Supplementary information for *Reliable heatwave attribution based on successful operational weather forecasts*

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S1 Methods-supporting figures

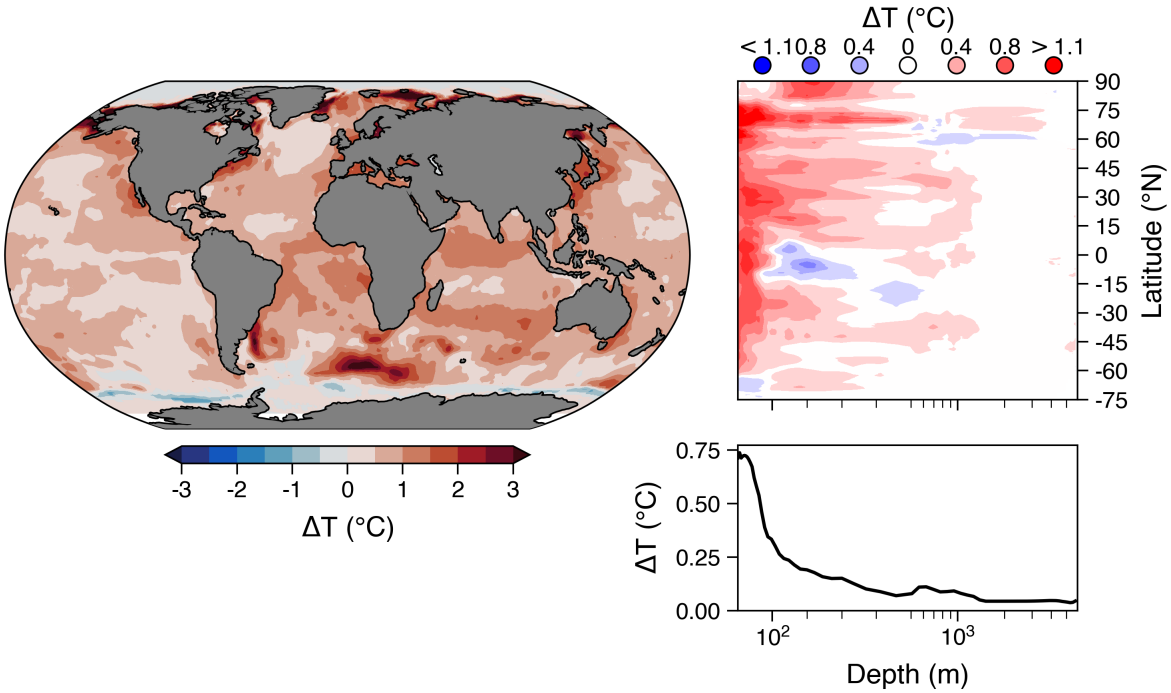

Figure S1: **The initial ocean state perturbation applied. Left panel:** map of the surface temperature perturbation. **Inset:** timeseries of annual maximum temperatures for the same dotted region. **Top right panel:** map of zonally averaged temperature perturbations as a function of depth. **Bottom right panel:** globally averaged temperature perturbation as a function of depth. Note that the x-axis switches from a linear to logarithmic scale at a depth of 500m.

