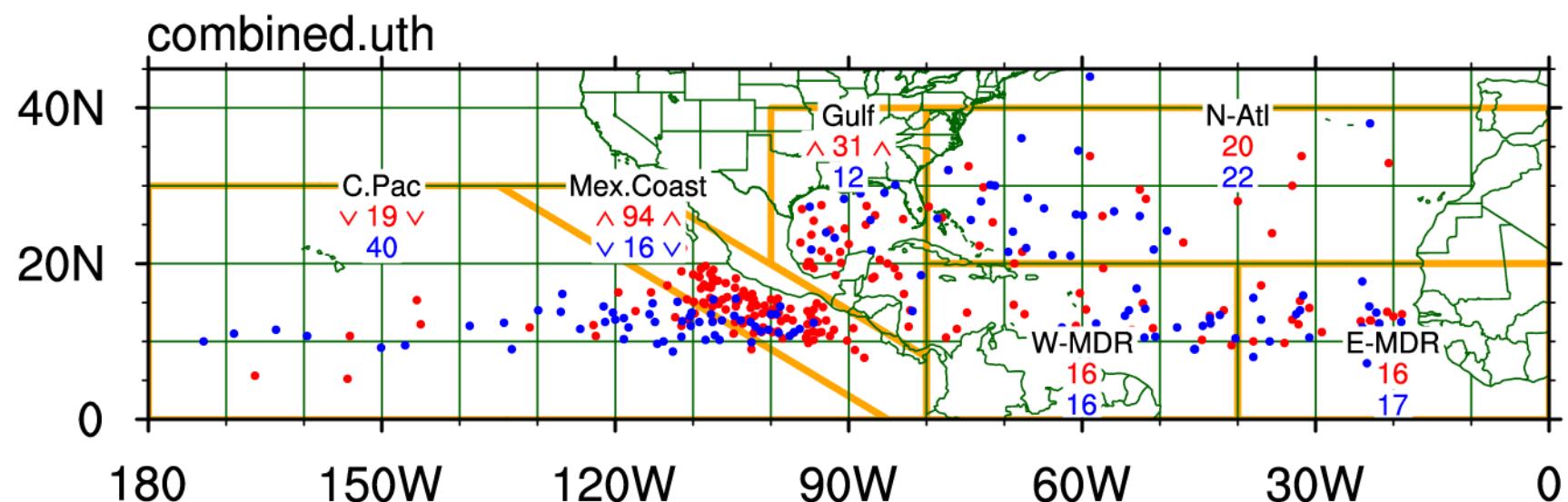
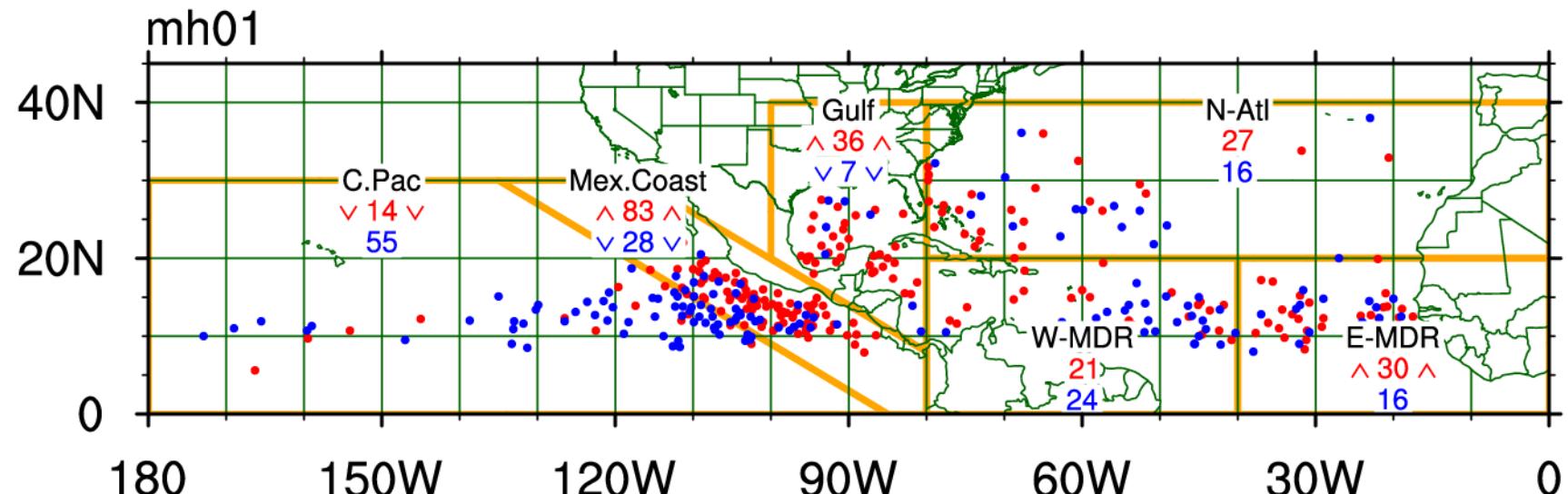
Composite UTH and 850 winds

