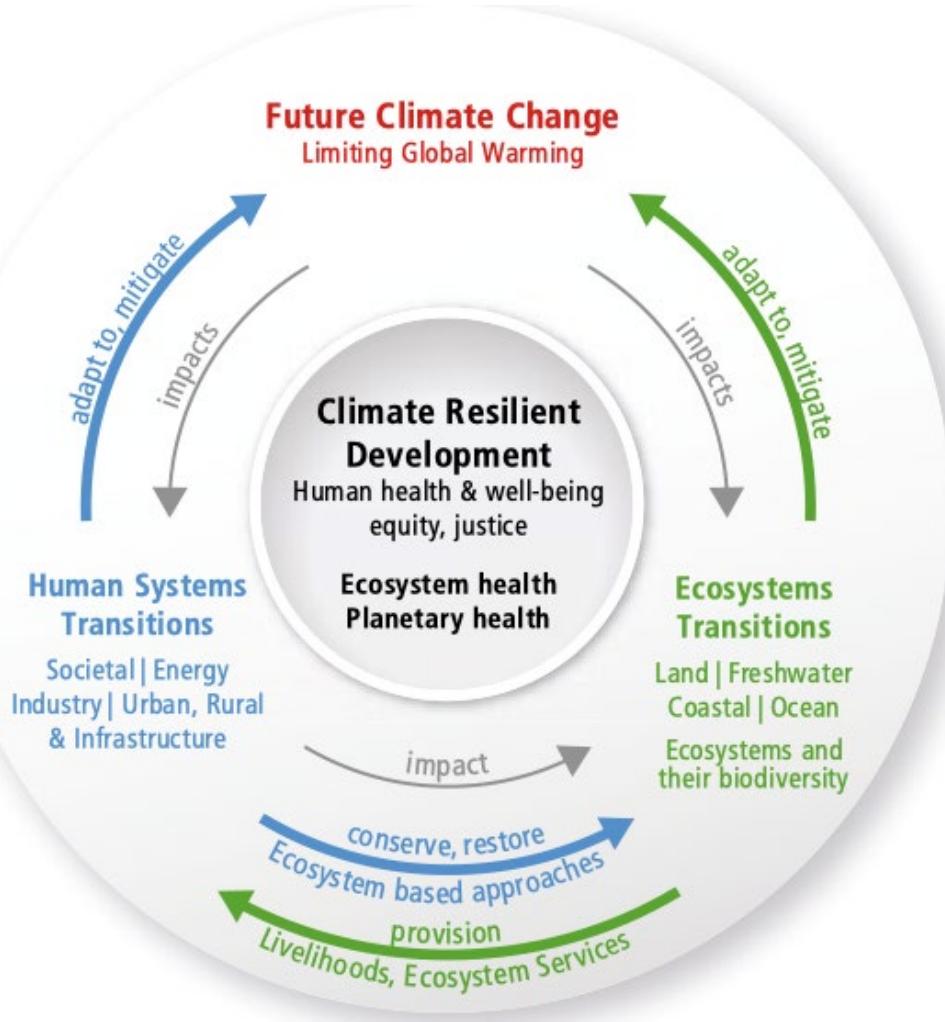


Weather and Climate Risks



Driven by curiosity and responding to societal needs, we engage in research and teaching on weather and climate risks.

We bridge the gap between science and society through reflection, modelling, and engagement with stakeholders in order to support option appraisal and decision making.

