Precession-scale variability of upwelling in the Arabian Sea and its implications for proxies of Indian summer monsoon

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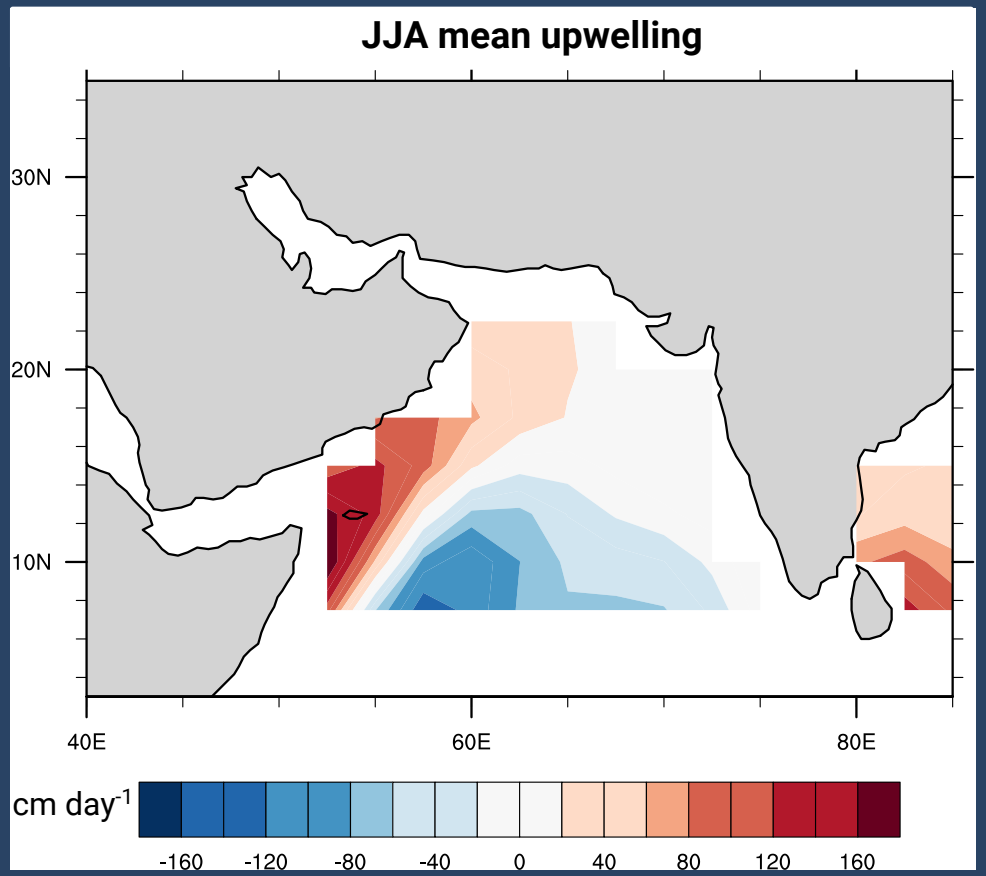
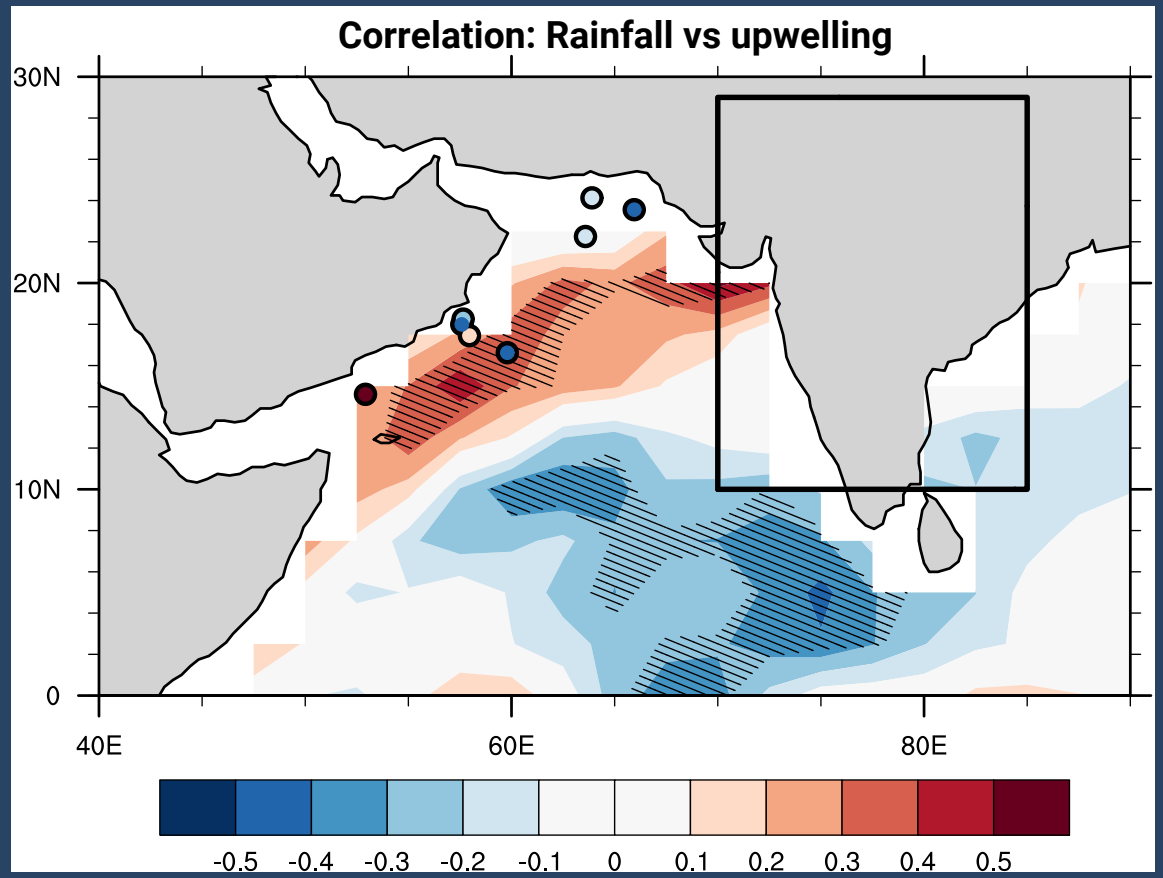
UPWELLING AS A PROXY OF INDIAN MONSOON

