Extreme event impact attribution

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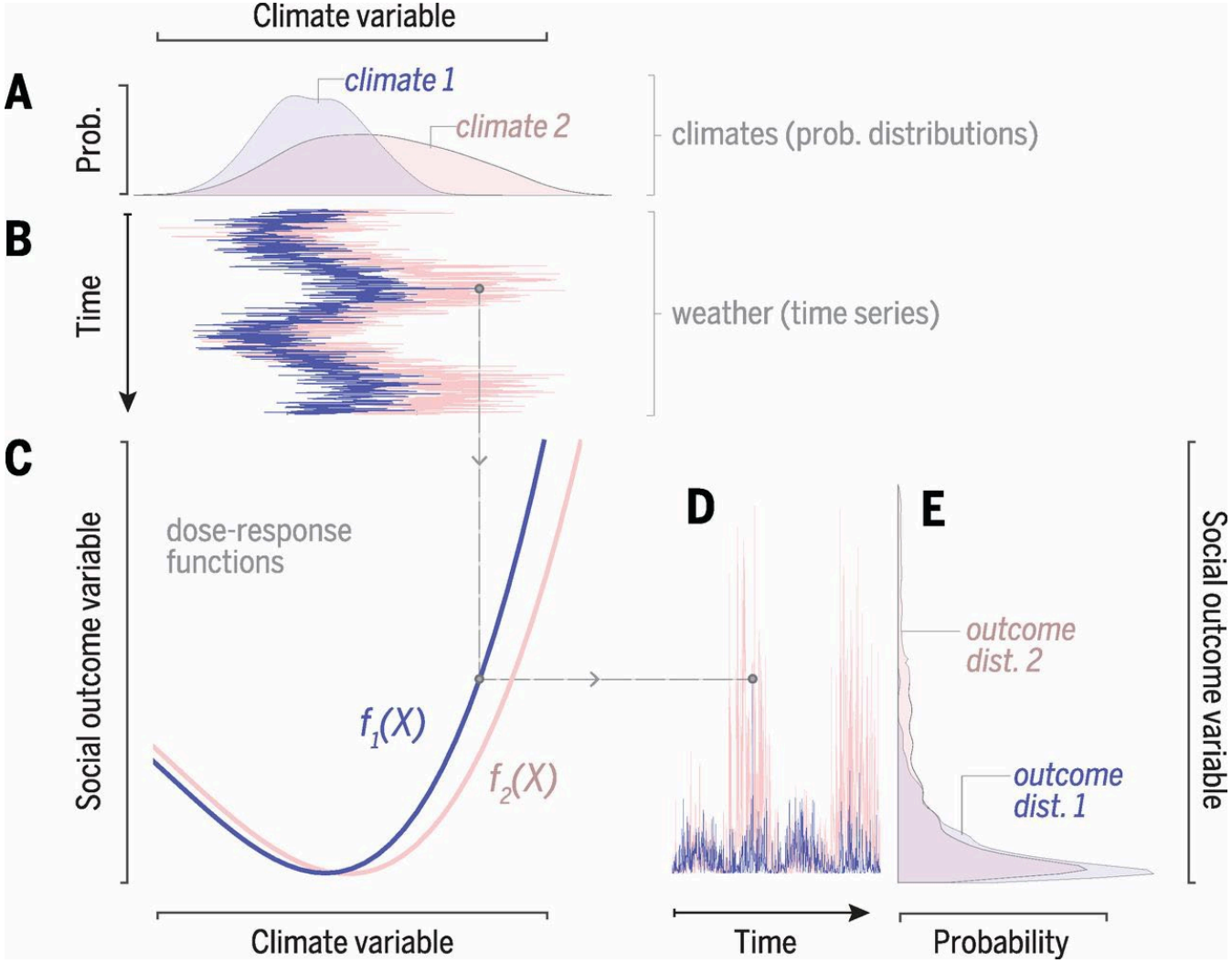
