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Velocity structure of the uppermost crust along the southern part of FIRE4 profile in northern Finland

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The Finnish Reflection Experiment (FIRE) was a reflection seismic survey in which data along four profiles was acquired in 2001 - 2003. In the measurements Vibroseis sources were used. Along profiles FIRE3 and FIRE4 also wide angle reflection and refraction survey was made using the same sources as in reflection seismic study. The FIRE4 reflection profile is situated in the northern Finland. The wide angle reflection and refraction profile is 235 km long. It stretches from south to north and crosses Archaean granitoids, early Proterozoic Peräpohja Schists Belt and Central Lapland Granitoid Complex. The Vibroseis source point interval of the FIRE project was 100 m. During the wide angle reflection and refraction experiment thirteen recording stations were deployed as evenly as possible along the profile. In our study we obtained the P-wave velocity model of the uppermost crust using the wide angle reflection and refraction data from the FIRE4 with both trial and error method and inversion using Rayinvr code by Zelt (1992). The first arrivals and reflections from boundaries in the uppermost crust can be traced to the offsets of 20 - 60 km. The maximum depth obtained is about 5 km. There are three main layers in the model with near horizontal layer boundaries that can be traced through whole model. The depth of the first boundary is about 0.8 km, while second layer is about 2.5 km deep. The major geological units can be seen in the model as horizontal variations in the P-wave velocity. The near surface velocity in the Archean granitoids, Peräpohja Schist Belt, and Central Lapland Granitoid Complex, are about 6,0 km/s, 5,7 km/s, and 5.9 km/s respectively. Similar horizontal velocity variations were detected also in the second and third layers.