Maloney & Hartmann (2001)

Combined UTH

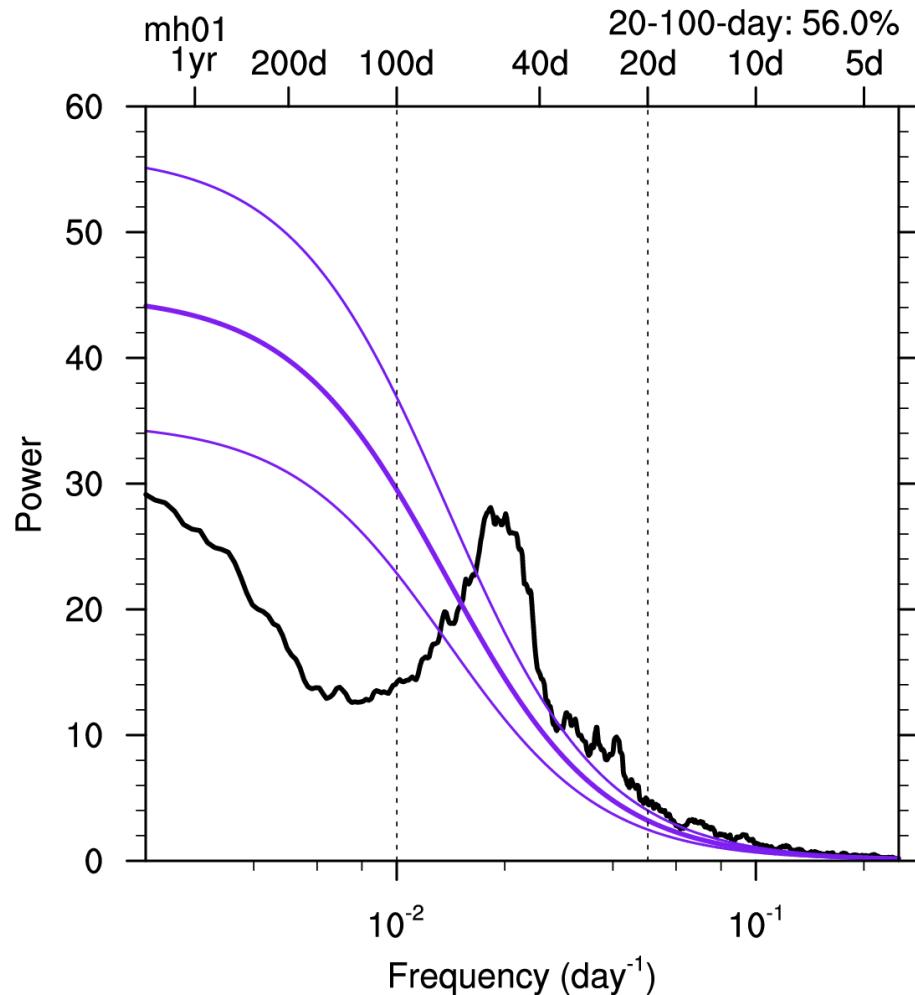


Genesis Modulation

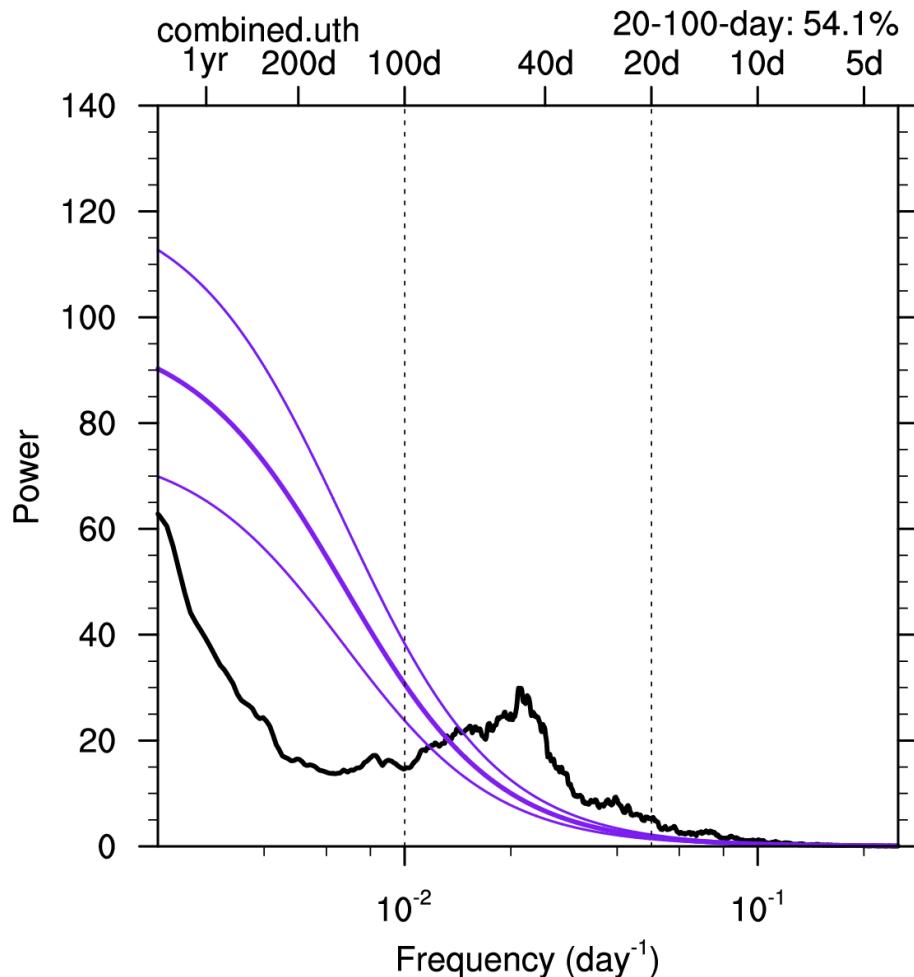


Spectral Analysis

Maloney & Hartmann (2001)

