

Geology and petrogenesis of Pulumbura volcano (Western Cordillera, Ecuador)

V. Valverde^(1,2), M. Chiaradia⁽²⁾, B. Beate⁽¹⁾

⁽¹⁾Escuela Politécnica Nacional, Quito – Ecuador, ⁽²⁾University of Geneva, Geneva-Switzerland

Pulumbura volcano (4214 masl) is an eroded dome-complex located in the northern part of the Western Cordillera of Ecuador, where it is surrounded by other volcanoes such as Parulo, Pilavo, Yanaurcu de Piñán, and Cotacachi. Pulumbura volcano is composed mostly by lava flows, domes, and block-and-ash flows, and its composition ranges from andesitic to dacitic. The geochemical, isotopic and petrographic data suggest that changes in incompatible element ratios like Sr/Y and La/Yb are the results of crustal processes such as fractional crystallization and mixing. Although difficult to infer because of the lack of primitive compositions, the Pulumbura most primitive magmas were likely derived from partial melting of a metasomatized mantle, as it is commonly considered to occur in a subduction-related setting. They suffered a first fractional crystallization in the lower crust and subsequent mixing processes in the middle-upper-crust. Amphibole data show P-sensitive replacements (AlIV versus AlVI), indicating that Pulumbura rocks formed at variable pressures, some of which could be linked with more superficial magma-reservoirs. ⁴⁰Ar/³⁹Ar geochronology yields an average age of ~12 Ma for the whole volcanic complex indicating that Pulumbura is the oldest volcano in the area.