The WCR Team

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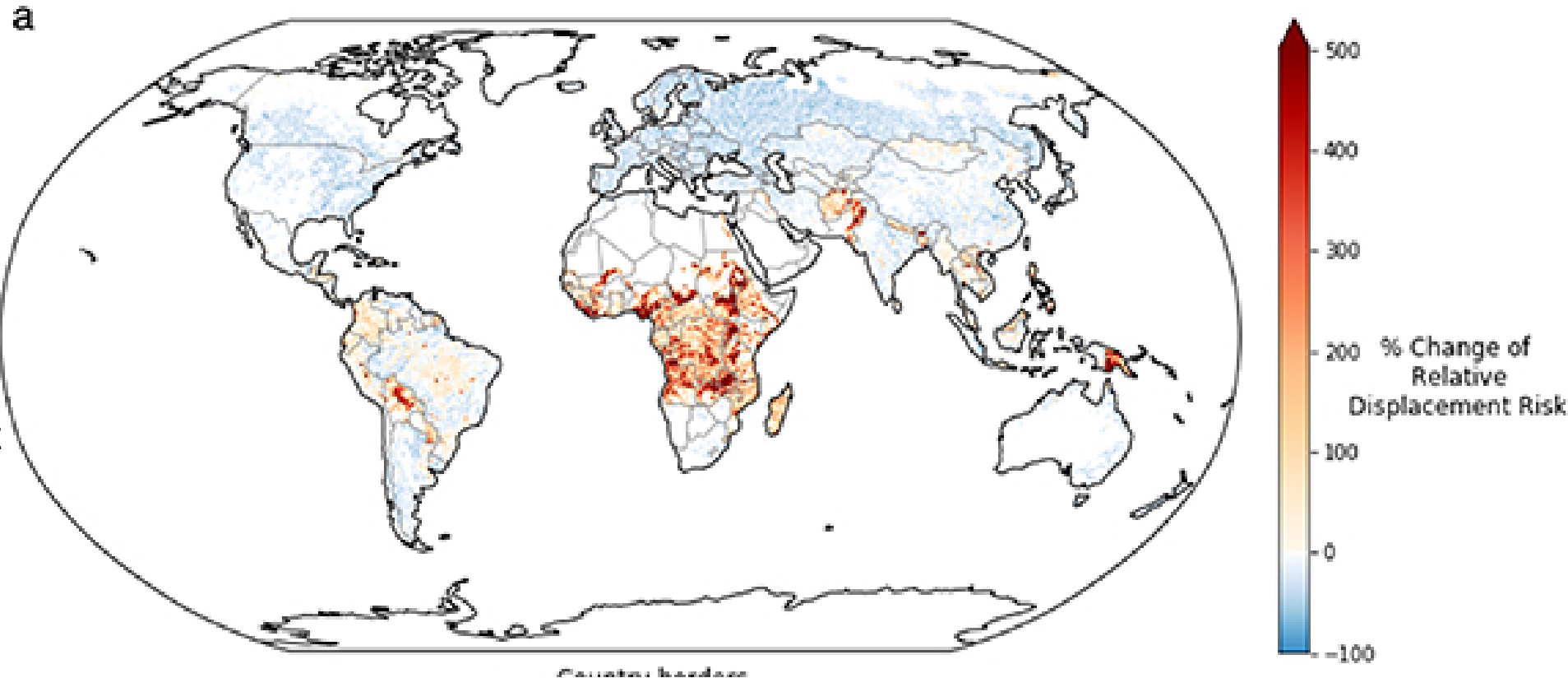
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Kam et al. 2021: Global warming and population change both heighten future risk of human displacement due to river floods

We use a global climate-hydrology-inundation modelling chain, including multiple alternative climate and hydrological models, to quantify the effect of global warming on displacement risk assuming either current or projected future population distributions.



Pui Man Kam, Gabriela Aznar-Siguan, Jacob Schewe, Leonardo Milano, Justin Ginnetti, Sven Willner, Jamie W McCaughey and David N. Bresch
Environmental Research Letters, vol. 16: no. 4, pp. 044026, Bristol: IOP Publishing, 2021.