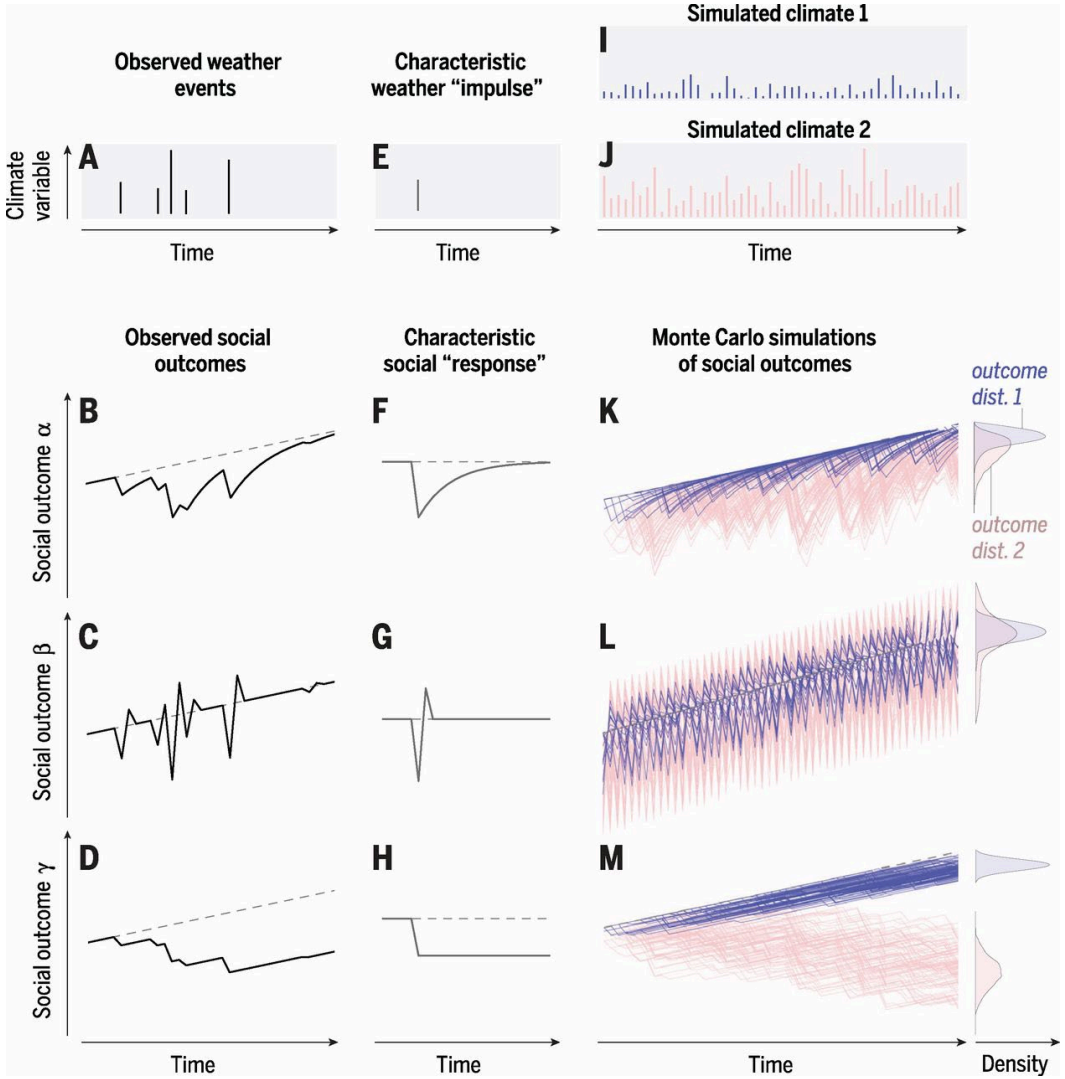
NAS Workshop: Extreme Event and Impact Attribution:
Challenges, Opportunities, and Applications

