

## Motivations

- With increasing urbanization and heat waves across the world, synergistic UHI-heat wave interactions (intensification of UHI during heat waves) have received much attention.
- UHI-heat wave interactions could vary with characteristics of heat waves. However, previous studies have not examined this aspect.

## Objectives

- Examine UHI-heat wave interactions in Seoul, South Korea
- Investigate their associations with meteorological conditions and accompanying synoptic patterns

## Data and methods

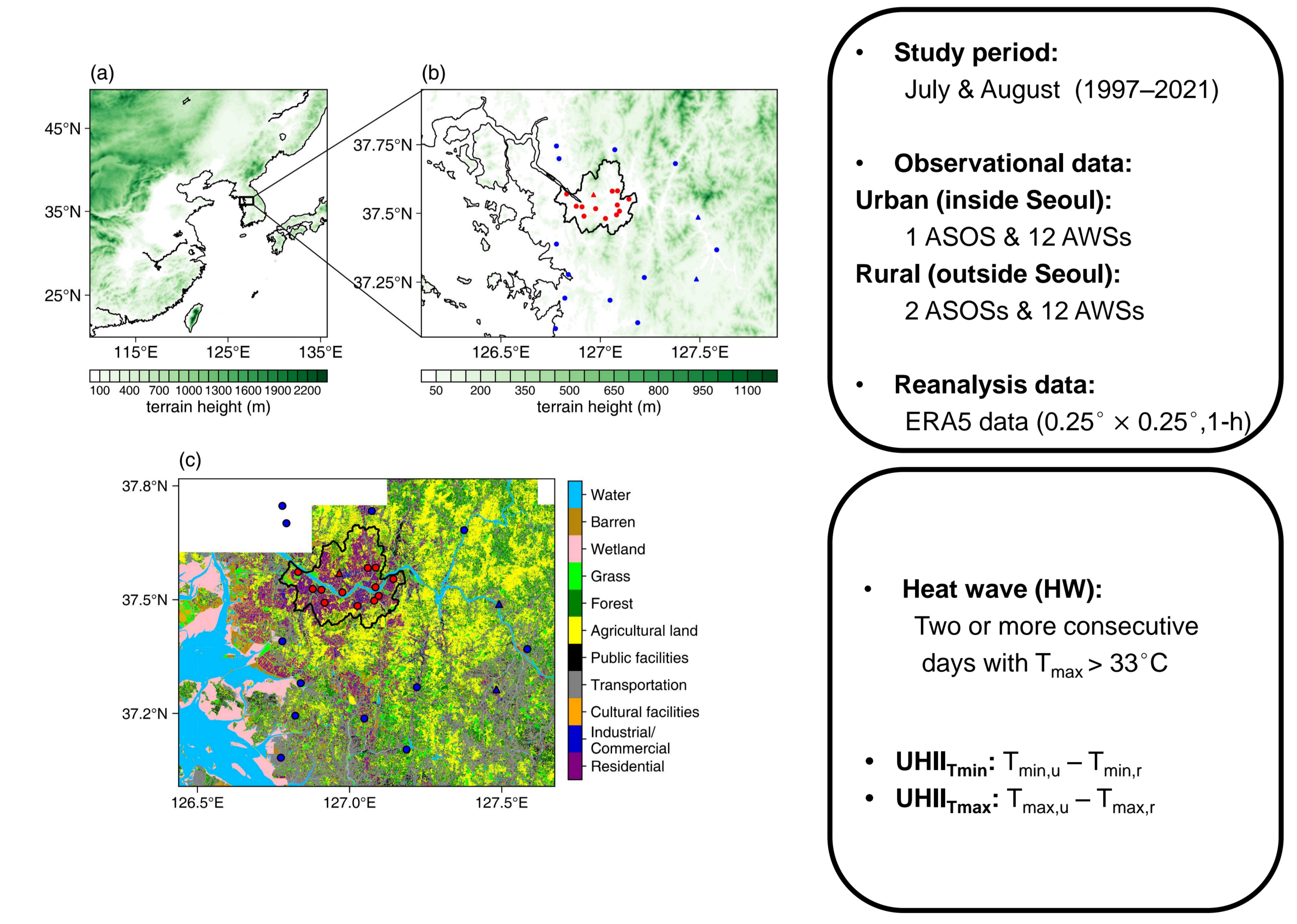


Figure 1 Locations of the ASOSs (triangles) and AWSs (circles) in the study area with terrain height and land cover.

