

Assessing the Potential of Diurnal Land Surface Temperature at High Spatial Resolution for Monitoring Heatwaves Over India

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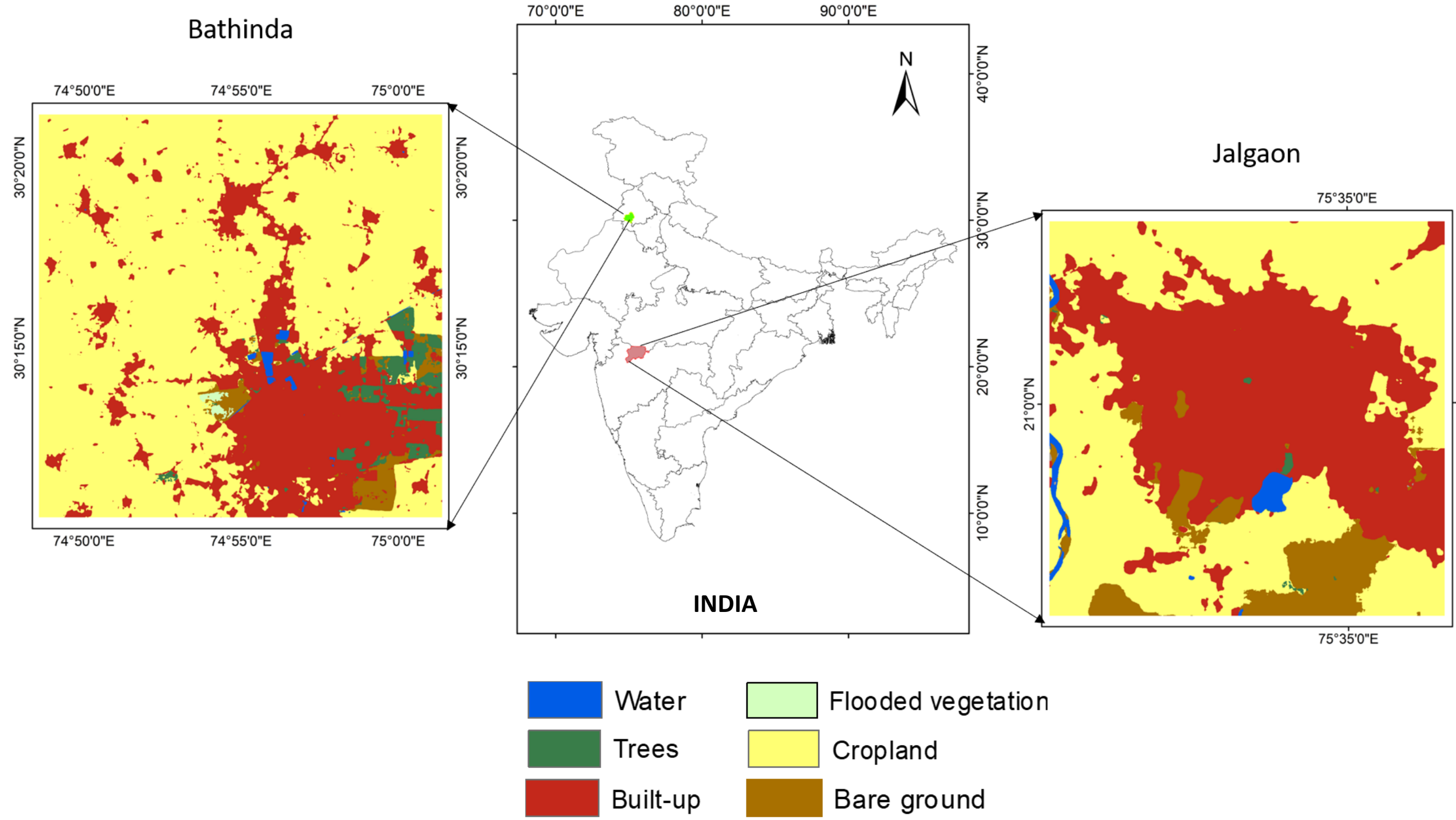
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Paper No : S130

