

## Stratigraphical and sedimentological study of the plinian tephra-fall deposit of the CE 1600 Huaynaputina eruption

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Huaynaputina volcano in southern Peru produced a large eruption (VEI 6) in CE 1600. Since 2016 the 'HUAYRURO' research project pursues three objectives: 1) tephrostratigraphy and physical characteristics of the Plinian fallout, 2) palaeoclimatic consequences and 3) catastrophic impacts on villages within a 20 km distance from the volcano. The erupted deposits encompass five tephra and PDC units, but we focus on the stratigraphical, sedimentological and physical characteristics of the voluminous Plinian tephra-fall deposit.

The pumice-fall deposit shows three to six layers. A thin, inversely graded lapilli layer forms a sharp contact above the pre-existing soil. The crudely stratified pumice increase in size together with cm-sized lithics in the second and third layers, but decrease in size while lithics become scarce in the fourth layer. The fifth layer contains coarse ash with free crystals and scarce lithics. In proximal sections the uppermost, thinnest layer presents coarse pumice and small lithics. Oxidized lithics are scattered in all but the fifth and sixth layers. The grain-size distribution of 123 samples and the componentry of 101 samples was analysed in proximal, medial and distal areas.

Using pre-existing and new thickness measurements from 647 sections, we drew a revised isopach map and two isopleth maps. The 1cm-isopach map covers an area of 128,072 km<sup>2</sup> showing a dispersal axis oriented SW in the proximal zone < 32 km, W in medial areas between 32 and 78 km, and NW in distal areas >78 km. Using methods based on the exponential decrease of the deposit with respect to the distance of source, we calculated a volume of 8.60 - 9.93 km<sup>3</sup>, i.e. increasing the previously published volume by 10 to 25%. Using Carey and Sparks' method, we estimated the total height of the column at 35±2 km, a value similar to the pre-existing estimates.