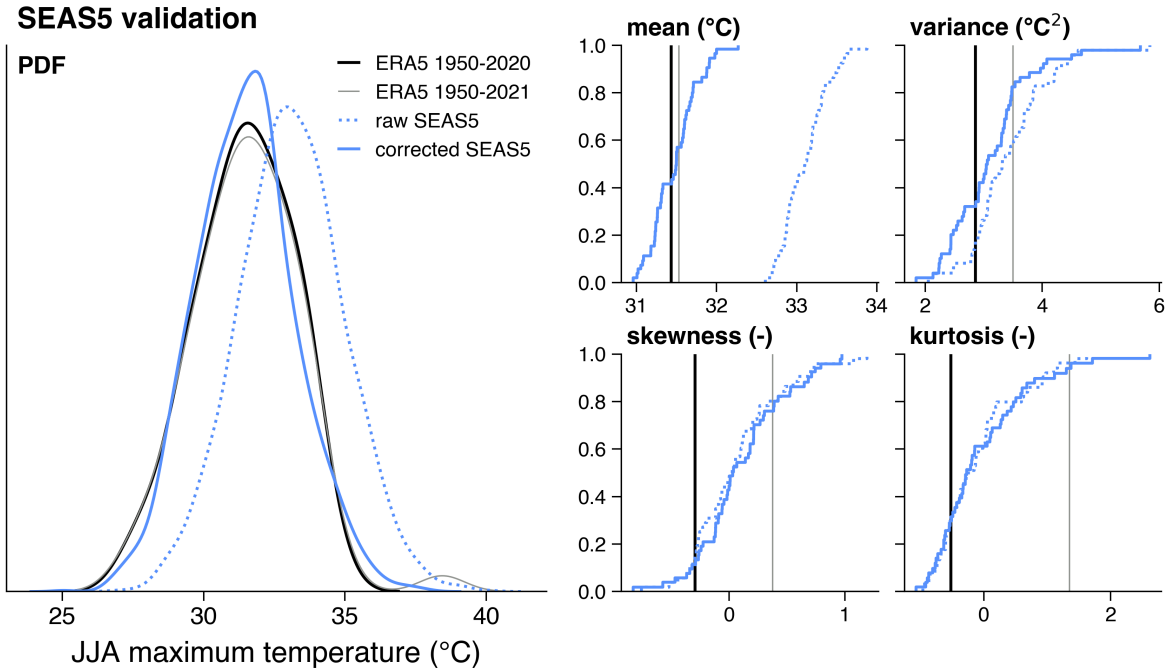

Figure S2: **Validation of the bias correction applied to the SEAS5 seasonal forecast simulations**, following[1] Figure 2.

