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Session 8: Extreme event attribution, likelihoods and impacts.

Title: High-impact Multivariate Compound Events in Australia under Present and Future Climates

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In recent years it has become increasingly clear that the investigation of isolated natural hazards is inadequate. Looking at hazards in this way does not describe the complex character of natural disasters. As such, information on multivariate risk has become crucial for industry, emergency services, and government agencies. Here we focus on two high-impact hazard combinations for the Australian continent that have caused severe damage and insurance losses in the past: the co-occurrence of (i) strong winds and heavy rainfall and (ii) heatwaves and drought. We report results from multi-model assessments of occurrence probabilities of these multivariate compound events under current and future climates based on round 6 of the Coupled Model Intercomparison Project (CMIP6). For this we focus on historical conditions (1980 – 2014) and three different Shared Socioeconomic Pathways (SSP1-2.6, SSP2-4.5, SSP5-8.5). Further, we link these events to past insurance losses to highlight the importance of these events and introduce a methodology that can be refined to inform decision-makers and other stakeholders about multi-variate risk.