Tephra volumes and erupted masses of South Central American volcanic eruptions

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Ash clouds of Plinian and ignimbrite-forming eruptions from volcanoes along the Central American volcanic arc are distributed at stratospheric heights westward across the Pacific Ocean [1]. The ash is preserved in layers in the marine sediments and represents the distal deposit of these, mostly climate relevant, eruptions up tp several hundreds of kilometers from the vent regions and account for the major fraction of the erupted tephra volumes.

We analysed the tephra inventory of 18 DSDP/ODP and IODP sites offshore Costa Rica for their major and trace element glass shard compositions and were able to correlate tephra layers between different sites, with onland volcanic sources and/or to well studied eruptions using geochemical-fingerprinting. The established tephrostratigraphy for the southern Central American volcanic arc reaches back to the Miocene providing a long time series of eruptions and the overall volatile and elemental budget (e.g. [1; 2]) for this part of the subduction zone.

The correlations were used to draw isopachs and calculate minimum erupted volumes and magma masses for all these eruptions. For some eruptions (e.g., Tiribi Tuff in Costa Rica [3], Fontana Tephra from Nicaragua [4]) that are well studied on land we were able to increase the calculated volumes with our new more distal correlations. For others, only known from local deposits in Costa Rica, we are able to provide the first eruptive masses described so far.

The gathered data was combined with volatile data to study single eruptions but also entire arc segments. This enables us to elaborate the volatile fluxes into and out of the subduction zone, which are important players regarding the exchange between lithos-, hydros-, and atmosphere and how the climate has potentially been influenced by volcanism in the past [2].

[1] Kutterolf *et al*. (2008) *Geochem. Geophys. Geosys.* **9**, doi:10.1029/2007GC001791. [2] Freundt *et al*. (2014) *Int. J. Earth Sci.* **103**, 2101-2127. [3] Pérez *et al*. (2006) Bull. Volcanol. **69**, 25-40. [4] Wehrmann *et al*. (2006) *In: Rose, W. I., Bluth, G. J. S., Carr, M. J., Ewert, J., Patino, L. C., Vallance, J. W. (eds.) Volcanic hazards in Central America: Geol. Soc. Am. Spec. Publ.*, 209-223.