

# Overview of results from continuous GPS observations in Iceland from 1995 to 2010

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**Abstract** — *Iceland is a natural laboratory for a variety of processes associated with crustal deformation, such as earthquakes, magmatic events, tectonic plate motions, and glacial load changes. Continuous GPS (CGPS) measurements started in Iceland in 1995, and since then data from the network have helped to shed light on many different active deformation processes. The number of CGPS sites in Iceland tripled during 2006–2008, as a result of an international collaborative effort coordinated by Icelandic scientists. By early 2010 the number of CGPS stations in Iceland had reached 64, located primarily around and within the North-American–Eurasian plate boundary zone. Since its initiation, the CGPS network has played an important role in monitoring volcanoes and seismogenic areas, most notably during the 2009–2010 Eyjafjallajökull volcano unrest. Plate spreading of up to 2 cm per year usually dominates the horizontal motion observed at the CGPS sites, while uplift is observed at many of the stations due to recent retreat of the Icelandic ice caps. Co-seismic and post-seismic deformation of the largest earthquakes in 2000 and 2008 in the South Iceland Seismic Zone were captured by the network, and high-rate (1 Hz) CGPS observations helped to identify two magnitude 6 mainshocks in 2008 that were separated in time by only 2–3 seconds. The CGPS network has thus enabled us to monitor deformation occurring over days to months caused by migration of magma or fluids, post-seismic transients, rapid deformation caused by earthquakes and eruptions, as well as the long term plate spreading signal.*