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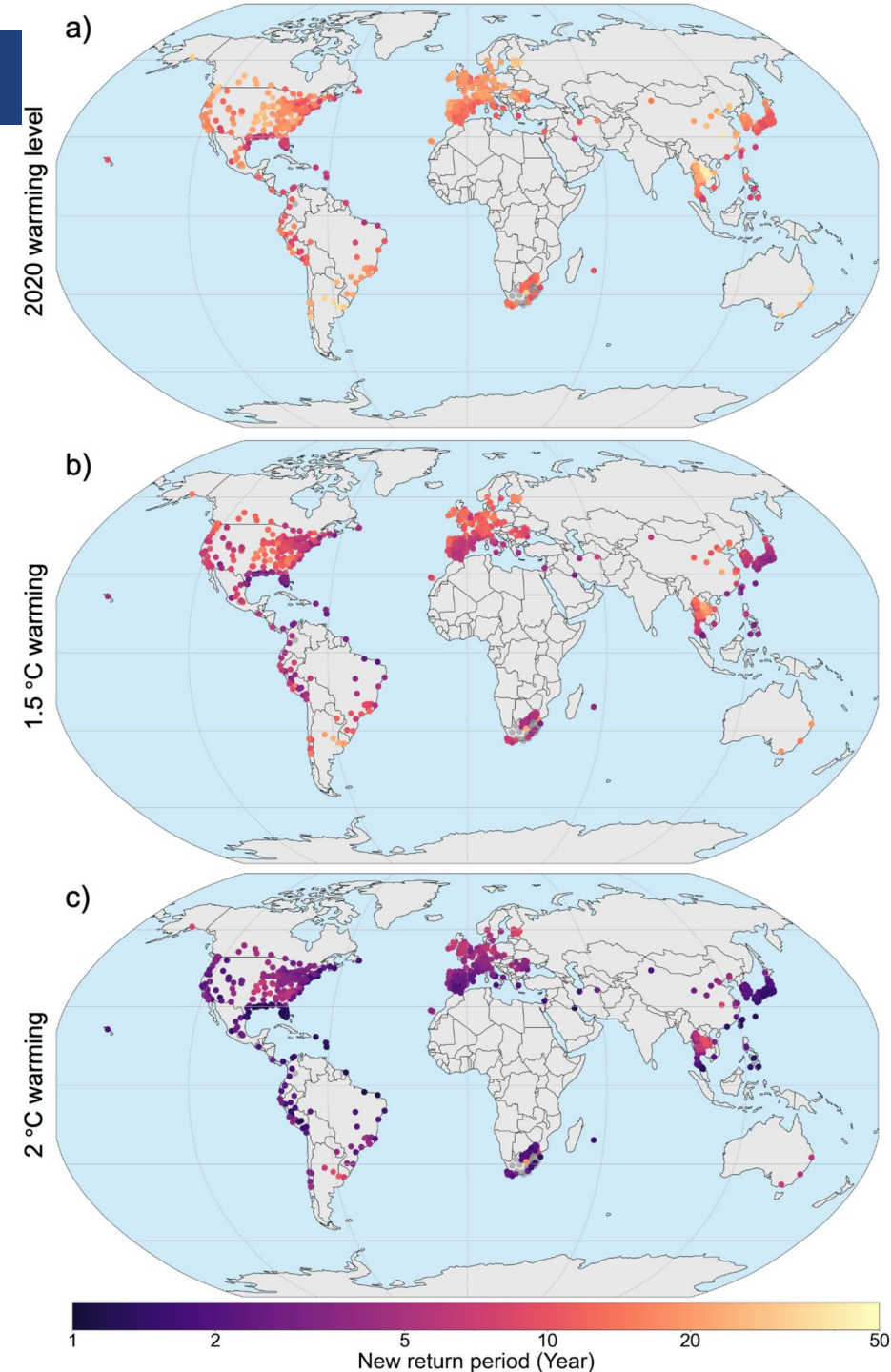
Lüthi et al. 2023, Rapid increase in the risk of heat-related mortality

- Heat-mortality relationships examined across 47 countries
- A 1-in-100 heat mortality year in the climate of 2000 becomes much more likely in the climate of 2020 and further likely with future warming

Lüthi, S., Fairless, C., Fischer, E.M. et al. Rapid increase in the risk of heat-related mortality. *Nature Communications* 14, 4894 (2023).

