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The Model Intercomparison Project on the climatic response to volcanic forcing (VolMIP)

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Our understanding of the climatic response to volcanic forcing is limited as large uncertainties affect both the observational records, due to the limited number of observed events, and the non-robust dynamical responses simulated by different climate models. The lack of agreement between model results is crucially determined by differences in the model's characteristics such as resolution, complexity and implementation strategy of the forcing, and uncertainty in the eruption details including magnitude, latitude and season, input data and background climate. The multiple and varied nature of these factors prevents their contribution to uncertainty from being distinguished within existing transient simulations or non-coordinated multi-model experiments. It is therefore necessary to frame the future modeling activities within common designs that separately focus on specific aspects i.e. uncertainties in the reconstruction of radiative volcanic or associated feedback mechanisms activated in the coupled ocean-atmosphere system for one specific volcanic forcing.
The Model Intercomparison Project on the climatic response to Volcanic forcing (VolMIP) presented here focuses on the response of the coupled ocean-atmosphere system to strong volcanic forcing. VolMIP is a CMIP6 endorsed project, which defines a common protocol to subject Earth system models and coupled general circulation models to the same volcanic forcing and under a similar range of background climate conditions. By doing so, VolMIP aims at assessing to what extent simulated responses are robust across models and at identifying the causes that limit robust behavior, especially as far as different treatment of physical processes is concerned.
We will present an overview about VoLMIP and its recent activities. It will also be illustrated how VoLMIP is linked to CMIP6 and to other coordinated modeling assessments and how it will improve our understanding of past, current and future climates.