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Moraine destabilization leading to the 2013 landslide onto Svínafellsjökull glacier, SE Iceland

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On February 27th 2013 a large landslide fell onto Svínafellsjökull glacier, on the western slope of Öræfajökull volcano, SE Iceland. The slide occurred during an intensive rainstorm event between February 24th and 27th. The slide was detected at 20:30 o'clock at a seismic station located several kilometres away. It originated from lateral moraine and talus material below the steep north-eastern slope of Mt. Skarðatindur above a small contributory glacier. The debris flowed down-glacier towards the west with an approximate runout distance of 3000 m and a width of 500-600 m, covering about 1,4 km^2 or about 17% of the glaciers' surface. The extent of the debris deposit suggests a highly water saturated debris flow. Based on Digital Elevation Models (DEMs) from 2011 and 2013 the estimated volume of the slide was 5,4±0,1 million m^3 which makes it one of the largest debris slides in Iceland over the last decades.
Long term destabilization by glacier unloading was investigated by comparing DEMs from 1994 to 2011. Meteorological data suggests that record breaking amounts of precipitation in combination with snowmelt due to relatively warm temperatures in late February caused a significant water inflow into the system which is likely to have caused the failure.
Analysis of aerial imagery and DEMs after the failure suggest a complex slide. The debris cover on the glacier reduced the surface ablation which resulted in an up to 30 m height difference between the debris free glacier surface and the debris covered part in 2020.