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Observation of Crustal Deformation around the Pärvie Postglacial Fault, Lapland, Sweden, using InSAR techniques

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The Pärvie postglacial fault is a 155 km long fault that probably snapped in one single and anomalously steep reverse-slip event at the end of the Pleistocene glaciation about 9,500 ybp. Still today the seismicity, limited to roughly one magnitude-3.5 event per 15 years, one M=2 event per year, is anomalous and events have been attributed to the fault system by seismologists. In this project we try to find signatures of deformation using different interferometric Radar Remote Sensing techniques. A stack of ERS and ENVISAT acquisitions straddling over 15 years has been analysed with multi-baseline interferometric stacking (MB) and with the Short Baseline (SBAS) method. Also Persistent Scatterer methods have been attempted, but with less success owing to the lack of strong and sharply confined reflectors. In our findings we notice correlation between mm-sized displacements in outlined zones near the fault; they appear to correlate with the variations of seismicity that seismologists of the Swedish National Seismic Network have determined. In addition, rockfalls and slumps in areas of typically 1-3 km diameter could be found. The results of SBAS and MB techniques show comparable signatures of deformation. Our results may bracket the range of the ratio of "aseismic" to seismoc slip in this area. The fault scarp itself is not visible in the deformation patterns. Thus we expect rather low values for this ratio.