Statistical inference of extreme event impact & attribution on outcome risk



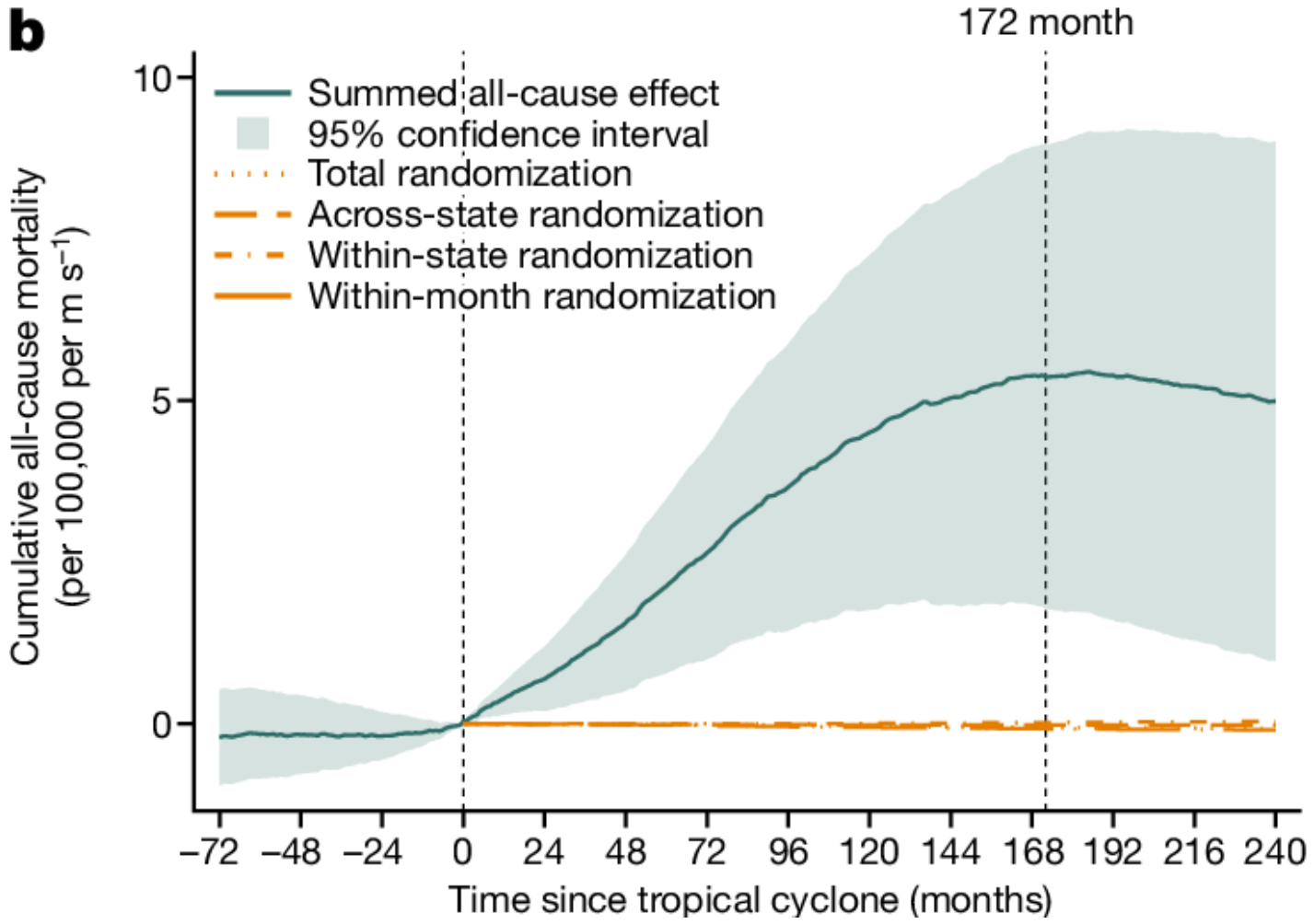
Carleton & Hsiang (*Science*, 2016)