Introduction

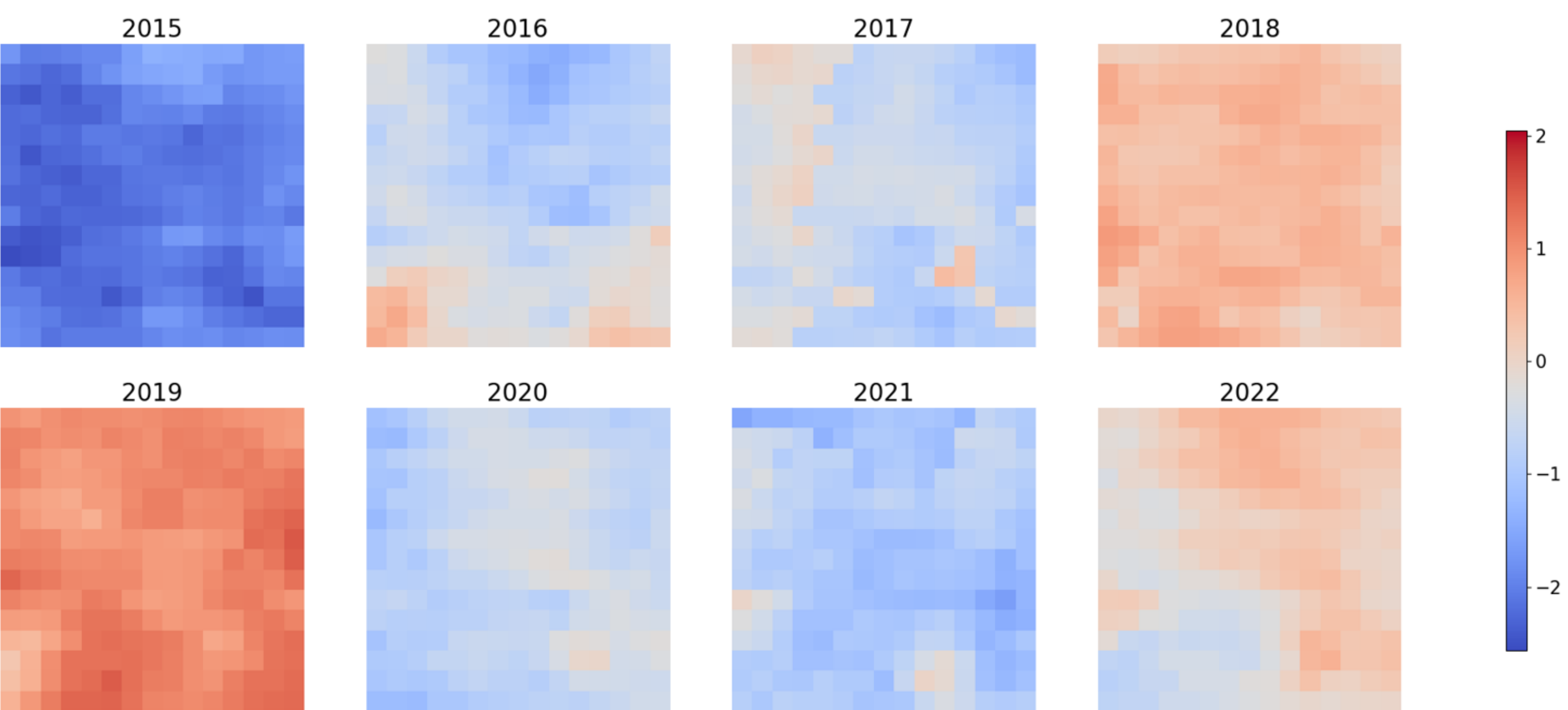
- Heatwave events are becoming frequent and intense over India.
- Sparse network of air temperature observations are not helpful for understanding the localized effects of heatwaves.
- The utility of land surface temperature (LST) and its diurnal cycle (DTC) at high spatial resolution is explored for monitoring the effect of heatwaves.
- A hybrid approach to derive the DTC of LST at fine resolution is proposed.