<https://doi.org/10.1038/s41467-023-40599-x>

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Stahlhandske, 2022: Projected impact of heat on mortality and labour productivity under climate change in Switzerland

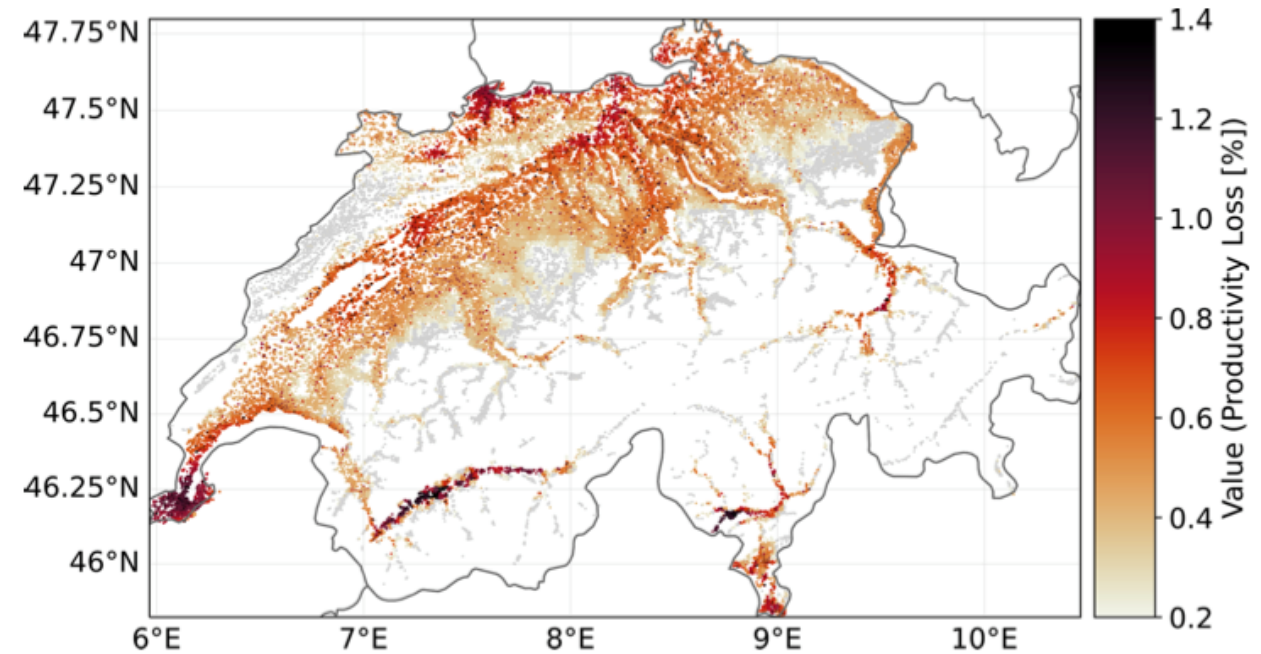
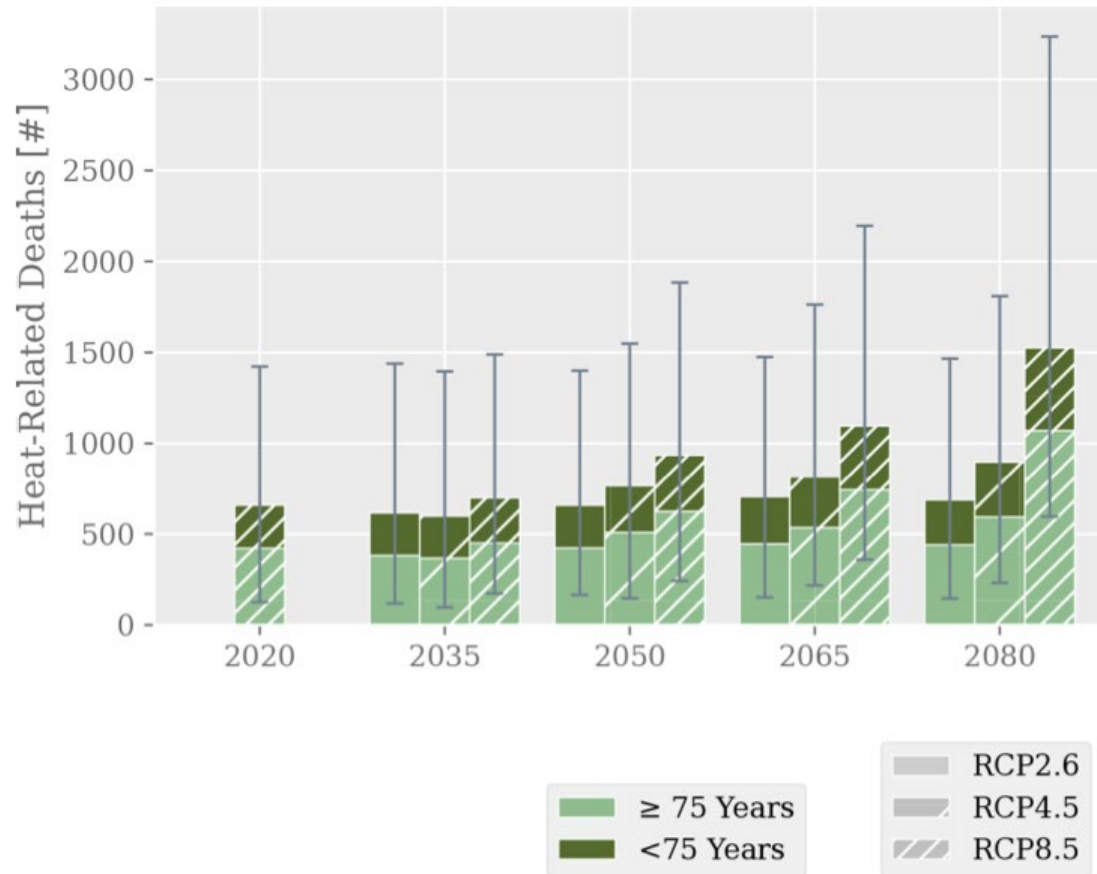


