Geophysical Research Abstracts, Vol. 9, 00430, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-00430
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Crustal deformation models and time- frequency analysis of GPS data from Deception Island Volcano (South Shetland Islands, Antarctica)

M. E. Ramírez(1), M. Berrocoso(1),M. J. González-Fuentes(1),A. Fernández-Ros(1)

(1)Laboratorio de Astronomía, Geodesia y Cartografía. Dep. Matemáticas, Facultad de Ciencias. Universidad de Cádiz. (mariaeva.ramirez@uca.es/Fax- Nr: (+0034) 956 016 288)

Deception Island Volcano is one of the few active volcanoes in the Antarctica, with its last reported eruptions in 1967, 1969 and 1970. It is situated in the South Shetland archipelago, lying on the Bransfield Basin, which constitutes an actively extending marginal basin separating the South Shetland Arc from the Antarctic Peninsula. In this area it also takes place the conjunction of four major tectonic plates, what makes this environment to be scientifically interesting from the tectonic and volcanic point of view. From 1989, GPS surveying campaigns and seismic monitoring are planned every austral summer in order to control and monitor the volcanic status in the island.

GPS data from the 12 stations that constitute the geodetic network are episodically processed with the BERNESE v4.2 GPS Scientific Software to obtain the displacements in the island along the years. In addition, GPS data were reprocessed by considering 30 min observation windows. Wavelet tools for the time-frequency analysis of the data were applied to the obtained time series. In particular, this work deals with the filtering strategies and the detection of certain seasonal components that are not reflected by the usual processing strategies, which consider 24 hours observation windows, as well as the time variation of the detected periodicities. A brief discussion about the noise property in the data is also included in this contribution.