S2 Additional supplementary figures

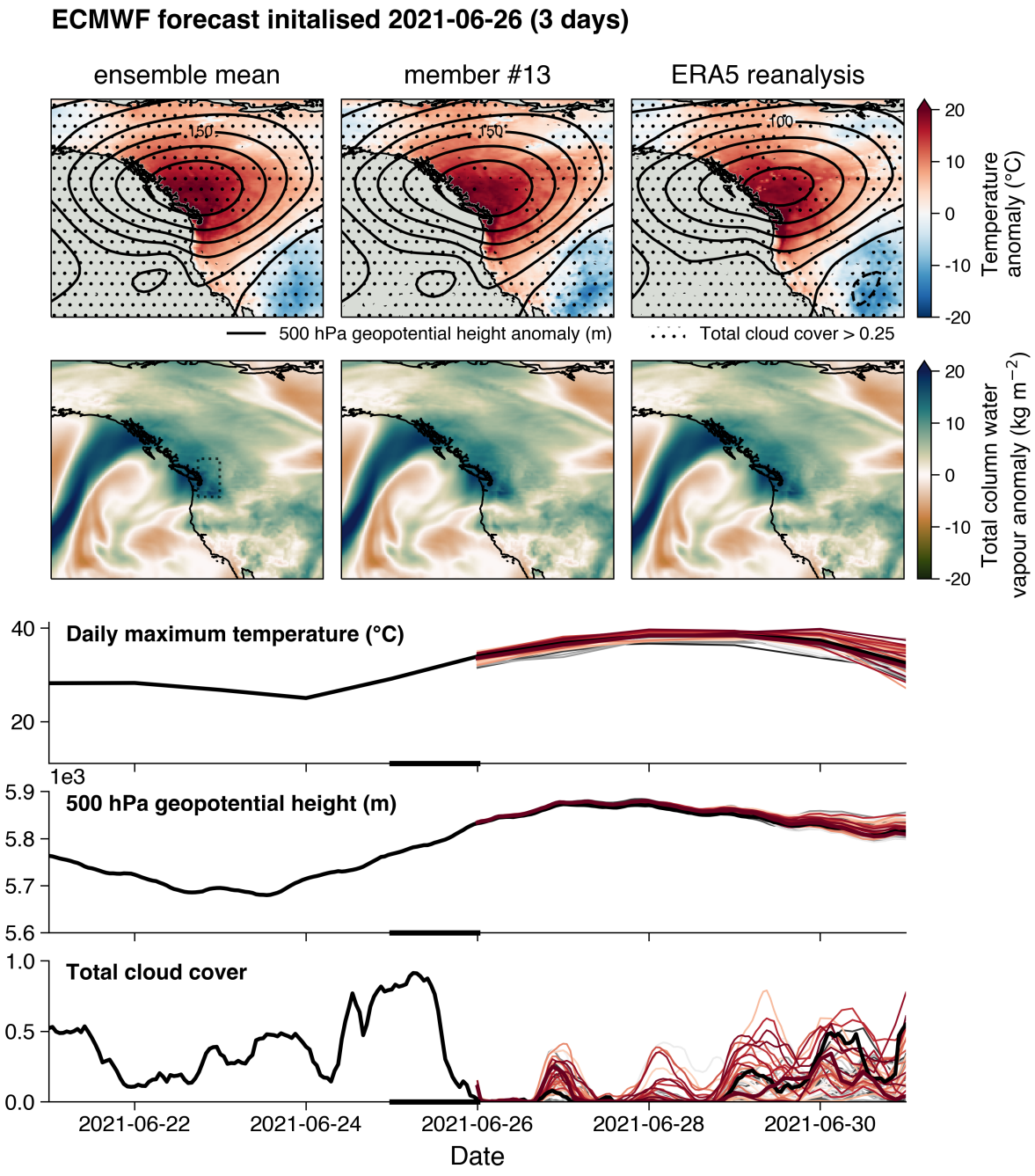

Figure S3: **Drivers of the PNW heatwave and their predictability in the forecast initialised 2021-06-26 (3 days).** As Figure 2, but for the forecast initialised on 2021-06-26.

