

STRUCTURE AND EMPLACEMENT MECHANISMS OF THE ROQUE NUBLO DEBRIS AVALANCHE, GRAN CANARIA (CANARY ISLANDS)

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The Roque Nublo debris avalanche deposits (~ 14 km, travel distance >25 km) were deposited ~3.5 Ma years ago as a result of sector collapse of a stratovolcano in the central part of Gran Canaria (Mehl and Schmincke, 1999). The subaerial deposit comprises almost intact, km-sized blocks of the former volcano ("toreva blocks") with well-preserved original stratigraphy. These blocks came to rest within distances <10 km from the source. The blocks are dissected by subhorizontal shear zones as well as by multiple vertical cracks, normal to the direction of avalanche motion. Both structures were formed at the moment of deposition due to rapid deceleration of the blocks. Farther from the source, the deposit is strongly shattered, but only moderately sheared and weakly mixed. The original stratigraphy is still preserved in many locations, but large blocks of the former volcano are strongly deformed. The deposit represents part of the landslide, which transformed in the avalanche and travelled unconfined, experiencing little mixing. On distance ~15 km from the source this part of the avalanche was blocked by transverse topographic barrier. Beyond the barrier the avalanche deposit displays abrupt increase of shearing and mixing. Only small fragments of the original stratigraphy of the former volcano are preserved. This part of the avalanche was channelized by narrow paleocanyons. Transportation along the curved canyons increased relative movements of blocks in the avalanche and thus forced mixing process. The main shear was concentrated along the base of the avalanche in a layer several meters thick, producing thorough mixing and longitudinal orientation of elongated clasts. Absence of strong cataclasis as well as inferred low temperature in the base at the moment of deposition (no charring of wood fragments and no melting of rocks) indicate that basal friction was very low during the avalanche transport. Strong basal friction appeared only shortly before the avalanche came to rest.