## Results

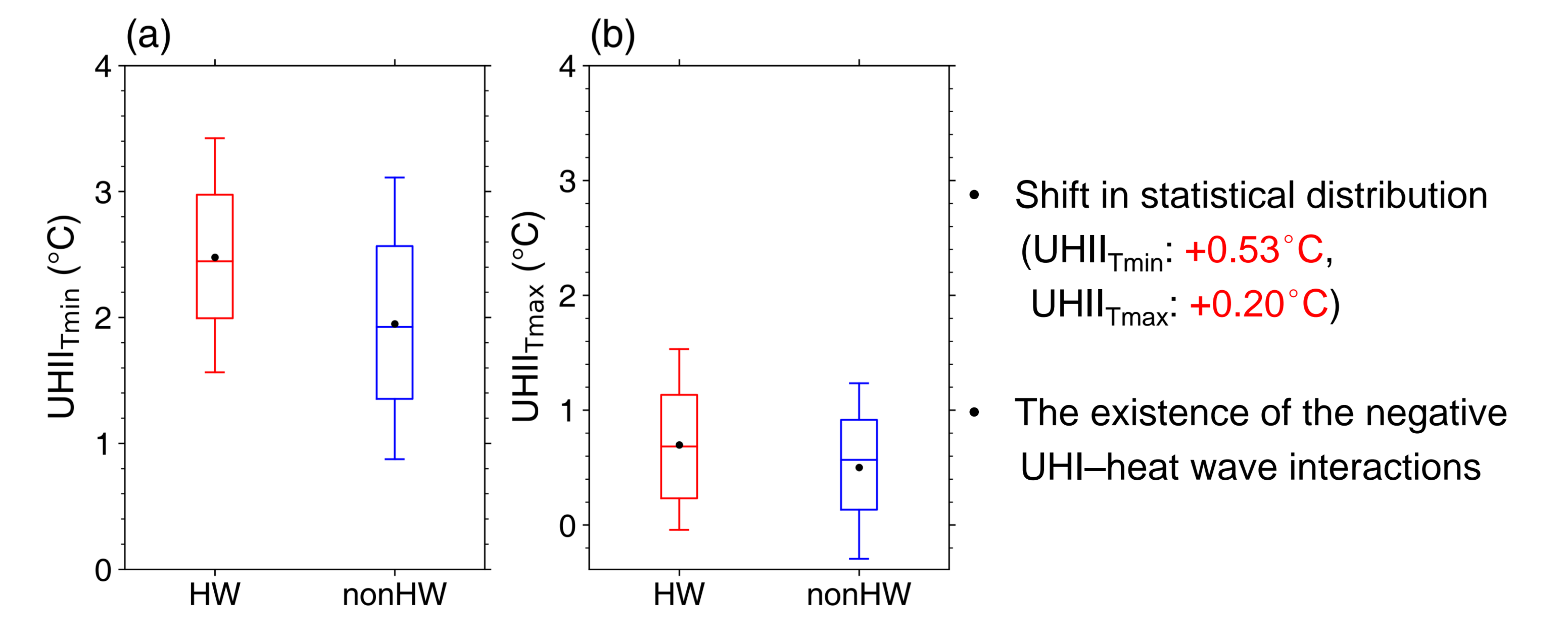


Figure 2 Box plots of (a) UHII<sub>Tmin</sub> and (b) UHII<sub>Tmax</sub> under HW and nonHW.