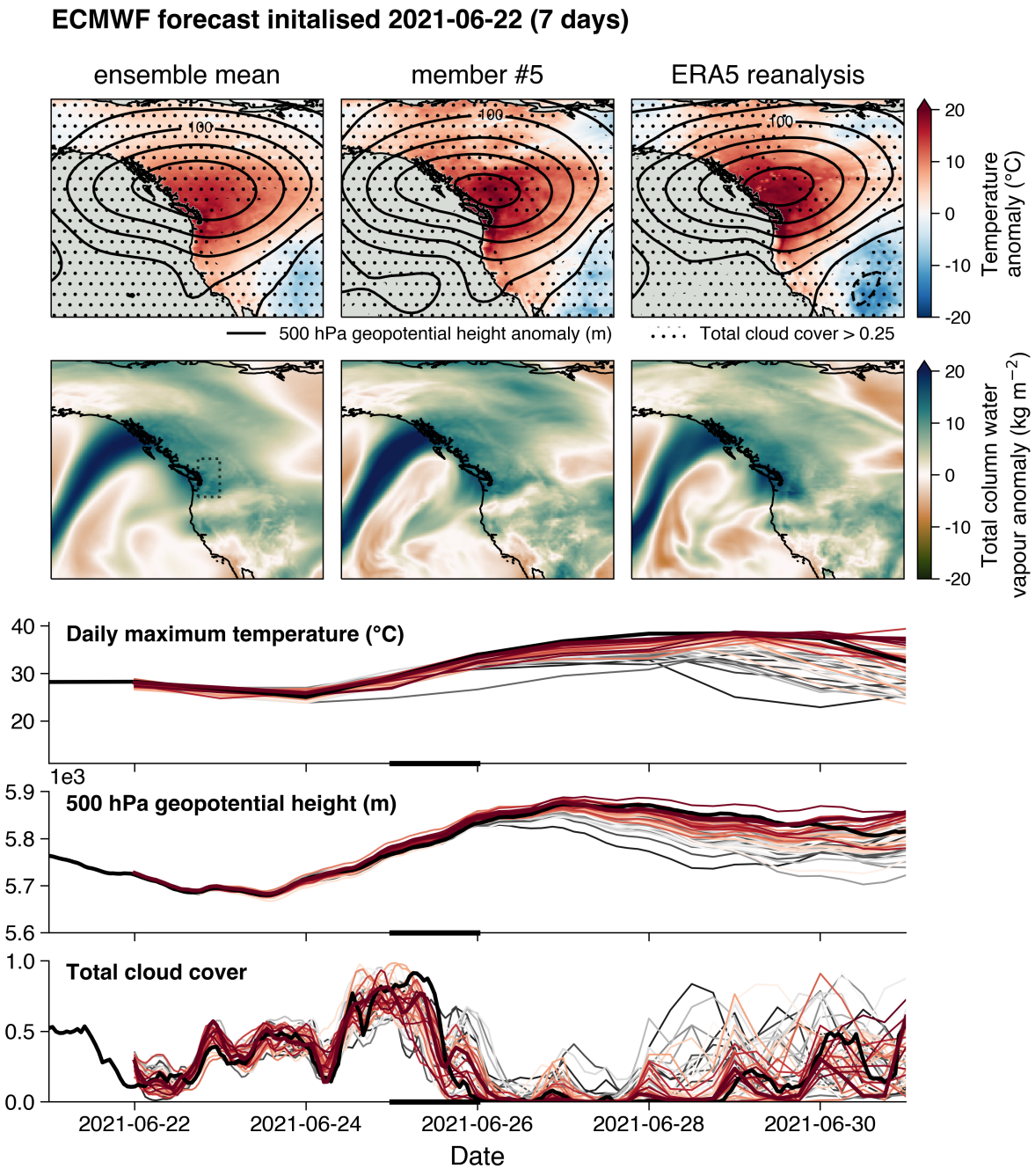

Figure S4: **Drivers of the PNW heatwave and their predictability in the forecast initialised 2021-06-22 (7 days).** As Figure 2, but for the forecast initialised on 2021-06-22.

