**Investigating the Climatic Impact of the 1257 Samalas Eruption**

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**Abstract:**

The 1257 Samalas eruption was one of the largest eruptions of the Holocene epoch and had wide-ranging and regionally heterogeneous impacts on global climate. Proxy data, such as from tree rings and lake sediments, suggests the global cooling due to sulphur aerosol emission from the Samalas eruption was of the order of -0.7 to -1.2°C and persisted for up to three years. Previous attempts to simulate the impact of the eruption using climate models have tended to overestimate the eruption’s radiative forcing and thus estimated a global surface cooling of up to -4°C. Using the output from an ensemble of UK Earth System climate model simulations I will be investigating the global climatic response to the Samalas eruption through key metrics including surface temperature, precipitation, El Niño Southern Oscillation state, wind dynamics, ice volume, and ozone thickness. These model simulations include state-of-the-art aerosol microphysics, a requirement needed to be able to reconcile model simulations and proxy records of climate change following large eruptions. I will also be investigating the dependence of radiative forcing and climatic response on pre-existing conditions such as ENSO state. The presence and potential driving forces behind an ENSO response to the eruption, such as the influence of the amount of aerosol pre-cursor gases emitted or prevailing atmospheric conditions will also be assessed. Where appropriate, proxy data, such as from tree rings, and historical texts will also be included.