## Results

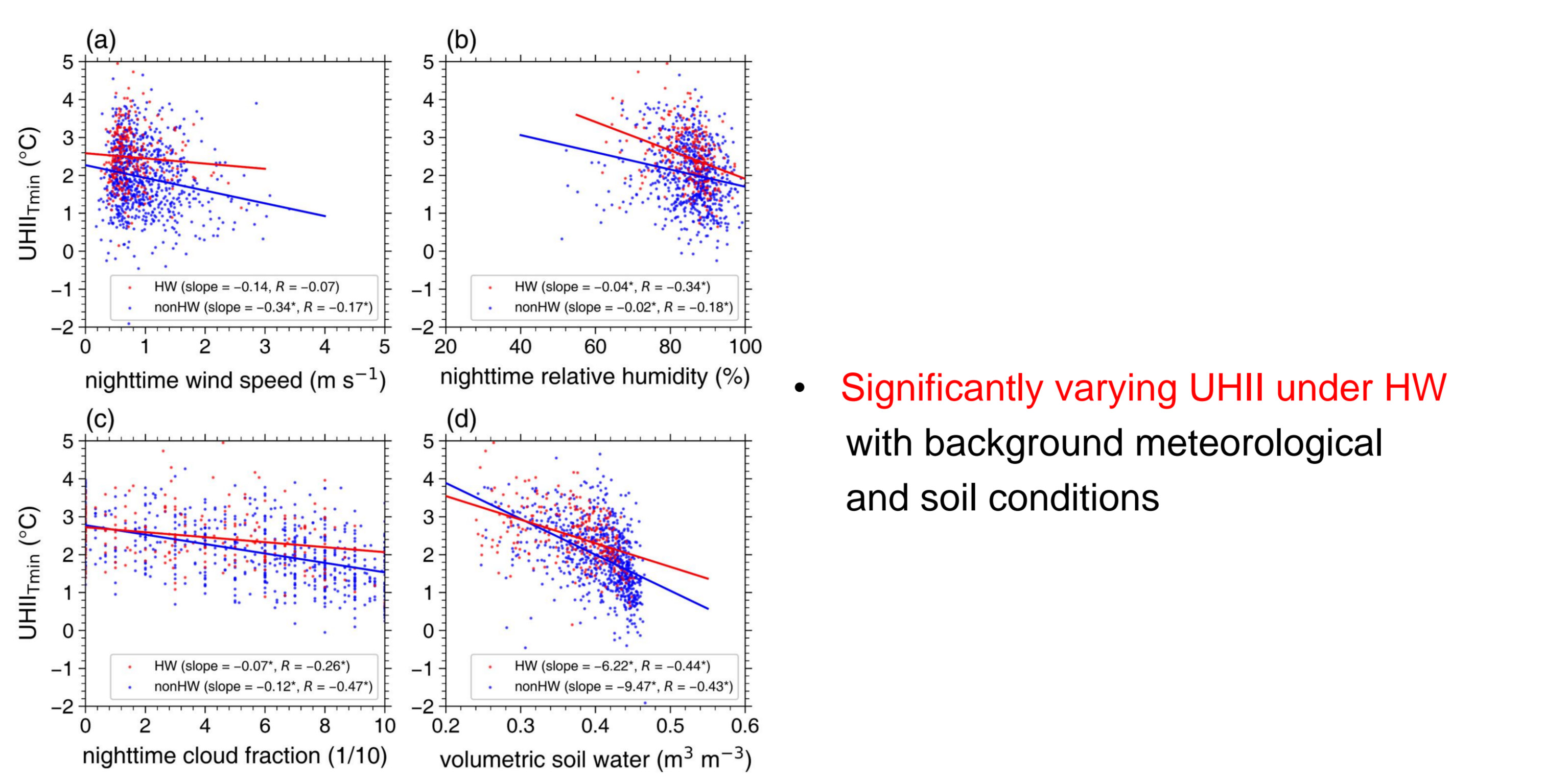
