High Rate CGPS Instrumentation on Cotopaxi Volcano

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Cotopaxi volcano, Ecuador, is a large stratovolcano located approximately 60 km south of the capitol city Quito. The last important eruption (VEI 4) occurred in 1877 and mild eruptive activity continued into the early 1900s. In an effort to improve the deformation monitoring of Cotopaxi volcano, two dual frequency (L1/L2) GPS receivers (Trimble NetRS receivers with Zephyr Geodetic antennas with ground planes) were installed in early 2005 on the NE and SW flanks of Cotopaxi at 4400 m elevation, with a baseline length of approximately 8 km. Data arrives to the Instituto Geofisico-Quito in real time via telemetry/ethernet connection. Data processing will assess probable correlations between the vigorous seismic swarms and increased gas exhalations from the crater, which are observed by a permanent video camera on the crater rim (5890 m), with possible inflationary/deflationary cycles related to the migration of magma and/or magmatic volatiles. This new instrumentation compliments the data obtained from two L1 GPS instruments operating since 2002 (installed by UNAVCO), six EDM arrays measured since 1987, and two telemetered tiltmeters.

Figure 1. Photograph of CGPS site CONE on the northeast flank of Cotopaxi volcano. This CGPS site along with CGPS site MORU span the edifice with a baseline length of 8 km. The CONE monument is 0.5 m spike mount, epoxied into a glaciated lava flow.