

Seismic soundings of sediment thickness on Skeiðarársandur, SE-Iceland

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Abstract – Seismic soundings on Skeiðarársandur show clear reflections from bedrock and inter-sedimentary layers. Ten seismic profiles were collected at scattered locations in 1997 and 1999. They indicate a sediment thickness of 80–100 m near the terminus of Skeiðarárjökull, increasing to about 250 m at the coast. The soundings suggest that a 100 m deep valley is present in the bedrock south of Skaftafell, probably eroded by a Pleistocene ice stream. Three seismic units are detected in the sediments. The uppermost unit and the most voluminous consists of unconsolidated glaciofluvial sediments with a seismic velocity of 1.4–1.8 km s⁻¹. A second unit with a slightly higher seismic velocity (1.9–2.2 km s⁻¹) is found inside the outermost moraines of Skeiðarárjökull and Svínafellsjökull. A comparison with studies on Breiðamerkursandur suggests that this unit may be glaciofluvial Holocene sediments compacted by loading of ice during the Little Ice Age and earlier Holocene advances. Alternatively, the higher velocities may be due to larger proportion of coarse-grained sediments in the vicinity of the glacier. A third unit, with seismic velocity of 2.5–2.7 km s⁻¹, is found in the southern and central parts of the sandur, buried under 100–150 m of sediments. The velocity is consistent with consolidated sedimentary rock of Pleistocene age. The total volume of sediments on Skeiðarársandur is 100–200 km³. The majority of this material has not been subjected to compaction under glaciers and must therefore date from the Holocene. There may have been large variations in sedimentation rates over the Holocene, but the average growth of the sandur body over the last 10,000 years has been about 1 km³/century.