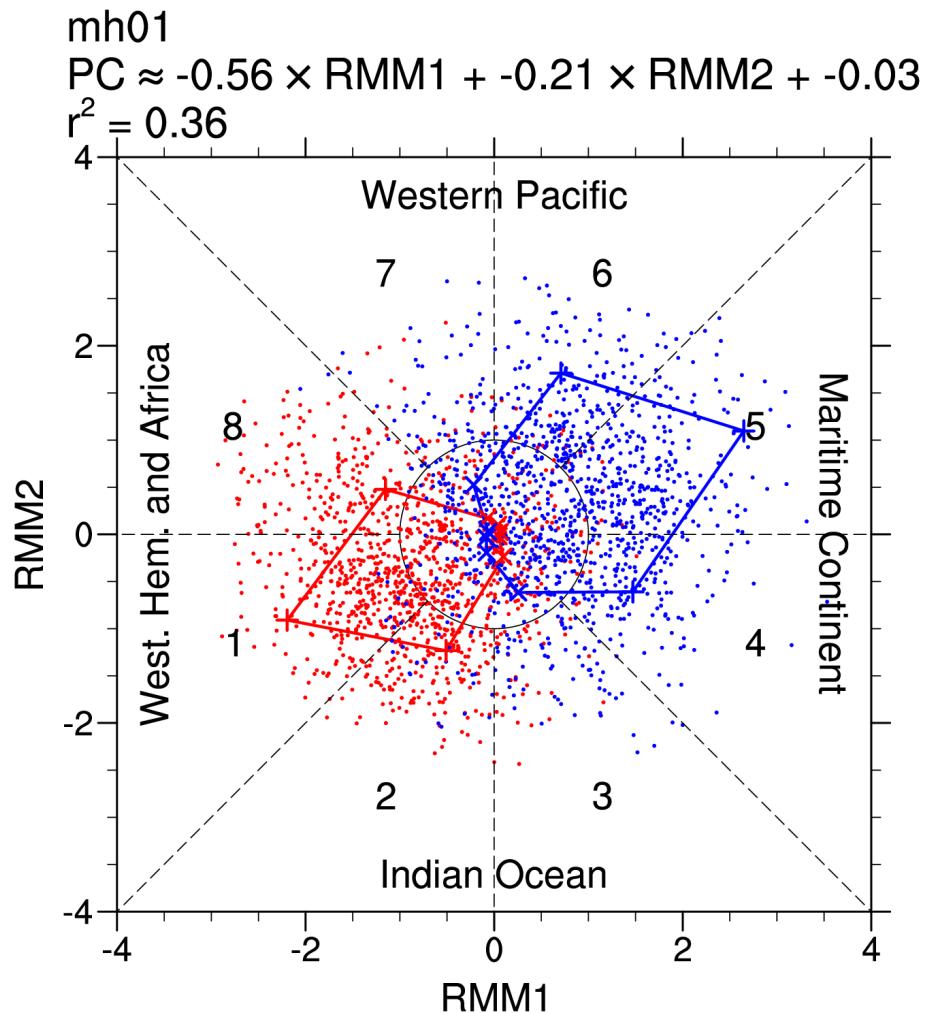


Combined UTH

