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## Avoided impacts of climate change on compound hot-dry events under sustainable development versus fossil-fueled development

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Climate change is expected to increase the frequency and intensity of compound hot-dry events, which can have significant impacts on human life, economic systems, and agriculture. The extent of this impact depends on the socioeconomic pathway we adopt in the future. While sustainable development aspires to reconcile economic growth, environmental protection, and social equity, thereby ensuring a more sustainable future for all, fossil-fueled development may drive economic growth at the expense of exacerbating climate change, pollution, and resource depletion. This study employs a CMIP6 multi-model ensemble to scrutinize the global-scale potential for mitigating climate change impacts on compound hot-dry events under sustainable development versus fossil-fueled development. These events are quantified by analyzing the joint distribution probability between temperature and soil moisture extremes through bivariate copula functions. The results show that although the likelihood of compound hot-dry events is expected to increase under both scenarios, the increase under fossil-fueled development is anticipated to be twice larger than that under sustainable development. The results show that although the likelihood of compound hot-dry events is expected to increase under both scenarios, the increase under fossil-fueled development is anticipated to be twice as large as that under sustainable development. The mitigated impact through sustainable development is not regionally uniform, with the largest mitigation, up to one-third, expected in the Mediterranean region.