Modern observations; NCEP



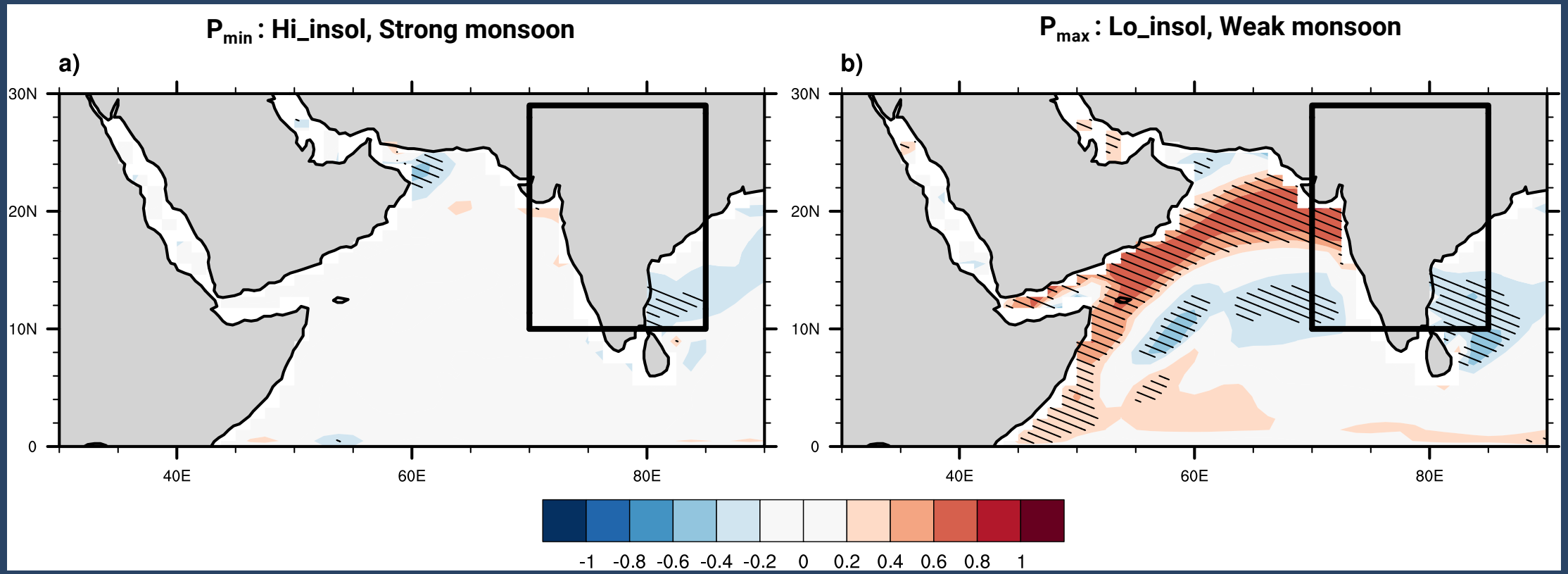
Summer upwelling in Arabian Sea, a characteristic of monsoon



