



## **Geodetic observations in Iceland: divergent plate boundary influenced by a hotspot**

Benedikt Gunnar Ofeigsson (1), Sigrun Hreinsdóttir (2), Freysteinn Sigmundsson (2), Thora Arnadóttir (2), Kristin Vogfjörð (1), Halldor Geirsson (3), Pall Einarsson (2), Sigurjon Jonsson (4), Thierry Villemin (5), Sigurdur Fjalar Sigurdsson (1), Matthew Roberts (1), Erik Sturkell (6), Peter C Lafemina (3), Richard Bennett (7), Christof Voelksen (8), Gudmundur Valsson (9), and Thorarinn Sigurdsson (9)

(1) Icelandic Meteorological Office, Reykjavik, Iceland (bgo@vedur.is), (2) NordVulk, Institute of Earth Sciences, University of Iceland, Reykjavik, Iceland, (3) The Pennsylvania State University, University Park, PA, United States, (4) King Abdullah University of Science and Technology, (5) Université de Savoie/CNRS, le Bourget du Lac, France, (6) University of Gothenburg, Sweden, (7) University of Arizona, Tucson, AZ, United States, (8) Bayerische Akademie der Wissenschaften, München, Germany, (9) National Land Survey of Iceland, Akranes, Iceland

The mid Atlantic ridge, separating the Eurasian and North American tectonic plates, is mostly buried below the Atlantic. There are, however, a few places where subaerial exposure of the mid-oceanic rift system allows geodetic observations of the deformation associated with the plate boundary. Iceland is the largest portion of the system emerged above sea level, a consequence of excessive volcanism caused by the interaction of a mantle plume with the mid-oceanic ridge. Iceland is therefore a unique site to study processes associated with divergent plate boundaries, and the effects of the plume-ridge interaction. A network of continuous GPS stations have been operating in Iceland since 1995 when the first station was installed in Reykjavik. Since then, stations have been added to the network at different points in time, with over 70 stations presently in operation. The network has been used e.g. for studies of deformation associated with the divergent plate boundary, micro-plate formation due to rift jumps, the plate-spreading deformation cycle associated with rifting episodes, strain rates and stress accumulation on transform zones connecting the ridge segments and deformation due to magmatic processes. In addition the GPS network is used in studies of the deformation associated with mass variations of Iceland's glaciers. The continuous GPS network serves as monitoring tool in Iceland, both for volcanic and seismic hazards but also as a research tool. In the recent Futurvolc project, which partly builds on EPOS, the data from the continuous GPS network along with data from the seismic network and InSAR observations, will serve as the main input in joint analyses of long and short term magma movements in volcanic regions. The establishment of the continuous GPS network in Iceland has provided an ideal tool to further increase our understanding of the geodynamic processes associated with divergent plate boundaries and plume-ridge interaction as well as establishing a background velocity field, serving as the backbone for detailed geodetic studies of individual processes.