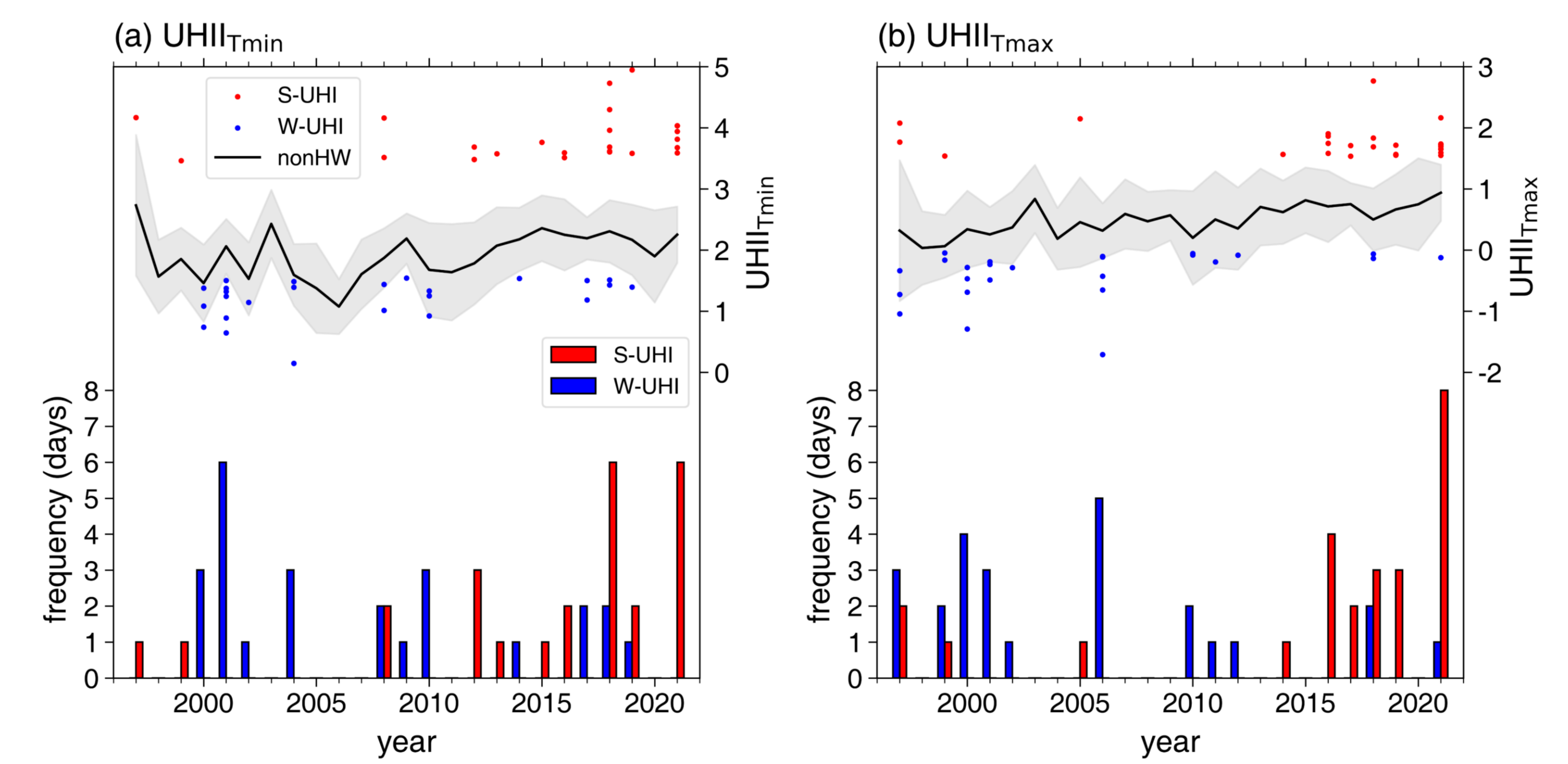
