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Emergence of heat stress hazards in the CMIP6 models

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Hazards associated with the combined effects of temperature and humidity can have a wide range of impacts, particularly on human health and agriculture. The human body removes metabolic heat through sweating and heat conduction, and the efficiency of these processes is reduced when ambient temperatures and humidity are high, resulting in heat stress. The effects of this range from general discomfort to increased morbidity and mortality rates, trends that have been observed during recent severe heatwaves such as those that occurred during the summer of 2019 in Europe. A number of factors may exacerbate heat stress, including intense physical activity and being located in an urban area as opposed to a rural area.

As global temperatures increase, the risk associated with heat stress hazards is expected to increase, and this signal is expected to emerge from natural variability over the coming decades, if not sooner. Here, simulations from the new CMIP6 models are analysed to investigate the timing of emergence of heat stress hazards, in order to identify regions of the globe that are particularly vulnerable to extreme heat stress and/or imminent emergence of these hazards. Event attribution techniques are also applied to estimate the impact of anthropogenic warming on the hazard risk.