

ASSESSING THE PHYSIOLOGICAL RESPONSES OF REGIONAL INDIAN FOREST ECOSYSTEMS TO CLIMATE STRESSORS USING QUANTILE REGRESSION



References

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Region	and
Region	

atial Resolution	Temporal Resolution
50 m	16 day
00 m	8 day
0 m	8 day
3 km	Daily
25°	Daily

Preliminary Results:

NDVI Anomalies and its relationship with climatic conditions:

- Based on the *slopes of quantile regression*, we deduce that:
- Region compared to T2m
- temperature and Western Ghat-Deciduous species more sensitive to Soil Moisture.
- temperature



- shows diminished responsiveness. pronounced impacts on vegetation health.

Exceedance of physiological thresholds and safety margins:

- multiple instances where vegetation surface temperatures had reached critical temperature levels and operating close to physiological thermal thresholds.
- we calculate the *percentage of occurrences* for each category combination of Surface Temperature Categories and PFT Regions in the Western and Eastern Ghats, select scenario when **GPP<0** and then plot the heatmap with those percentages.

Limitations

- Surface temperatures are using LST remote sensing product, bare-soil mixing possible
- Physiological thermal threshold used are for leaf level



• Negative NDVI anomalies can occur independently of T2m anomalies, while the maximum distribution of NDVI anomalies and RZSM z-score jointly suggests a clear dependence on soil moisture deficit, highlighting a water availability-driven relationship.

- RZSM has stronger effect on both deciduous and evergreen vegetation types present in Western Ghats Region and Eastern Ghats

When compared between deciduous and evergreen species, Deciduous species are more sensitive and vulnerable to heat and drought

When compared deciduous species between two regions, Eastern Ghat-Deciduous species were found to be more sensitive

When compared evergreen species between two regions, Eastern Ghat -Evergreenspecies more sensitive to Soil Moisture and

In the Eastern Ghat region-Deciduous habitat, higher quantiles of soil moisture exhibit greater slopes compared to lower quantiles, suggesting that denser or healthier vegetation responds more sensitively to temperature variations, while already stressed vegetation

Conversely, in Western Ghat-Deciduous areas, lower quantiles of vegetation greenness demonstrate higher slopes, indicating that sparse vegetation may be more sensitive to temperature fluctuations due to reduced canopy cover, potentially leading to more





