



GPS APPLICATION TO THE STUDY OF GROUND DEFORMATION IN THE VOLCANO TECTONIC SYSTEM OF THE GRACIOSA ISLAND (Azores)

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The Azores archipelago is located in North Atlantic Ocean, in the junction of Eurasian, American and African plates, which reflect the existence of a complex system of fractures, namely the Mid-Atlantic Ridge, the Eastern Azorean fracture zone, the Terceira Rift and the Gloria Fault. The Azores are, therefore, an excellent place for the application and development of various volcano tectonic observation techniques (geophysics, geochemistry and geodesy) and preliminary modeling of some of the volcanic systems. In the scope of the Azores seismovolcanic monitoring programme a geodetic network was implemented in Graciosa Island.

This network is composed by thirty-four geodetic benchmarks distributed according to the main volcanic and tectonic structures. A continuous GPS station installed in the island since 2003 is used as reference. In the last five years there have been eight observation campaigns, which took place between September 2003 and July 2008. For the processing of the GPS observations it was used the Bernese GPS Software 5 (developed at the University of Berne). For the GPS processing of September 2003, March 2004 and August 2004 campaigns, three processing strategies were tested to study the effect of the correction of troposphere refraction, resulting in three different solutions: one solution with pure modeling (no estimation of troposphere parameters) and two solutions with estimation of one and two troposphere parameters, using Niell's hydrostatic mapping function. A processing methodology was created, a good and reliable zero-epoch for the study of the volcanic-tectonic system of the Graciosa Island was established and a preliminary evaluation of the velocity field was obtained for Graciosa island.