



**Project: - Short Term Climate Variability and Prediction**  
**Sub-Project: - Short Term Climate Variability, Predictability and Applications**  
*Assessing Changes in Characteristics of Hot Extremes Over India in a Warming Environment and their Driving Mechanisms*

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**OBJECTIVES**

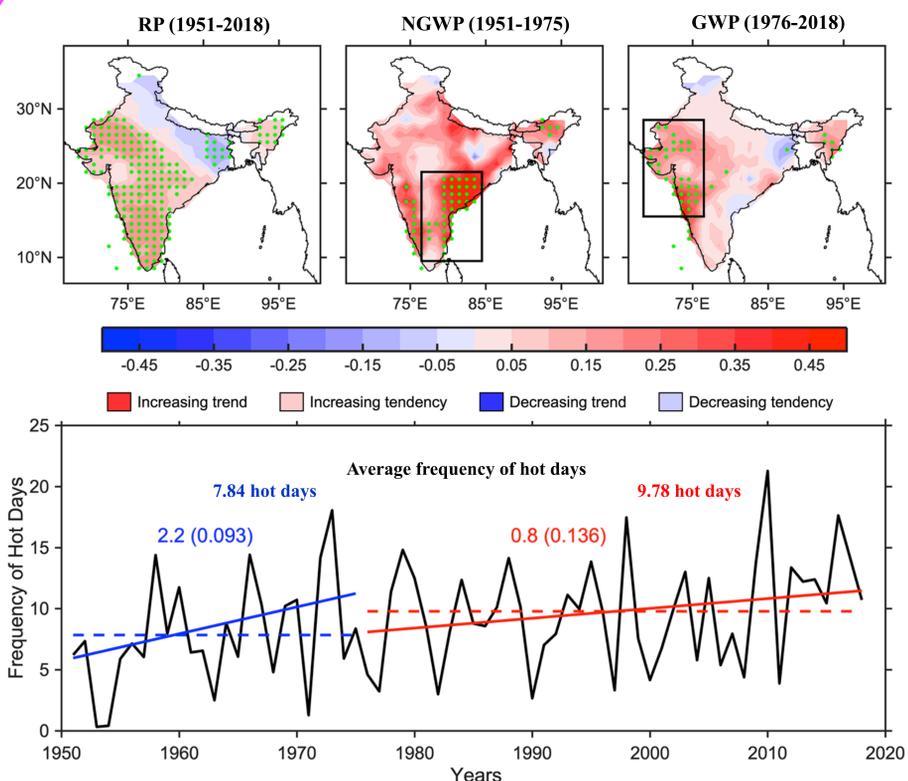
- ❖ Diagnose change in characteristics of hot extremes over India before and after the 1976 climate shift.
- ❖ Explore driving mechanisms (including atmospheric circulations, local factors, and natural variability) responsible for such disparities.

