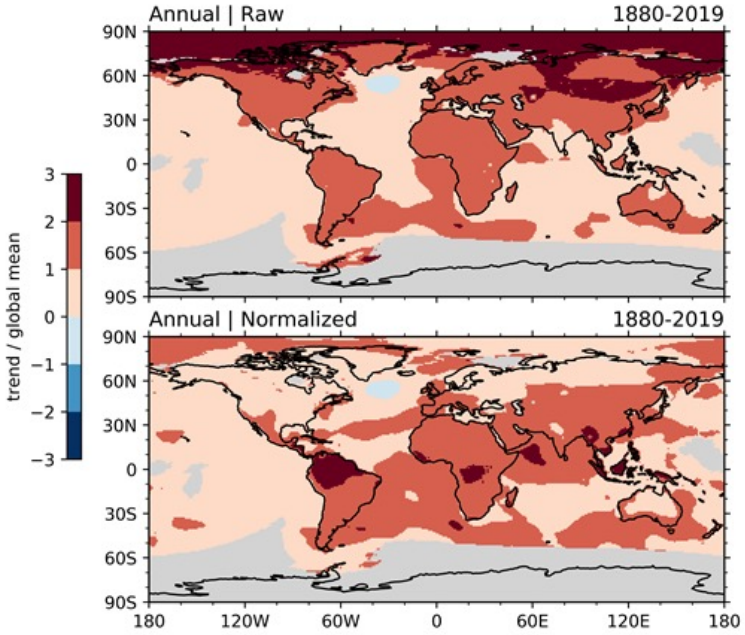
Quantifying the occurrence of record hot years through normalized warming trends

Xubin Zeng's MAP Project

Surface air temperature trends and extreme hot events are of global concern and they are related at a given location. However, it remains unknown whether this dependence is relevant to the comparison of extreme hot event occurrences over different regions.

Based on observational data & 32 CMIP5 and CMIP6 models:

- Compared with the raw trends showing Arctic amplification, the normalized trends show a tropical amplification over land (see Figure)
- Occurrence of record hot years in different latitudes is better correlated with normalized, rather than raw, temperature trends
- Earth system models' correlations between normalized trends and record-breaking events are as high over land as over ocean, unlike in observations



Top: observed annual mean temperature trends from 1880 to 2019, expressed as a ratio to the global mean trend; and bottom: same as Top but for normalized trends.

Reference: Zeng, X., J.E.J. Reeves Eyre, R.D. Dixon, and J. Arevalo, 2021: Quantifying the occurrence of record hot years through normalized warming trends. Geophys. Res. Lett., 48, e2020GL091626, doi: 10.1029/2020GL091626

News Release: https://news.arizona.edu/story/record-breaking-temperatures-more-likely-populated-tropics

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