Study Area

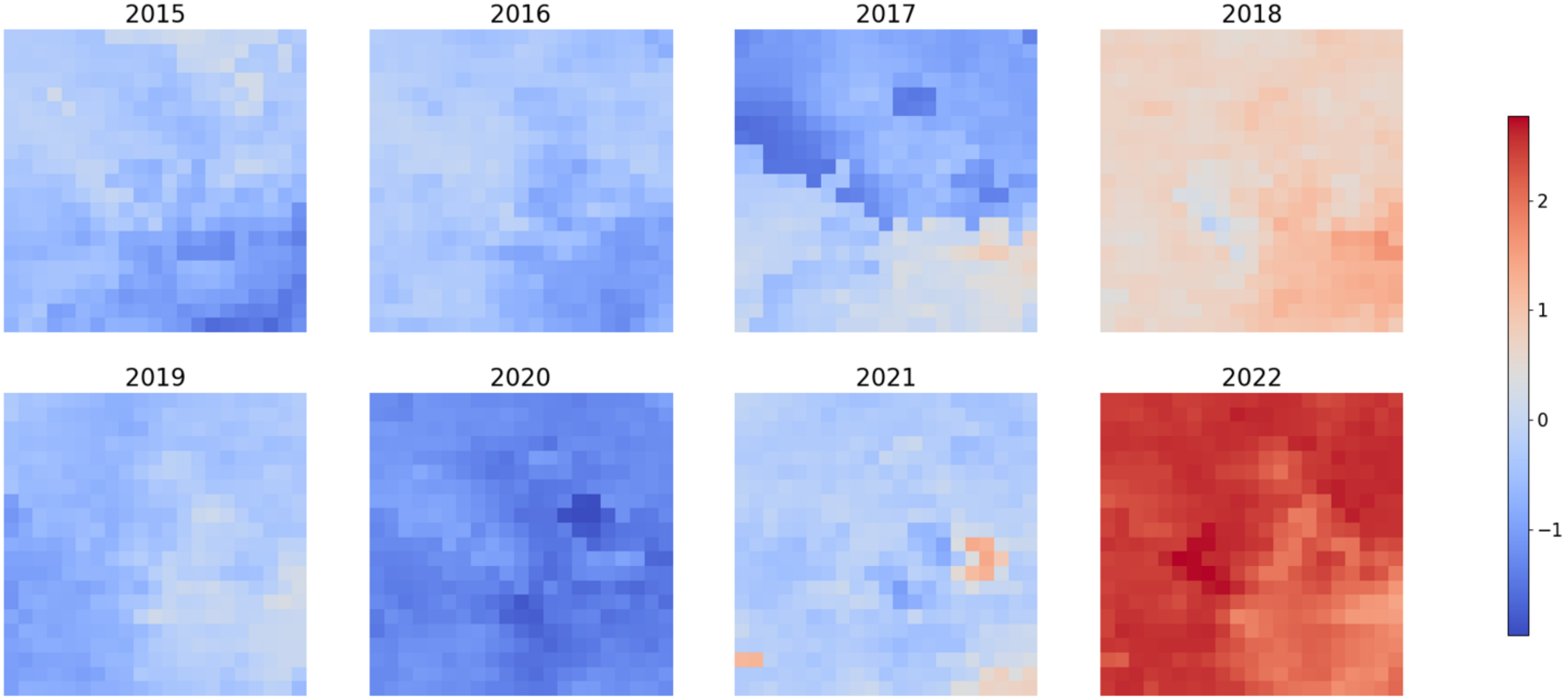


Identification of heatwave events

The heatwave events were identified using LST anomalies from MODIS.