**DATASETS**

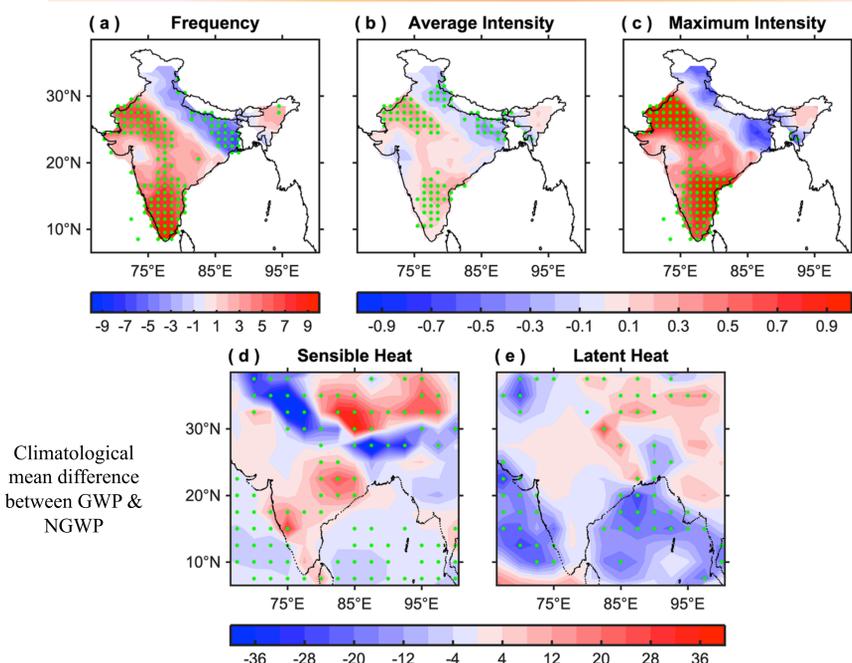
- ❖  $T_{Max}$  data ( $1^\circ \times 1^\circ$ ) from IMD.
- ❖ Analyze relationship of atmospheric & surface parameters with hot extremes, NCEP/NCAR reanalysis data is used.
- ❖ Investigate SST forcing of hot days frequency, ERSST.v5 monthly data ( $2^\circ \times 2^\circ$ ) is used.

