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Stress transfer and time variations of the steady-state plate divergence in Iceland : a continuous GPS contribution.

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Many studies realized nowadays about the tectonic activity of Iceland have shown that deformation is expressed by volcanic and seismic crisis. In southern Iceland, the recurrence between each main events evolves between several years in the Eastern Volcanic Zone (EVZ) to 45 to 115 years for the South Iceland Seismic Zone (SISZ). From 1995, the installation of a continuous GPS (CGPS) network allows to follow current displacements and to study the time variations of velocities in relation with the seismic and volcanic activity of Iceland.

The analysis of the time series of this 17 CGPS stations in Iceland between July 2000 and December 2002 has allowed us to highlight some important displacement variations in the SISZ and the EVZ. For the SISZ, all the stations have presented a displacement oriented between 114˚N and 128˚N for the second part of 2000 and between 105˚N and 115˚N until end-2002. The comparison of this time evolution with the progressive decrease of the microseismicity for the same period confirms that this eastward orientation of the displacement highlights a short period of post-seismic deformation (less than 2 years). For the EVZ, the displacements of the CGPS stations show some strong variations mainly detected on the north-south component. The periods of low southward displacements are synchronous with periods of strong seismic activity of the Katla volcano and could correspond with periods of depletion of the volcanic edifice induced by a emptying of the magma chamber by magma injection into sills or dykes located at low depth.