Figure 6. Map showing the spatial impact for labour productivity in percentage compared to the total exposure value for the year 2050, the RCP8.5 scenario, and the category high physical activity.

McCaughey et al. 2018: Socio-economic consequences of post-disaster reconstruction in hazard-exposed areas

- New knowledge of a coastal risk leads to socio-economic segregation: wealthier residents move to safer inland areas, poor residents end up stuck in coastal areas
- Implication for climate migration and sea-level rise: poor may be 'trapped' in coastal areas with increasing hazards and degrading conditions

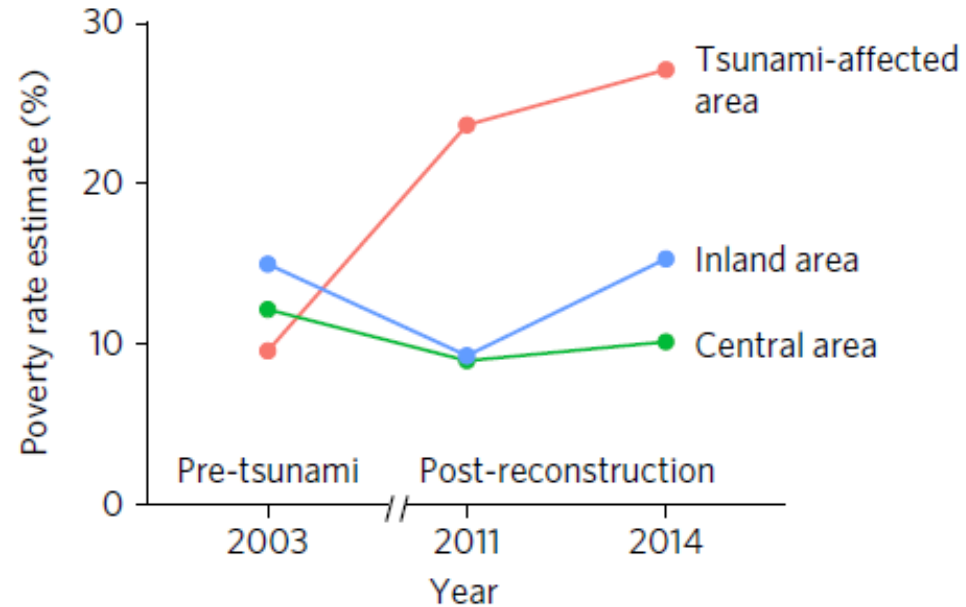
