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High output rates of subglacial till at the outlet of a paleo-ice stream draining the southwestern Fennoscandian Ice Sheet

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High-resolution seismic and core data have been used to study the North Sea Fan, located on the continental slope at the outlet of the Norwegian Channel, northern North Sea. The North Sea Fan is dominated by glacigenic debris flows sourced from subglacial till brought to the shelf break by the Norwegian Channel Ice Stream, which drained a major part of the southwestern Fennoscandian Ice Sheet. Thickness maps of glacigenic debris flows and evidence from well dated cores show that during the last glacial cycle close to 6000 km3 of glacigenic debris flows were deposited. Evidence from cores along the upper slope and in the Norwegian Channel suggests that the ice stream was active between c. 9 and 5 k.y. during the last glaciation (from ~28 ka to 15 14C ka BP). This activity period implies output rates of sediment between 6500 and 11600 m3 per metre of the ice stream front each year. These output rates are higher than what has been calculated from presently active ice streams in Antarctica. Implications for the thickness of the deformable till layer beneath the ice stream, sediment budget and slope stability will be discussed.