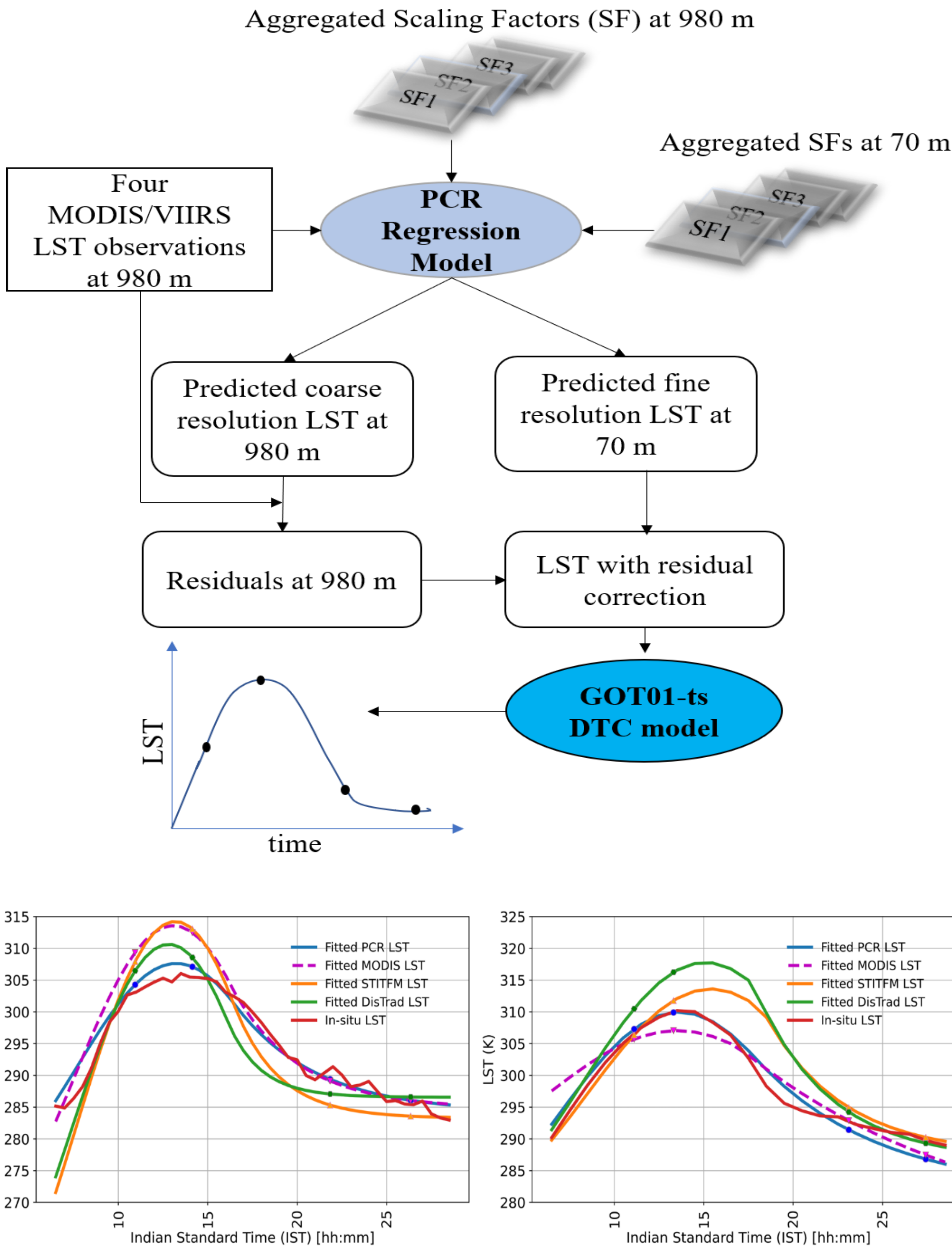


Thermal anomaly map, Jalgaon, Maharashtra, India

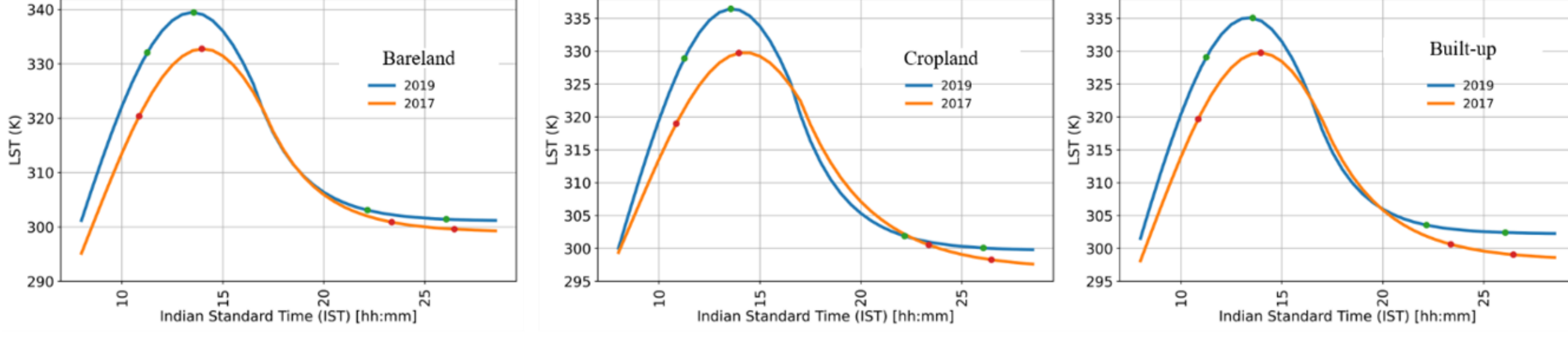


Thermal anomaly map, Bathinda, Punjab, India

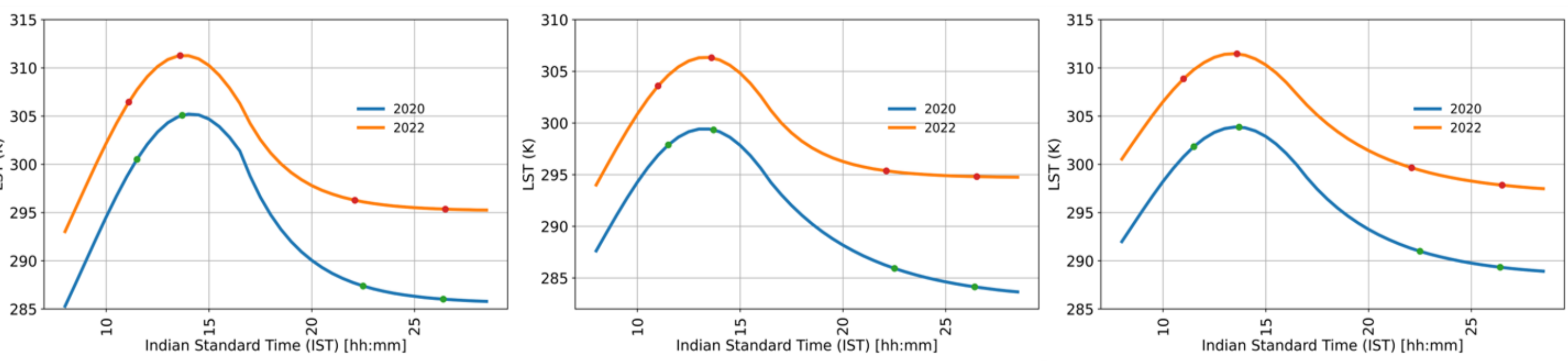
LST disaggregation and DTC modelling



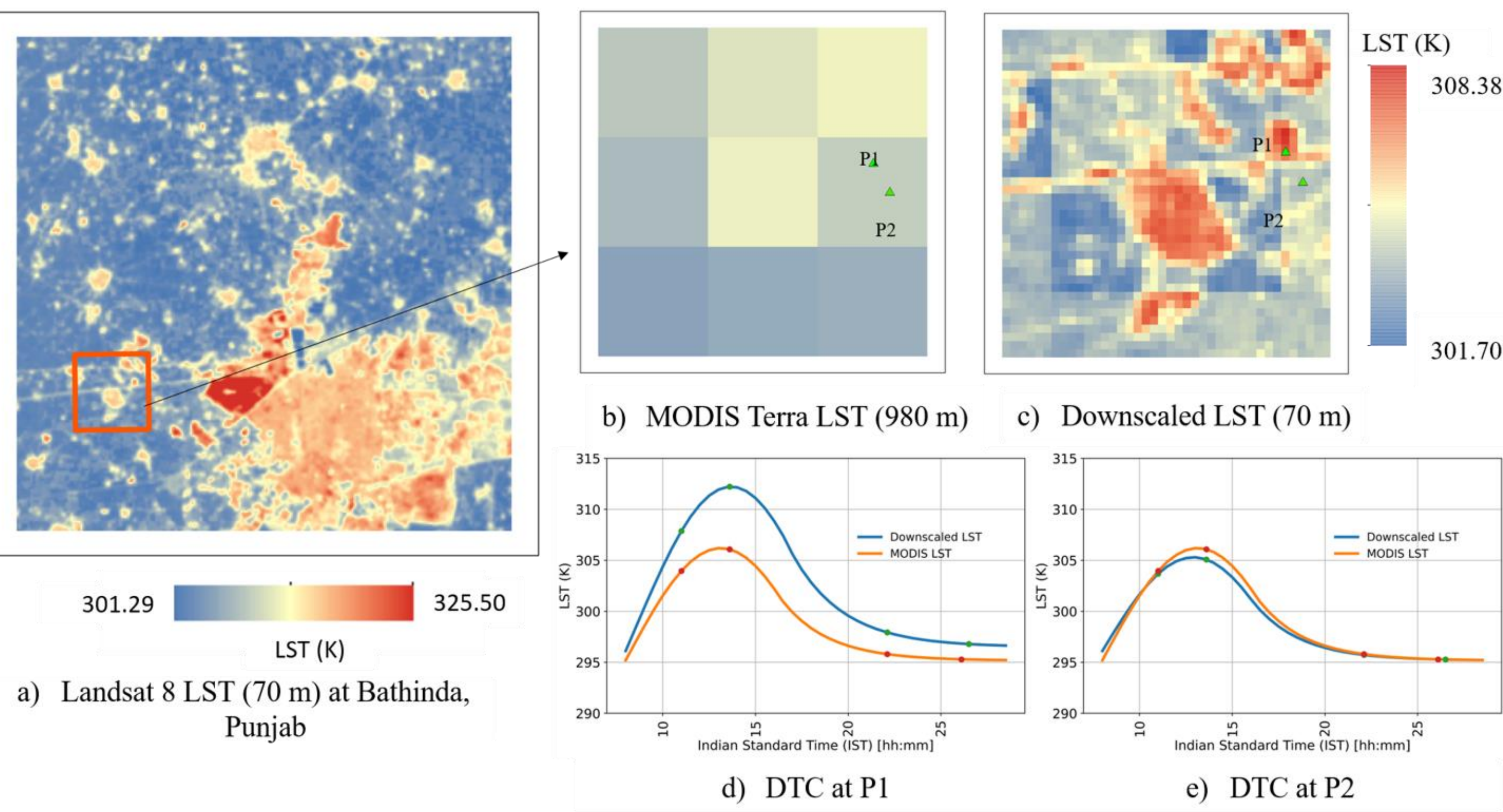
Highlights



DTC derived for a single day in April, 2017 & 2019 at Jalgaon using PCR disaggregation & GOT01-ts DTC model



DTC derived for a single day in March, 2020 & 2022 at Bathinda using PCR disaggregation & GOT01-ts DTC model



Comparison of the LST and DTC variation of two points at two different scales (980 m & 70 m)

Conclusions

- High resolution thermal data is indispensable for understanding the dynamics of heatwaves at local levels.
- LST can be used as proxy along with heat stress index to monitor heat events at a finer scale.
- Identifying hotspots and time at which temperature peaks can help in mitigating the impact of heatwaves.