Upwelling is positively correlated with monsoon.
But proxies suggest otherwise.

Jalihal et al. (2022)

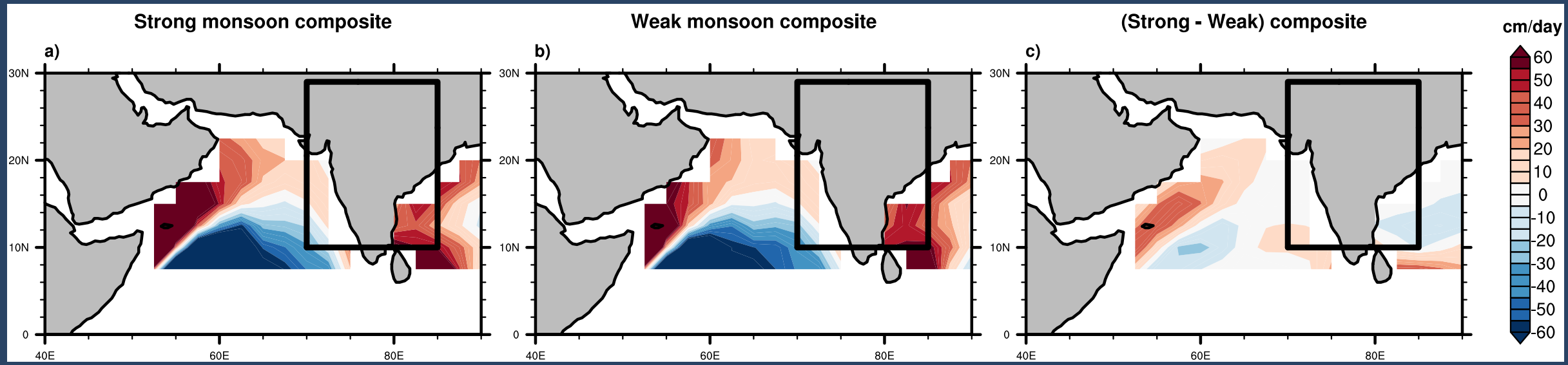
MONSOON-UPWELLING CORRELATION DIFFERENT IN DIFFERENT CLIMATES



Jalihal et al. (2022)

Significant correlation between monsoon and upwelling only in Pmax like orbital configurations.

