Geology of the Nevado Coropuna volcanic complex

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The Nevado Coropuna volcanic complex (NCVC), located in the northernmost CAVZ (15°3' S, 72º39' W), includes several edifices, aligned WNW-ESE above Neogene ignimbrites. Adjacent composite volcanoes include the Late Pliocene, eroded Sunjillpa to the WNW and the glacially eroded, 0.6-0.25 Ma-old Cunciacha to the ESE. Located on the west flank of the Western Cordillera, the asymmetric volcanic complex shows stubby lava flows overlying the NE, 4500 m-high plateau, contrasting with long, inverted lava flows and debris-avalanche deposits filling deep valleys draining the steep SW flanks. The central, highest NCVC is a cluster of five, aligned lava domes reaching 6160 and 6330 masl. The dome cluster and its voluminous lava flows overlie an old stratovolcano with inverted lava flows dated at 1.02 Ma. The 0.4 Ma-old base of dome cluster is overlain by lower lava flows c. 270 - 254 ka, middle lava flows c. 118 - 108 ka, and the uppermost lava domes 70 – 60 ka. A high-spatial resolution DEM shows six vents on the domes and one collapse scar open to the south. NCVC has grown atop a caldera as shown by AMS data collected on Early Quaternary ignimbrites dipping away west, south and east of NCVC, and by abnormal contacts with both adjacent volcanoes to the WNW and the ESE. All lavas show two major compositional fields of high-K andesites and dacites (SiO_2 57-67%wt). Harker diagrams and trace elements suggest AFC magmatic processes. Although CNVC tephra and PDC deposits represent a small volume, we observed Late Glacial Plinian fallout are scattered and Holocene ashfall layers are associated with three lava flows, the youngest being 1700 to 2400 yr old. The Nevado Coropuna ice cap c. 44.1 km^2 is arguably the largest in the world tropical belt.