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Degassing from the Central American arc

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The Central American volcanic arc supplies a significant proportion of the persistent annual global sulphur dioxide emissions from volcanoes. In November/December 2003, we completed a survey of the arc section from Mombacho to San Cristóbal in Nicaragua recording individual mean fluxes of 540, 350 and 190 Mg/d in the plumes from San Cristóbal, Telica and Masaya respectively. Measurements at Momotombo were inconclusive but suggest that SO_2 may have been below instrumental detection limits by our point of measurement. An assessment of fluxes published since 1997 along the entire Central America arc yields a mean total arc flux of SO_2 of 4260 Mg/d or 7-12 % of the annual estimated global volcanic SO_2 flux to the troposphere. Extrapolating from measurements of the high-temperature plume from Masaya volcano to the entire Central American arc gives mean HCl and HF fluxes of 1150 and 170 Mg/d and a particulate sulphate flux of 40 Mg/d for 1997 to 2004, although without further understanding of the degassing processes and sources at depth of these different volatiles, these arc-scale estimates should be treated with caution. Preliminary calculations suggest that Cl is more efficiently recycled through the subduction zone than CO_2, while results for H_2O are inconclusive.