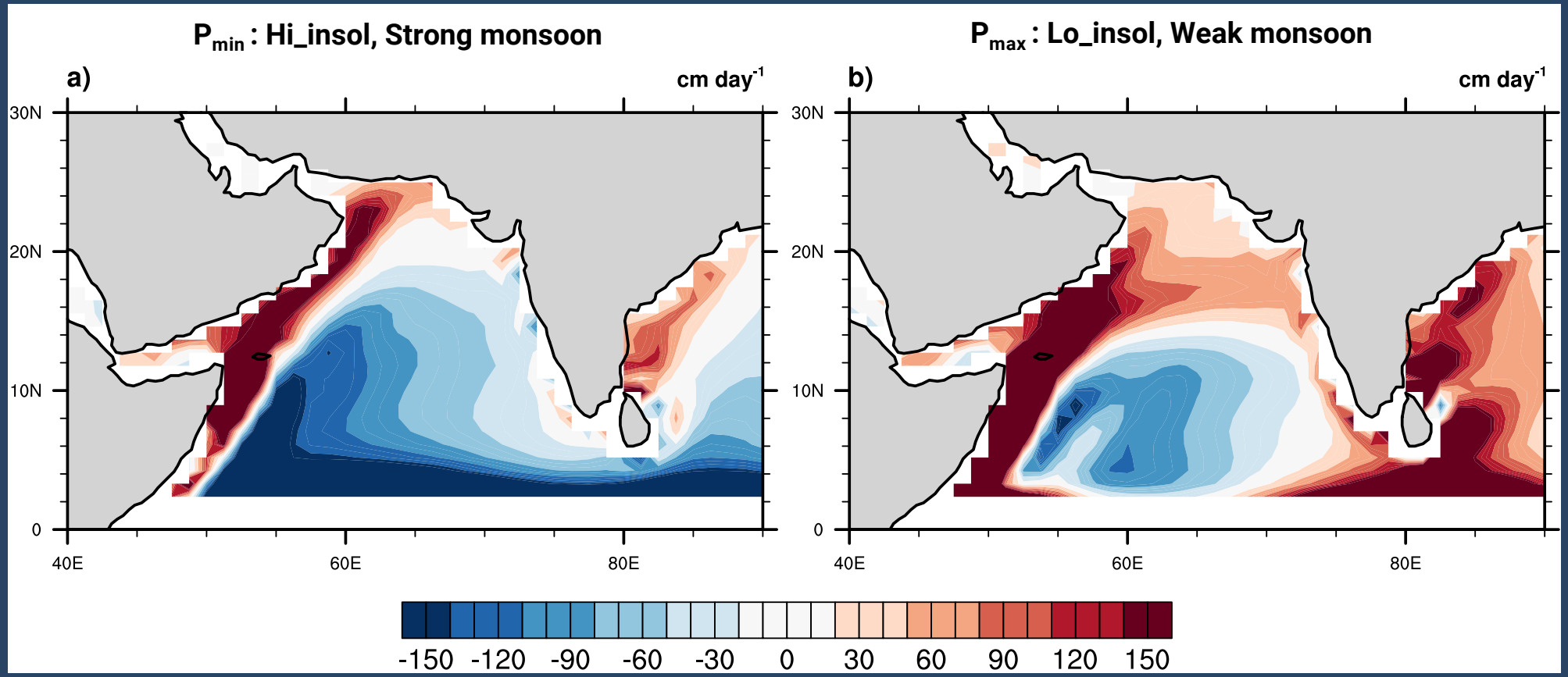
MODERN : INTERANNUAL VARIATIONS CHARACTERIZED BY CHANGES IN INTENSITY



In modern climate (Pmax like): changes in upwelling are mainly in the intensity.

Spatial pattern of upwelling does not change.