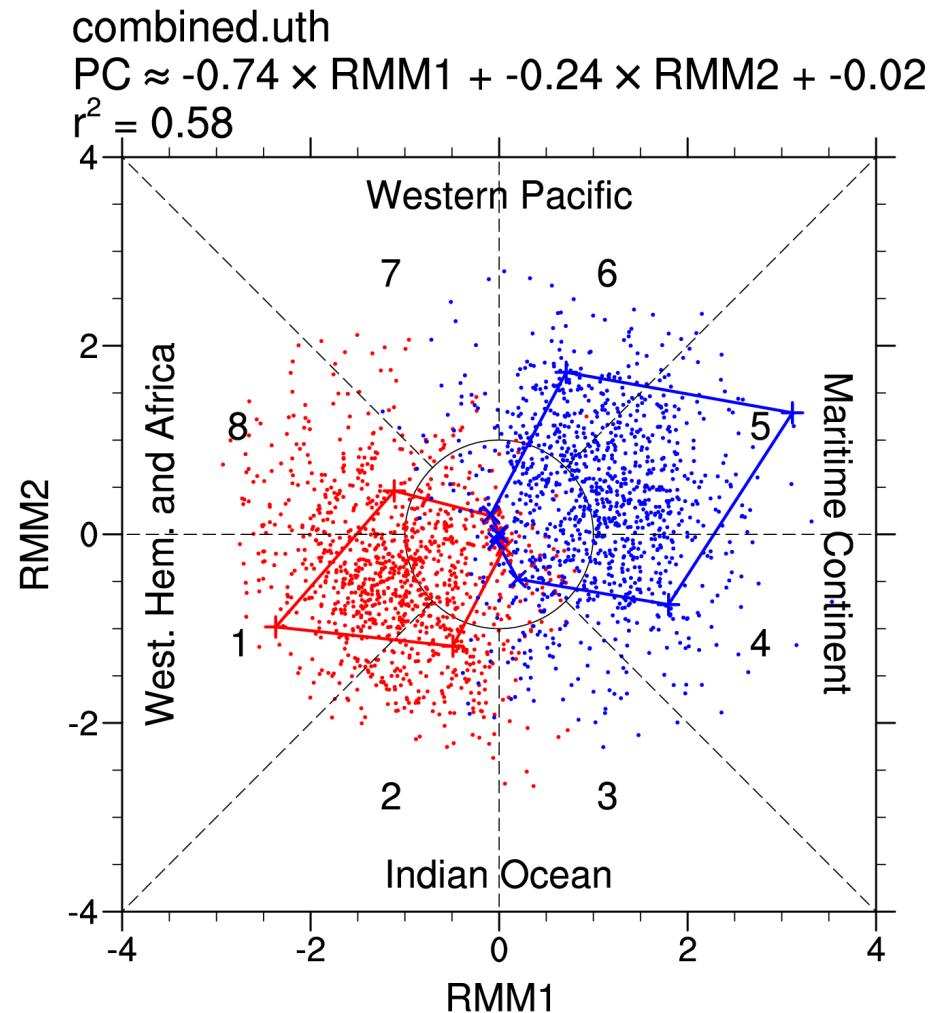


Independence from RMM

Maloney & Hartmann (2001)



