

GEOLOGY Data Repository - Annex

All the data used in this manuscript are from our sampling campaign carried out early in September, 1991. We took drillcore samples with PVC tubes all around the volcano in order to sample the entire stratigraphy. The sampling distance range was from about 11 km to 45 km away from the volcano (see Figure DR1 for the exact locations). Since samples have been collected just after the climactic eruption, the layer C has not yet been modified, cut-off, or secondarily reworked in any ways. In addition, all the layer C were still layered between layer B (bottom, pre-climactic eruption deposits) and layer D (top, post-climactic eruption deposits) (Paladio-Melosantos et al., 1996), which confirms we had the complete stratigraphic section of layer C.

We used wet sieving techniques (ASTM screen sieve with 1Φ intervals and $1/2\Phi$ for the finer sizes) from 16 mm to $44.19\ \mu\text{m}$ (from -4 to $4.5\ \Phi$). This wet sieving method was chosen to reduce abrasion. Because the finest fraction (less than $44.19\ \mu\text{m}$) was non-negligible, we also used a laser-diffraction analyzer (Cilas model 226). The laser diffraction size analysis is based on the principle that particles of a given size diffract through a given angle. This angle increases with decreasing size. If we assume that all the grains have the same density, the analyzer gives a mass frequency function. This assumption is mostly true since most grains of this size are volcanic glass. With this laser analyzer, the class intervals were $1/2\Phi$ wide and range from 4Φ ($62.5\ \mu\text{m}$) to 10Φ ($0.98\ \mu\text{m}$).

We also analyzed ultradistal fallout samples from the Plinian Askja eruption (collected in Sweden at ~ 1900 km from source) with the same laser technique. No-sieving was required for those fine ash samples from this Askja eruption.

It is worth noting that many grain-size analysis found in the past literature disregard and neglect the very fine ash. Not taking into account the fines creates a strong bias in the statistical analysis. Most

of the conclusions of this paper would not have been found without the accurate knowledge of the full range of the grain size distributions. Therefore, most of the 600 grain-size data in our database have been carefully chosen because of their high analytical quality.

Figure DR1. Location (represented by a star) of all our samples collected around Mount Pinatubo volcano and used in this manuscript.

