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The BIFROST project: 21 years of search for the true crustal deformation in Fennoscandia

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The BIFROST (Baseline Inferences for Fennoscandian Rebound Observations Sea Level and Tec-tonics) project was started in 1993. The first primary goal was to establish a new and useful three-dimensional measurement of the movements in the earth crust based on GNSS observa-tions, able to constrain models of the GIA (glacial isostatic ad-justment) process in Fen-noscandia. Station velocities based on analysis of observations at permanent GPS stations in Sweden and Finland from the period August 1993 to May 2000 was presented in Johansson et al. (2002) and Scherneck et al. (2002) together with a thorough description of the BIFROST net-work. These velocities have then been used to constrain a viscoelastic self-gravitating model of the Fennoscandian GIA pro-cess (Milne et al. 2001, 2004). Updated station velocities were pre-sented in Lidberg et al. (2010) based on data from the period 1996 to fall 2006. Some additional sites in Norway, Denmark and northern Europe were also included in this solution. The early phase of the BIFROST effort, especially up to mid 1996, comprised a period of intensive devel-opment and hardware changes at the GPS sites. Such changes in hardware installation results in shifts in the position time series. Therefore the solution in Lidberg et al. (2010) shows smaller uncertainties in station velocity compared to Johansson et al. (2002).

Here we present our latest GNSS-based 3D velocity field of the Fennoscandian Glacial Isostatic Adjust-ment (GIA) process, and compare these with the latest model of GIA in Fennoscandia derived within BIFROST. The solution to be presented is the result of a re-processing of data from 1993 to 2014 including several hundred stations in northern Europe. It was computed using state-of-the-art strategy with the most recent versions of both GAMIT and GIPSY/OASIS software. We evaluate computed station velocities and discuss agreements and differences to previous presented GNSS solutions and GIA models.

Of special interests in activities like BIFROST are issues regarding reference frames, which are especially important while searching for true vertical velocities, as well as long-term stability in the observation system including new generation of satellites and changes in the ground seg-ment. These issues will also be discussed in the presentation.

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