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Event-based Attribution of the April 2022 Durban Flood

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South Africa experienced its most severe flood disaster in recorded history on 11–12 April 2022, when extreme rainfall triggered catastrophic flooding in the greater Durban area, resulting in 544 fatalities. Durban, like many southern African cities, is characterised by rapid urbanisation, the expansion of informal settlements in flood-prone areas, and limited adaptive capacity, leading to high flood risk during heavy rainfall events. Understanding how these interacting drivers shape flood hazard and risk, and disentangling the role of anthropogenic climate change from other controls, remains a key challenge. While attribution studies are increasingly capable of quantifying the effects of climate change on extreme rainfall, equivalent assessments for river flood magnitudes remain scarce. A direct translation of rainfall intensification into flood severity cannot be assumed, as flood generation is strongly modulated by antecedent catchment conditions, runoff processes and river network characteristics. This study applies a hydro-climatic, event-based attribution framework to investigate the April 2022 Durban flood. An ensemble of atmospheric model reconstructions of rainfall during 11-12 April 2022 is used to drive a hydrological model under counterfactual cooler and factual warmer (present-day) climate conditions. By explicitly representing catchment processes, the framework allows us to assess how climate change altered flood magnitude and timing (rather to focus only on rainfall), and to explore the sensitivity of flood magnitude to pre-event hydrological conditions. We find that peak flow in the Mlazi River was substantially increased by climate-change-amplified rainfall totals, thereby establishing a direct causal link between anthropogenic greenhouse gas forcing and the 2022 Durban flood. The results contribute to understanding the relative roles of atmospheric forcing and catchment controls in shaping extreme flood outcomes. Conducted as part of the WaRisCo project within the Water Security in Africa (WASA) programme, this study provides an urgent message for the need for climate-smart Disaster Risk Reduction as well as for longer-term adaptation in the greater Durban area.