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# Climate effects of the largest extratropical eruption of the Holocene - Mt. Mazama (43 N)

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Extratropical volcanic eruptions are generally thought to be less effective at cooling surface climate than tropical eruptions. Here, we focus on climate effects of the 6th millennium BCE Mt. Mazama eruption in Oregon, USA (43 N), the largest eruption in the extratropics and second largest overall of the Holocene. Previous publications on this Mt. Mazama eruption have mainly focussed on near-vent geochemical analysis, ice core deposition, and human impacts.

We have performed a transient model run for the 6th millennium BCE using the MPI Earth System Model with coupling of the atmosphere, land processes including dynamical vegetation, and the ocean including sea ice and biogeochemical tracers. The run was driven by reconstructions of orbital and solar forcing, greenhouse gas concentrations, and land use. Additionally, a newly revised volcanic forcing reconstruction based on Greenland and Antarctic ice core records and the Easy Volcanic Aerosol module was incorporated. Bipolar ice core signals reveal that the eruption released approximately 160 Tg S to the stratosphere, 20 times more than the well-observed Pinatubo 1991 eruption. The modelled surface response shows long-lasting global surface cooling and a reduction of the hydrological cycle, as well as changes in atmospheric and oceanic circulation. The climate response will be compared with high resolution temperature proxies. Regional effects on climate and vegetation will be linked to population impacts, and possible implications for archaeological findings will be discussed.