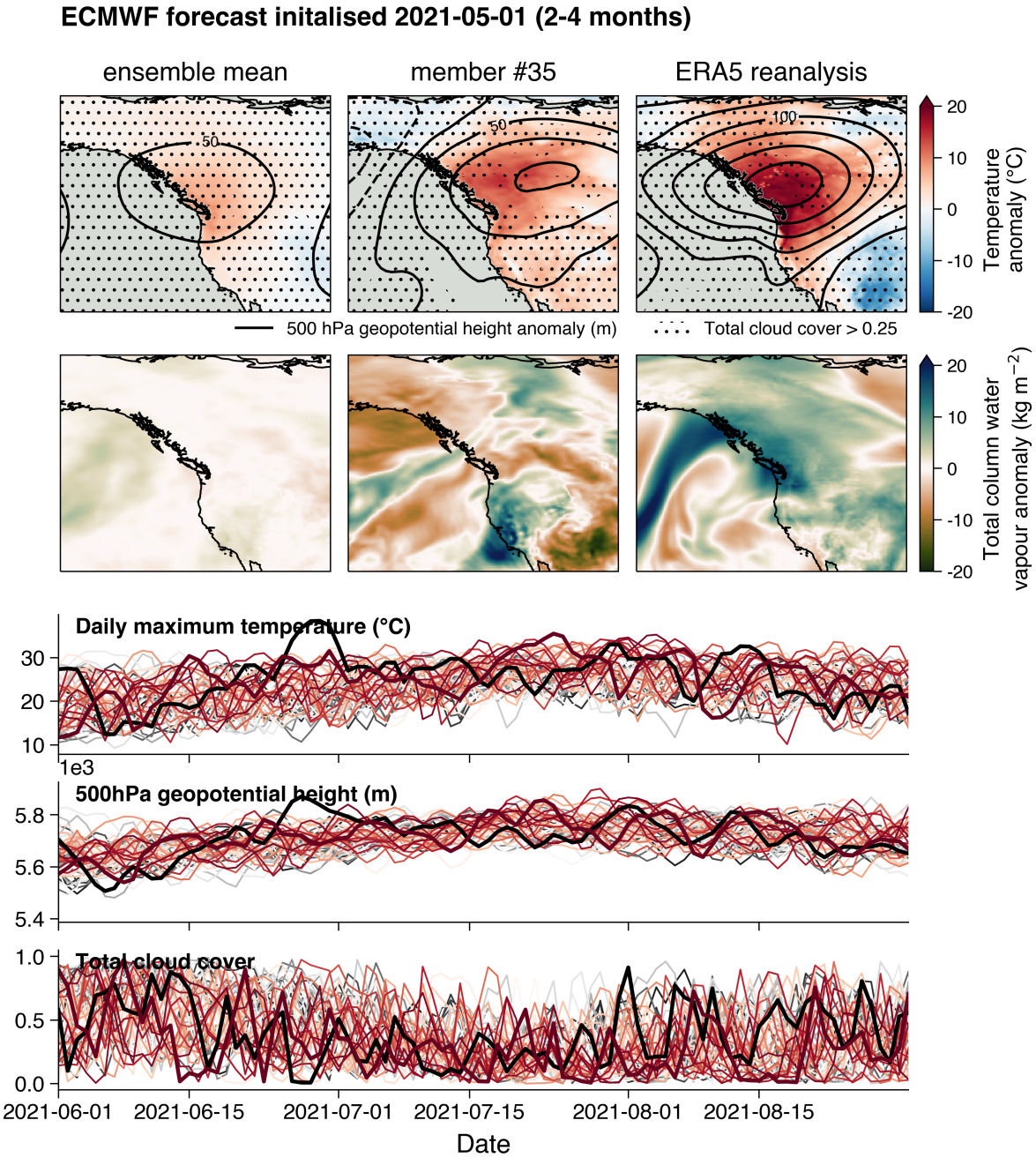

Figure S5: **Drivers of the PNW heatwave and their predictability in the forecast initialised 2021-05-01 (2-4 months).** As Figure 2, but for the forecast initialised on 2021-05-01.

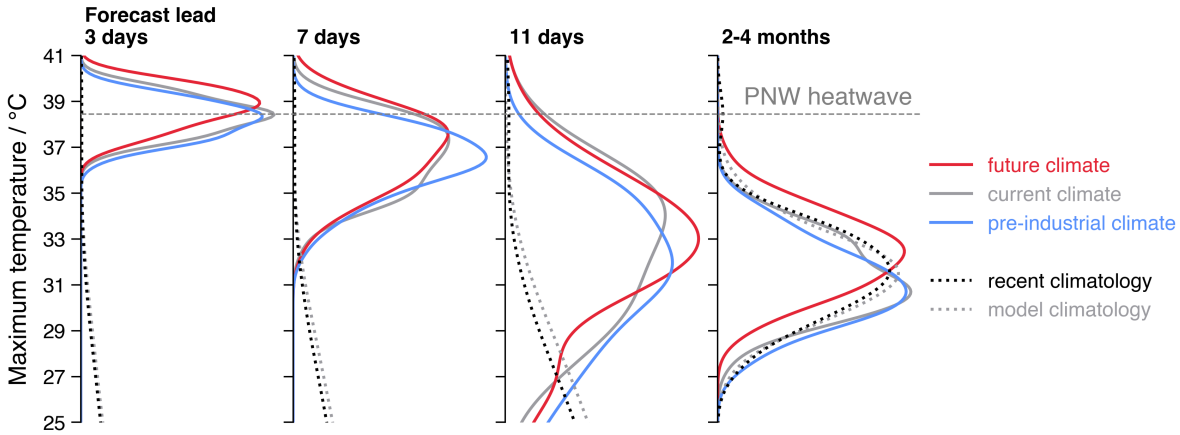

Figure S6: **PDFs of the PNW heatwave in the operational and counterfactual forecast ensembles.** As Figure 3, but showing probability density functions, rather than return-time diagrams.

