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Correlation between surface glacier motion and subglacial pressure, Engabreen, Norway.

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Several earth pressure cells are installed under 200m of ice at the ice-rock interface of Engabreen, an outlet glacier of Svartisen in northern Norway. The sensors measure variations in pressure at the base of the glacier at regular intervals. In May 2008, measurements were made of surface displacement of the glacier using differential GPS and ground based interferometric radar. The surface measurements were made about 1700 – 2000 metres down-glacier from the location of the earth pressure cells. The measurements occurred several days after a warm period when there was surface melting, but during a cold period of several degrees below zero and before the summer subglacial discharge regime was properly developed.

Many events occurred showing a sudden change in pressure at the base (usually a sharp drop, followed by a sharp rise) that were registered simultaneously at several load cells and with a magnitude of 5% or more change in pressure. These often correlated with a change in surface strain on the glacier surface shortly afterwards. However, several events were recorded at the base that seemed to have no expression on the surface motion, and sudden changes in surface motion did not always correlate with changes in basal pressure.