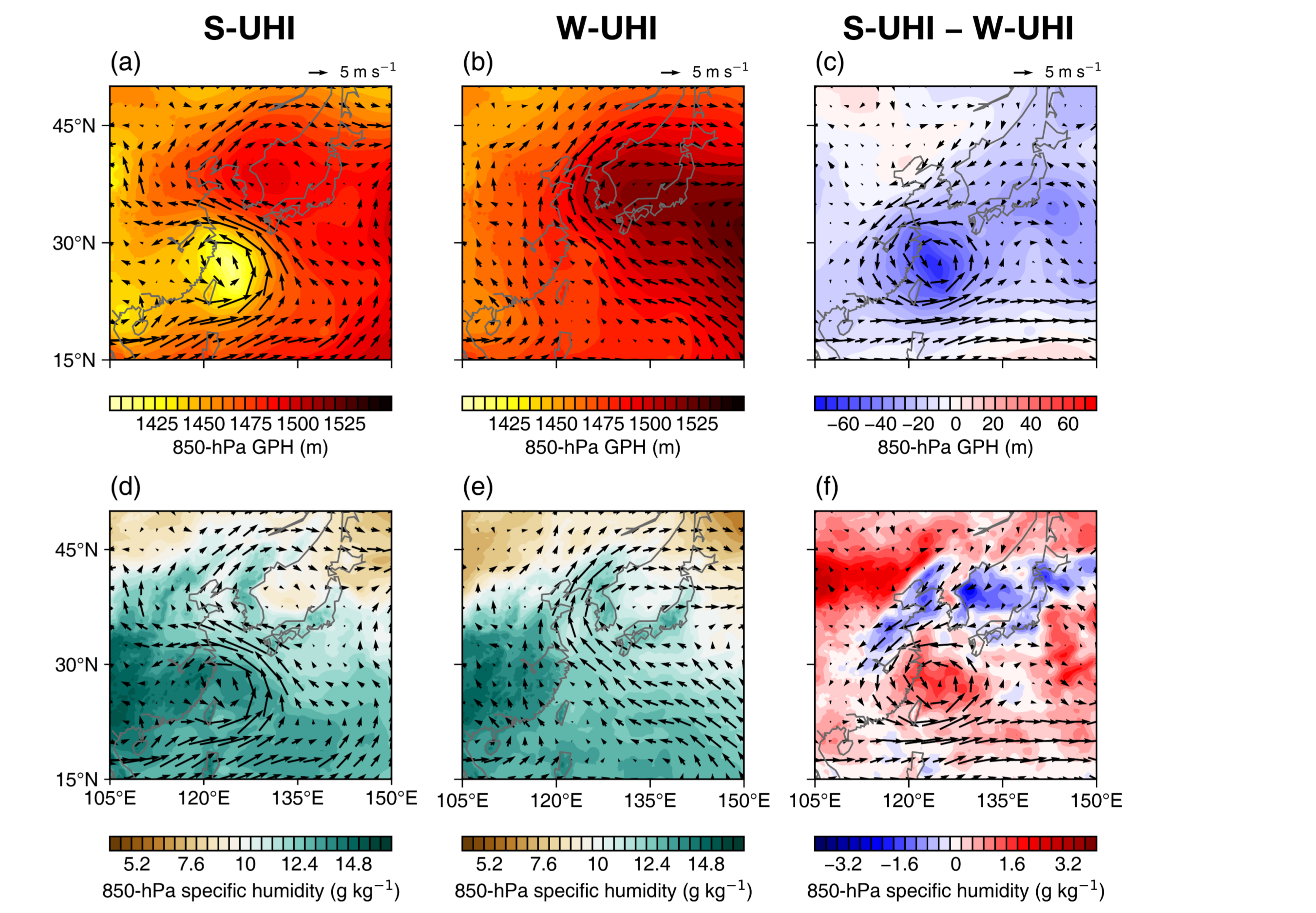


