

GPS DETECTION OF MOVEMENTS BETWEEN SCO AND SAM PLATES IN TIERRA DEL FUEGO ISLAND

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The nearly 600 km long Magallanes-Fagnano fault zone is interpreted as part of the modern transform boundary between the Scotia (SCO) and South American (SAM) plates. In Argentinean Tierra del Fuego the fault zone consists of several E-W rectilinear segments including the Fagnano-Turbio fault. Evidence from geologic and geophysics data are all consistent with a general left-lateral relative motion but quantification of separation rates were poorly constrained. In 1993, a 20 points GPS network was established in the region. It was measured each two years since then, last time during February 1999. Comparing vector components of different epochs, a clear displacement of about 30 mm have been detected between the points located in the south of Fagnano-Turbio fault, with respect to those in the northern part of the island. This means that in this region, the SCO plate is moving eastward at about 5 mm/year with respect to SAM plate. Taking into account the DORIS global movement determinations in Rio Grande (SAM – Tierra del Fuego) and Antartica, “absolute” motions for SCO plate can also be estimated. Recent geological mapping shows a consistent left-lateral displacement of about 20-30 km of the Jurassic-Cretaceous; Lower Cretaceous-Upper Cretaceous and Upper Cretaceous-Paleogene stratigraphic contacts across the northern and southern blocks of the Fagnano-Turbio fault. The youngest fault involved unit is the Upper Eocene (c. 34 Ma) and thus the geologic estimation of the separation rate is in the order of the millimeter per year, which is consistent with the geodetic measurements.