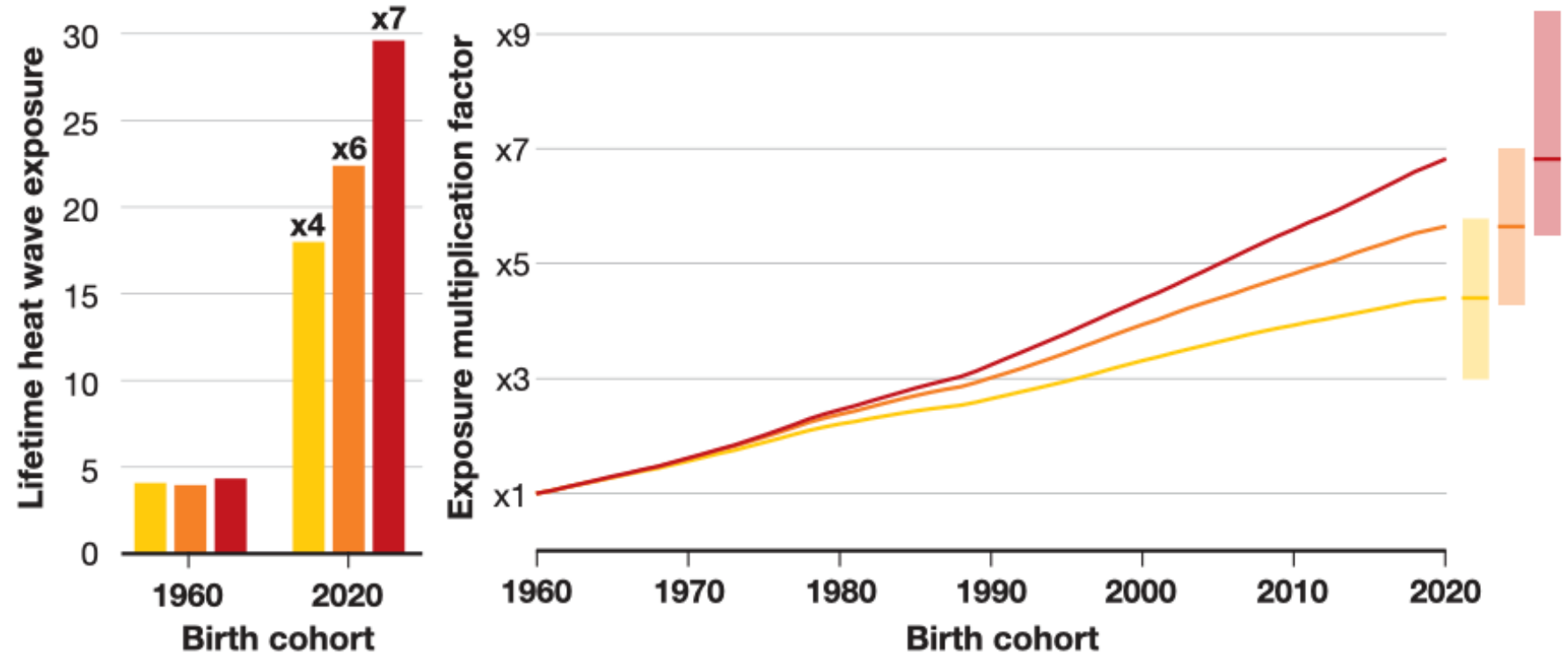


Fig. 3 | Estimates of poverty rates. Estimates of poverty rates are shown by area within Banda Aceh before the tsunami (2003) and after reconstruction (2011 and 2014). See Methods and Supplementary Table 4 for details of calculation of these estimates.

Thiery et al. 2021: Intergenerational inequities in exposure to climate extremes

- Climate research often focuses analyses on time periods, for example how the climate of 2050 may differ from the climate of today.
- This study looks at the same information from a different frame: how will different generations of people be differently exposed to climate extremes?