Figure 3 Scatterplots of UHII<sub>Tmin</sub> versus (a) nighttime wind speed, (b) relative humidity, and (c) cloud fraction and (d) volumetric soil water for HW and nonHW, respectively.



## Conclusions

- Overall, UHIs strengthen under HW, indicating synergistic UHI-heat wave interactions
- Both positive and negative UHI-heat wave interactions appear, depending on meteorological conditions and synoptic patterns under HW
- The prominent positive UHI-heat wave interactions are frequent in recent years



- S-UHI:** hot, calm, dry, and clear HW with strong subsidence. Pacific-Japan (PJ) pattern (a north-south dipole pattern).
- W-UHI:** less hot, less calm, humid, and cloudy HW with weak subsidence. The expansion of the western North Pacific subtropical high (WNPSH).

Figure 5 Composite fields of 850-hPa geopotential height and specific humidity for the S-UHI and W-UHI days based on UHII<sub>Tmin</sub> and their respective differences.

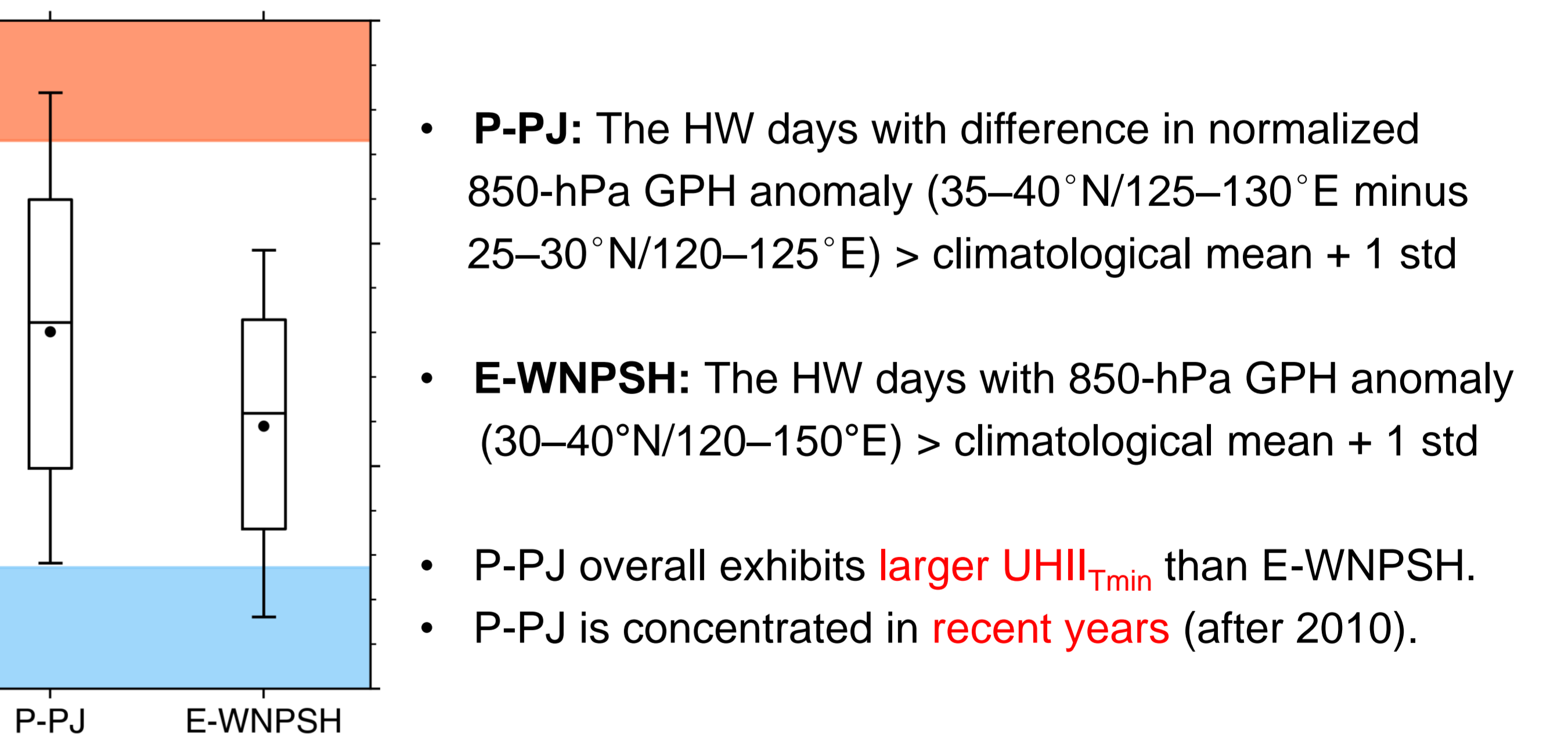


Figure 6 Box plot of UHII<sub>Tmin</sub> under P-PJ and E-WNPSH.

## References

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