**RESULTS**

**Spatiotemporal trends in the frequency of hot days**

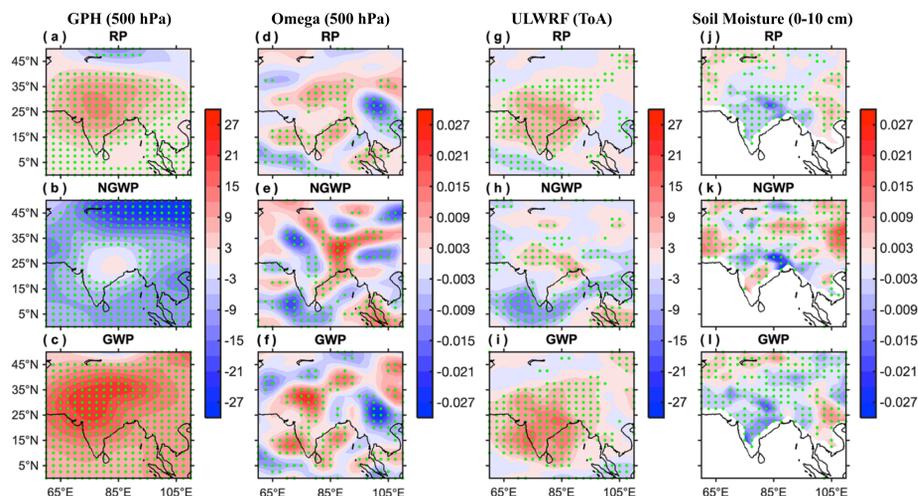


**Change in characteristics of hot extremes & associated heat fluxes**

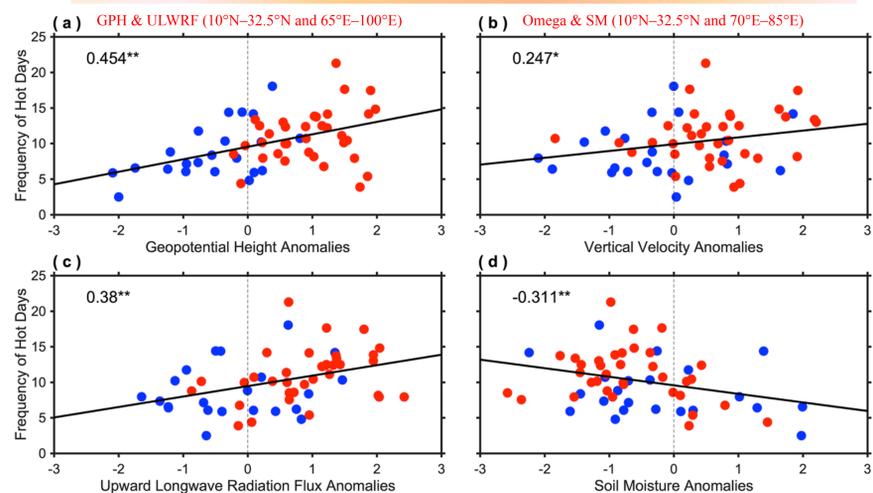


- ❖ IGP is amongst the most heavily irrigated regions in the world.
- ❖ Irrigation affects surface energy budget by enhancing LHF & deteriorating SHF.
- ❖ Due to intensive irrigation over IGP, vegetation & evapotranspiration increased substantially.
- ❖ This increase in evapotranspiration has led to smaller portion of SHF vs. LHF over most parts of IGPs during GWP, compared to NGWP.
- ❖ This resulted a decrease in near-surface air temperatures over that region.

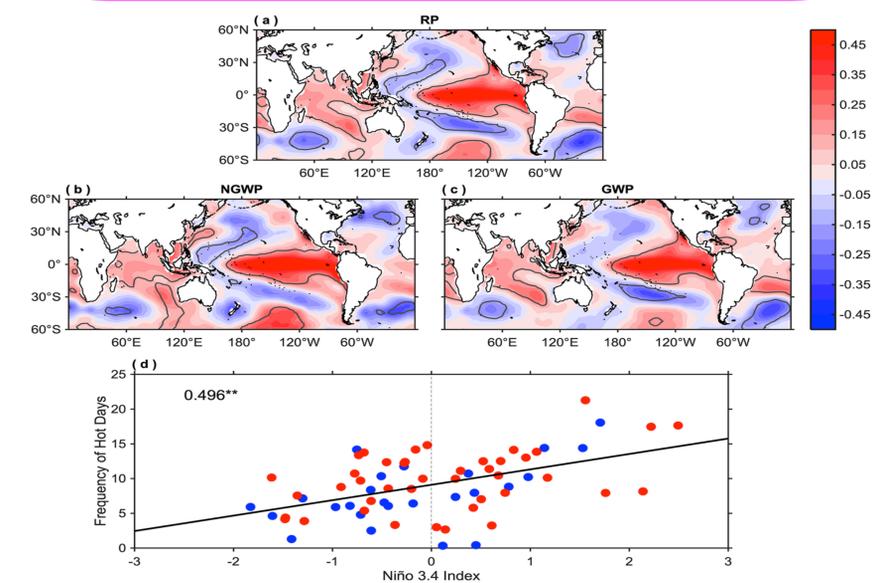
**Composites of atmospheric & surface parameters allied with hot extremes**



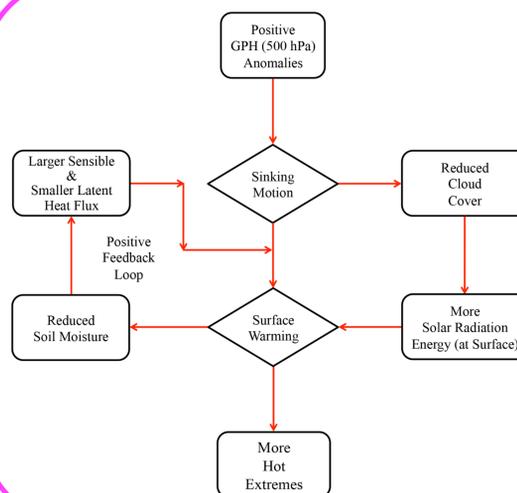
**Relationship of atmospheric & surface parameters allied with hot extremes**



**Role of ENSO in modulating hot extremes**



**Schematic illustrating Physical Mechanism of hot extremes**



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Joshi, M.K., Rai, A., Kulkarni, A., Kucharski, F. Assessing Changes in Characteristics of Hot Extremes Over India in a Warming Environment and their Driving Mechanisms. *Sci Rep* 10, 2631 (2020). <https://doi.org/10.1038/s41598-020-59427-z>