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Simulations of the climate response to major volcanic eruptions using different complexities of earth system climate models

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One of the most important natural causes of climate change are major volcanic eruptions as they have an significant impact on the Earth's global climate system. To evaluate the climate response to major volcanic eruptions we use the Earth System Model of Intermediate Complexity (EMIC) CLIMBER by forcing it with a new radiative forcing data set comprising large Plinian eruptions from volcanoes at the Central American Volcanic Arc (CAVA) over the last 200 ka. This specifically created radiative forcing data set is based on the "petrological method" and use information about strength and height of the volcanic sulphur injection (Kutterolf et al. 2008a,b). Our first evaluation involves simulations forced with the assessed radiative forcing of the largest CAVA eruption ($\sim$650 Mt SO_2) Los Chocoyos (84 ka). By comparing these runs with simulations of the best observed large volcanic eruption, the one of Mt Pinatubo in June 1991 ($\sim$17 Mt SO_2), we analyse similarities and differences, which may be generated by complex relationships between the radiative forcing and the climate system. The same set of forcing is also used for simulations with the complex Earth System Model (ESM) from MPI. Similarities and differences between the two different model runs will be used for a better understanding of the complex climate interactions after major volcanic eruptions. We consider global atmospheric effects as well as possible changes in the ocean circulation, the carbon cycle and vegetation.