Slow rock mass deformation in the mountain side north of the Tungnakvíslarjökull outlet glacier in western part of the Mýrdalsjökull glacier

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A large slow rock mass deformation has been detected in a mountain side north of the Tungnakvíslarjökull outlet glacier, located in the western part of the Mýrdalsjökull glacier in Iceland. A group of scientist from the University of Iceland, National Land Survey and Icelandic GeoSurvey have worked on collecting data from several sources and installed monitoring equipment at the site. According to observations, which were based on comparison of DEM from aerial photographs from 1945 to 2019, the slope has been showing slow rock mass deformation since at least 1945. The rate of movements has been estimated for the period from 1945 to 2019. The data show that the total displacement since 1945 is around 200 m. The data also indicate that the deformation rate has not been constant over this time period and the data shows that the maximum deformation was between 1999 and 2004 of total of 94 m or about 19 m/year.

The mountain slope north of the Tungnakvíslarjökull outlet glaciers reaches up to around 1100 m height. The head scarp of the slide, which is almost vertical, is around 2 km wide rising from about 4-500 m in the western part up to the Mýrdalsjökull glacier at 1100 m in the east. The total sliding from the head scarp down to the present day ice margin is around 1 km². The total volume of the moving mass is not known as the sliding plane is not known, but the minimum volume might be between 100 to 200 million m³. The entire slope shows signs of displacement and is heavily fractured and broken up. A GPS station that was installed in the uppermost part of the slope in August shows that the slope is moving about 3-9 mm per day, at a constant rate since installation.

There are two main ideas of the causes for this slow rock mass deformation. One is the consequences of slope steepening by glacial erosion, followed by unloading and de-buttressing due to glacial retreat. Another proposed cause for the deformation is related to its location on the western flank of the Katla volcano. Persistent seismic activity in this area for decades may be explained by a slowly rising cryptodome, which may also explain the slope failure.