Finnish Permanent GNSS Network, FinnRef

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SUMMARY

The National Land Survey of Finland operates a nation-wide GNSS network of 20 stations. All stations, equipped with individually calibrated choke ring antennas and GNSS-receivers, track 1 Hz data from GPS, Glonass, Galileo, Beidou and SBAS. The data are streamed to the processing center of the NLS, where the error modeling takes place. DGNSS corrections are transmitted free of charge through an IP network using NTRIP protocol and RTCM standards. The Rinex data of all the stations are stored for post processing purposes.

The Finnish Geospatial Research Institute (FGI), the research unit of the NLS, maintains the coordinate system of Finland, the national ETRS89 realization EUREF-FIN. The time series of daily Rinex data are analyzed for monitoring the deformations of the EUREF-FIN. The frame is mainly deformed due to the postglacial rebound and plate tectonics. Due to the crustal deformation the relation between ITRF (International Terrestrial Reference Frame) and EUREF-FIN is not accurately known without constant monitoring.

In this paper we explain the roles of the NLS and FGI for network operations. We describe in detail our concept for building a highly stable CORS network and how we provide open data freely for public and for research and development. We show achievable accuracies for open service. We also introduce the Aurora project as an example how the network can be fine-tuned for research purposes. Aurora is a test platform, located above the polar circle, which is designed for validating intelligent transport solutions in extreme weather conditions. We will provide an accurate GNSS correction service for the E8 road between Kolari and Kilpisjärvi. For the purpose 4 additional FinnRef stations will be built to Finnish Lapland.