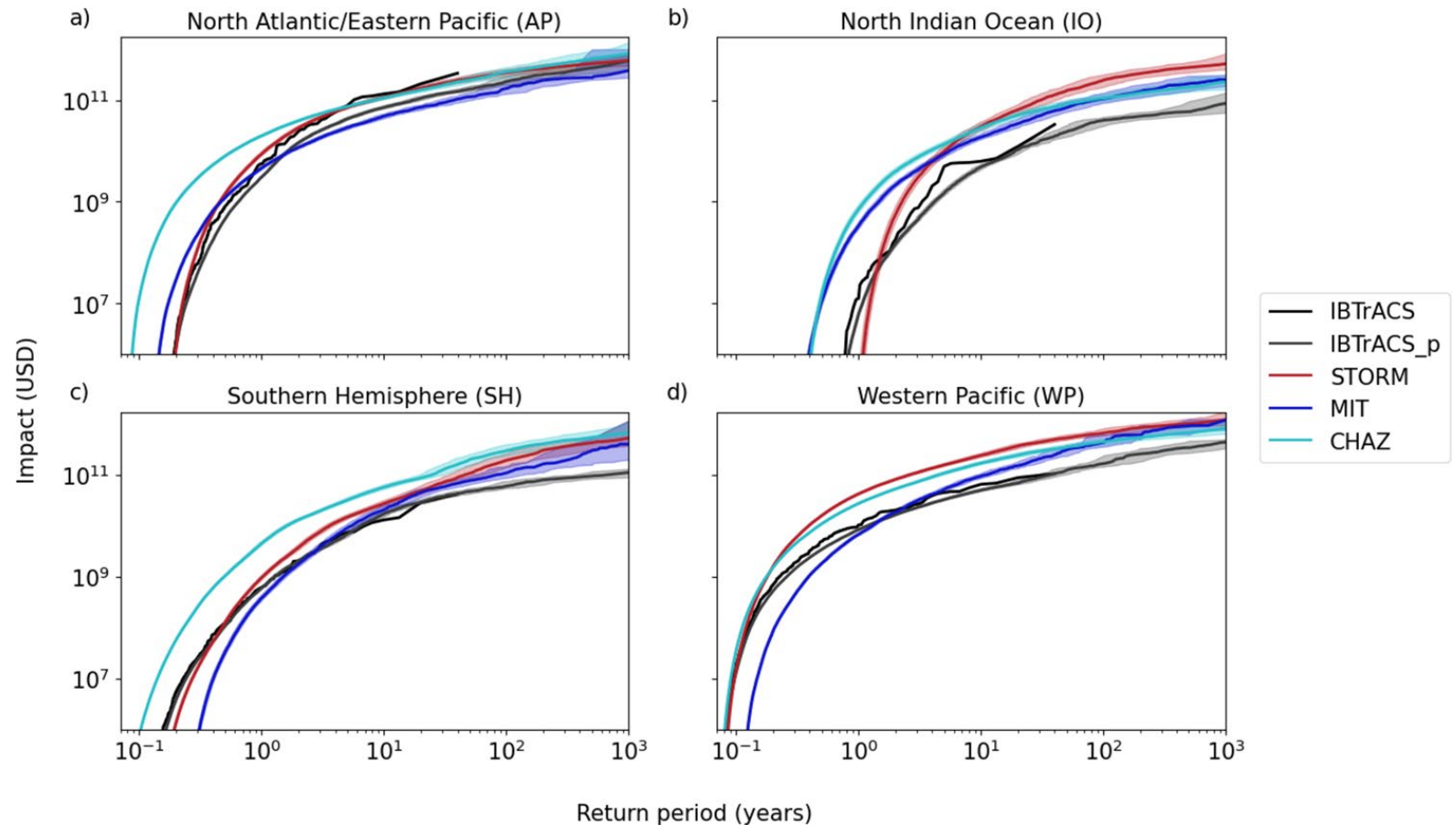


GRAPHIC: K. FRANKLIN/SCIENCE

Wim Thiery et al., Intergenerational inequities in exposure to climate extremes, Science, vol. 374: no. 6564, pp. 158-160, 2021. DOI: 10.1126/science.abi7339ca

Meiler et al. 2022: Intercomparison of regional loss estimates from global synthetic tropical cyclone models

- Intercomparison of four different global-scale synthetic tropical cyclone datasets in the impact space, comparing impact return period curves, probability of rare events, and hazard intensity distribution over land
- We find that the model choice influences the costliest events, particularly in basins with limited TC activity.



Meiler, S., Vogt, T., Bloemendaal, N. et al. Intercomparison of regional loss estimates from global synthetic tropical cyclone models. *Nature Communications* 13, 6156 (2022). <https://doi.org/10.1038/s41467-022-33918-1>