



GPS Signal Feature Analysis to Detect Volcanic Plume on Mount Etna

Flavio Cannavo['] (1), Massimo Aranzulla (1), Simona Scollo (1), Giuseppe Puglisi (1), and Giuseppina Imme['] (2)

(1) INGV - Istituto Nazionale di Geofisica e Vulcanologia, Catania, Catania, Italy (flavio.cannavo@ct.ingv.it), (2)

Dipartimento di Fisica e Astronomia, Università degli Studi di Catania, Italy

Volcanic ash produced during explosive eruptions can cause disruptions to aviation operations and to population living around active volcanoes. Thus, detection of volcanic plume becomes a crucial issue to reduce troubles connected to its presence. Nowadays, the volcanic plume detection is carried out by using different approaches such as satellites, radars and lidars. Recently, the capability of GPS to retrieve volcanic plumes has been also investigated and some tests applied to explosive activity of Etna have demonstrated that also the GPS may give useful information. In this work, we use the permanent and continuous GPS network of the Istituto Nazionale di Geofisica e Vulcanologia, Osservatorio Etneo (Italy) that consists of 35 stations located all around volcano flanks. Data are processed by the GAMIT package developed by Massachusetts Institute of Technology. Here we investigate the possibility to quantify the volcanic plume through the GPS signal features and to estimate its spatial distribution by means of a tomographic inversion algorithm. The method is tested on volcanic plumes produced during the lava fountain of 4-5 September 2007, already used to confirm if weak explosive activity may or may not affect the GPS signals.