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Incorporating missing volcanic impacts into future climate impact assessments

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Future climate projections for the 21st century generally do not include the effects of volcanic eruptions. While some attempt has been made to account for the integrated effect of multiple eruptions by incorporating a small continuous volcanic forcing, a recent study (<http://nature.com/articles/doi:10.1038/nclimate3394>) has already shown that this approach is insufficient to resolve the increased climate variance caused by individual eruptions, especially on decadal timescales. Increased climate variance exerts stresses on ecosystems and society, thus resolving the impacts of plausible future volcanic eruptions is of importance for certain adaptation and mitigation decisions.

While previous work has used a modelling approach to address this problem, in this talk we demonstrate a computationally inexpensive method to incorporate the effects of plausible volcanic eruptions into future climate projections. This method uses stochastic volcanic emulators based on 2,500 years of past volcanic activity and the characterization of the response of the climate system to individual eruptions. We will demonstrate not only this methodology, but also describe the requirements and potential for its application to the wider future projections of CMIP6.