PRECESSION SCALE : SPATIAL EXTENT CHANGES

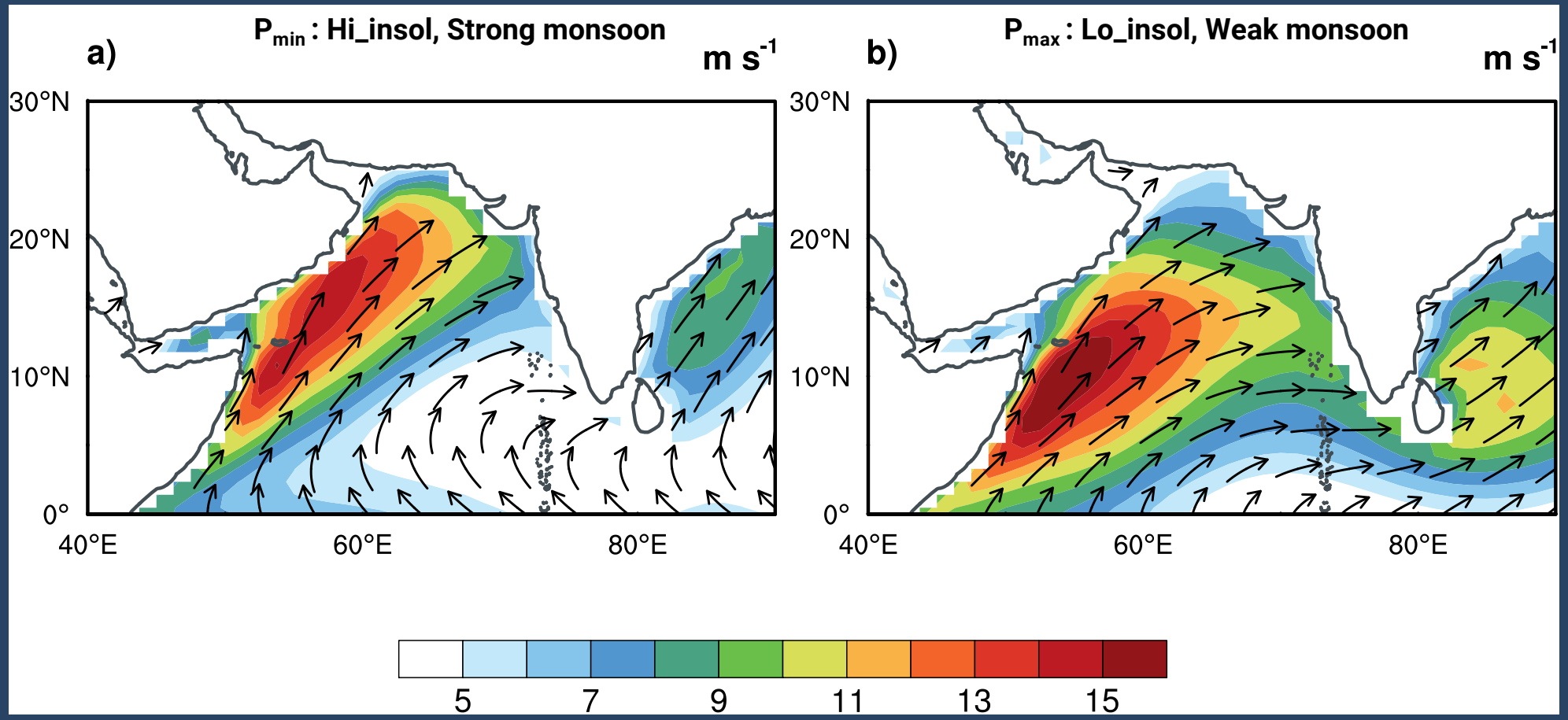


Jalihal et al. (2022)

On Precession timescales: changes in spatial extent and latitude of upwelling also prominent.

LATITUDE AND WIDTH OF LLJ CHANGE ON ORBITAL TIMESCALES

10 m winds



Jalihal et al. (2022)

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Response of the Low-Level Jet to Precession and Its Implications for Proxies of the Indian Monsoon

Chetankumar Jalihal, Jayaraman Srinivasan, Arindam Chakraborty

First published: 10 January 2022 | https://doi.org/10.1029/2021GL094760

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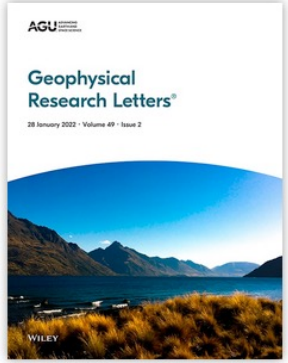

Volume 49, Issue 2
28 January 2022
e2021GL094760

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Conclusions

- Relation between Indian monsoon and upwelling is different on different timescales.

- On long timescales, factors other than Indian monsoon affect upwelling.

- Hence, proxies of upwelling do not represent the Indian monsoon and must be interpreted with care.