Impulse-response function determines how PDF for outcome will change



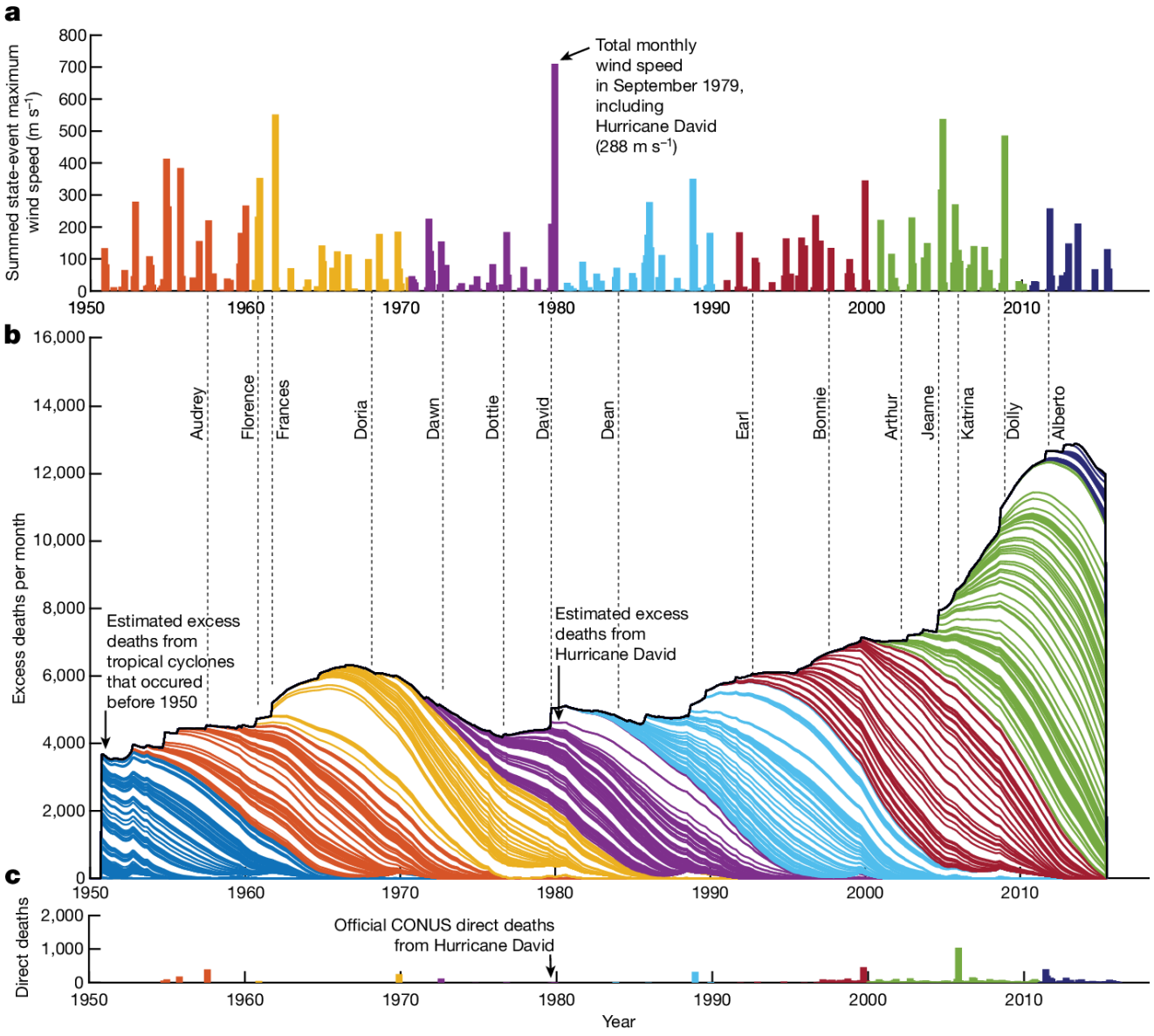
Carleton & Hsiang (*Science*, 2016)

