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Effects of the 2009 Sarychev Volcanic Eruption on Climate

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On June 12, 2009, the Sarychev volcano on Matua Island, Russia, erupted putting about 2 Mt SO2 into the lower stratosphere. This was be largest volcanic eruption since the 1991 Mt. Pinatubo eruption in terms of the amount of SO2 injected into the stratosphere. The resulting sulfate aerosol cloud, observed with the OSIRIS limb-scanning instrument on the Odin satellite, formed during the next month and persisted throughout the rest of 2009 in the Northern Hemisphere. We used the NASA GISS ModelE general circulation model to calculate the climate response to this eruption, using a range of possible SO2 injection amounts to bracket the range of reported observations, and report the climate response. The eruption caused a small amount global cooling, and we compare the amount to the observations, showing whether it should be detectable. The South Asian monsoon started late and the total amount of rainfall was below average in 2009. We show how the Sarychev eruption could have contributed to this.