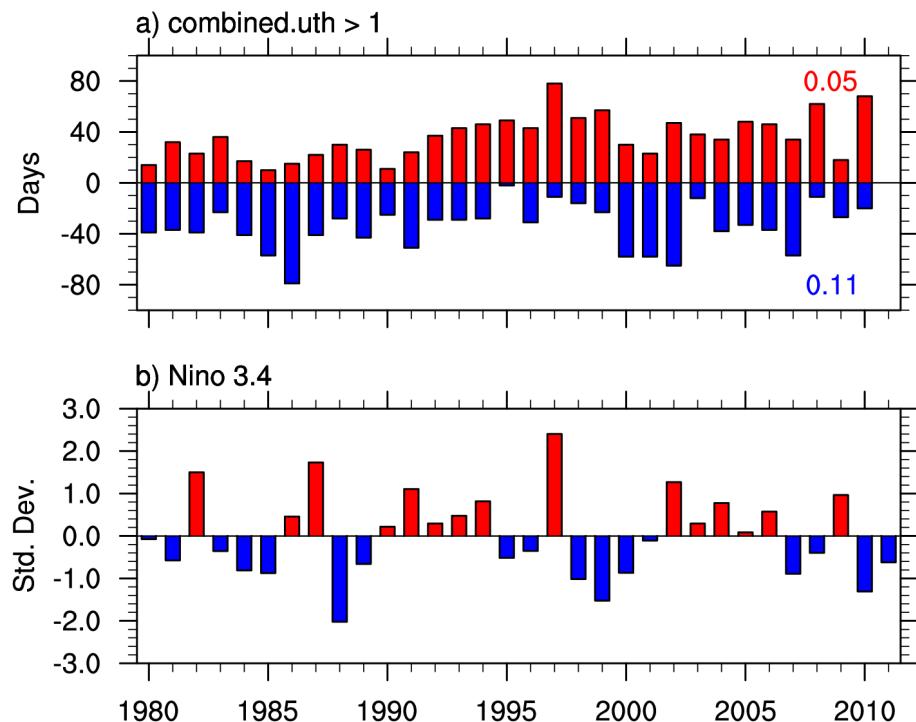
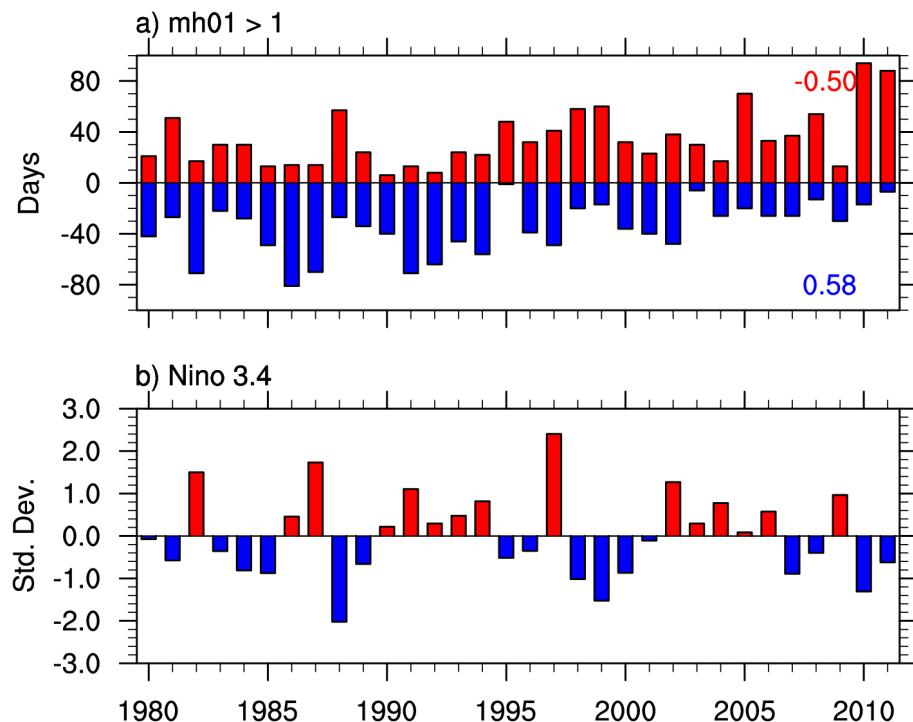
Combined UTH



Independence from ENSO

Maloney & Hartmann (2001)

Combined UTH



Head-to-Head Summary

	Maloney & Hartmann (2001)	Combined UTH	Wheeler–Hendon RMM1
Hurricanes: Central Pacific	55 - 14	40 - 19	33 - 31
Hurricanes: Mexican Coast	83 - 28	94 - 16	88 - 21
Hurricanes: Gulf of Mexico	36 - 7	31 - 12	29 - 12
% Power in 20–100 days	56	54	75
Correlation with RMM	0.60	0.76	1.00
Correlation with ENSO	-0.50 0.58	.05 0.11	0.00 0.11

Do we need an EP MJO index?

- Probably
- Both indices identify a stronger modulation of hurricanes than found with RMM
 - Even though both are correlated with RMM
- Could also be applied to other summertime MJO impacts in the Western Hemisphere