Ex 1: Mortality risk from a single tropical cyclone (USA)



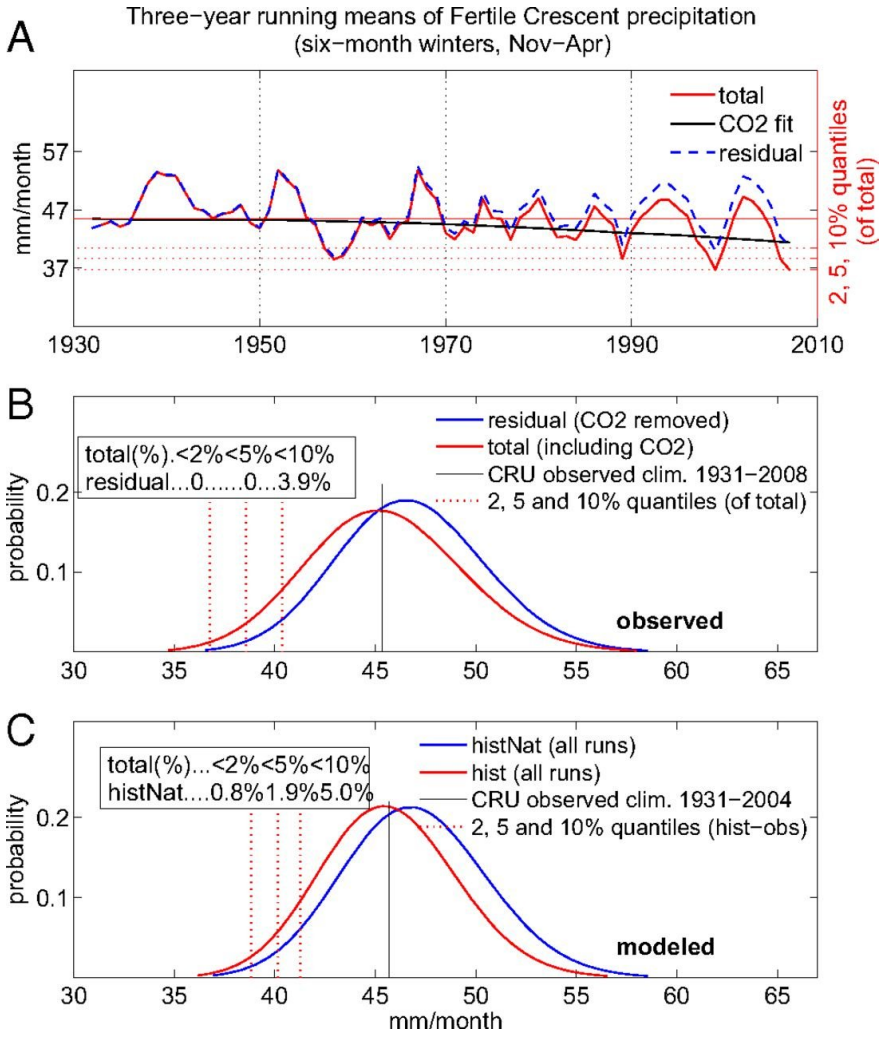
Young & Hsiang (*Nature*, 2024)

Ex 1: Attributing mortality burden to historical tropical cyclone climate



Young & Hsiang (*Nature*, 2024)

Ex 2: Attributing drought in Syria (2010) to anthropogenic climate change



Kelley et al (*PNAS*, 2015)

Ex 2: Attributing *ex ante* conflict risk in Syria (2010) to climate change induced component of the drought

Hsiang & Burke (2025)

Statistical models….

… **can** attribute a change in the probability distribution to climate.

“average mortality risk will likely be X rather than Y”

…**can** attribute a change in the probability of a specific outcome.

“conflict was Z% more likely”

…**cannot** say a specific outcome changed with certainty.

“Climate change made the US poorer by X”

“Climate change made the damages greater by Y”