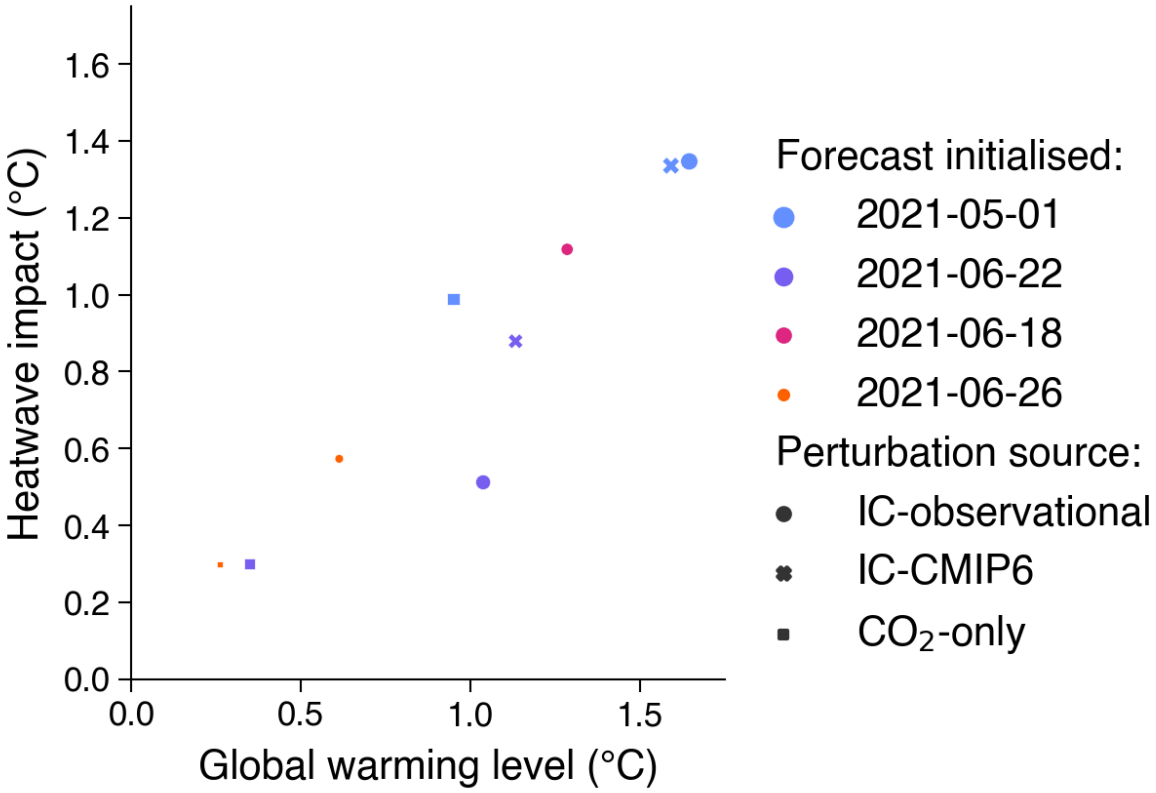

Figure S7: **Relationship between local and global warming signals.** Points indicate ensemble mean attributable change in peak heatwave intensity as a function of ensemble mean change in global land warming level. Both of these changes are computed as the difference between corresponding members of the future and pre-industrial ensembles.

References

[1] Thompson, V. *et al.* High risk of unprecedented UK rainfall in the current climate. *Nature Communications* **8**, 1–6 (2017). URL `www.nature.com/naturecommunications`. Publisher: Nature Publishing Group.