

Sulphur yield and climatic impact of the AD 1835 eruption of Cosigüina volcano, Nicaragua

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The January 1835 eruption of Cosigüina volcano, Nicaragua, produced a bulk tephra volume of $\sim 6 \text{ km}^3$ and ranks among the Americas' largest and most explosive historical eruptions. Ice cores from both the Arctic and Antarctica commonly show a prominent sulfate spike near AD 1835, suggesting that the Cosigüina eruption injected $\sim 13 \text{ Tg}$ of sulphur into the stratosphere. New electron microprobe data on matrix glasses and melt inclusions reveal that syn-eruptive devolatilisation of the 1835 magma alone released 2.2-3.3 Tg S. Most of the sulphur discharged during the eruption was probably derived from a sulphur-rich gas phase stored in the magma chamber beforehand. Temperature-sensitive tree-ring chronologies indicate significant cooling in 1836 and 1837 due to the eruption. The climatic impact of the Cosigüina eruption was thus likely sizable and comparable to or even larger than that of the 1991 eruption of Pinatubo.