



The Askja rockslide and the associated tsunami in the caldera lake

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A large rockslide was released in Askja, central Iceland, on the evening of 21 July 2014 and descended into the caldera lake. It is one of the largest known rockslides since the settlement of Iceland. The release area of the slide is approximately 900 m wide and 350 m above the lake. The front of the landslide travelled at least 2000 m along the lake bottom where it reached the depth of 150 m. The total run-out is approximately 3100 m and the fall height 500 m. The estimated volume of the slide is estimated as 15–50 million m³. The rockslide appeared as shallow tremor on IMO seismographs near Askja and the data show that the slide was released at 23:24. The slide created seismic waves that travelled over most of Iceland in roughly one minute. In addition, it triggered atmospheric pressure waves that were detected on an infrasound array some 210 km southwest of the event. The infrasound waves travelled this distance in 11 minutes and were reflected in the stratosphere.

Photographs from the rockslide area indicate that considerable movement had started a few years before the slide was released. Slow movement in the bedrock seems to have accelerated in the summer of 2014. There was deep snow in the mountains and fairly warm weather before the slide occurred. Percolating water from the melting snow might, thus, have increased the rate of movement. Seismic data indicate that a creeping movement started around 40 minutes before the slide, but at 23:24 the failure point was reached and the rockslide was released.

The slide triggered a tsunami in the lake that washed up on the lakeshores all around the lake, reaching up to 20–30 m elevation above the water level and even higher in some places. The wave travelled farthest around 400 m (horizontally) into the flatland SE of the crater Víti. It was fortunate that the rockslide occurred late at night when nobody was close to the water, otherwise it would have been extremely hazardous. A few hours earlier, dozens of people were at the lakeshore who might not have been able to escape the tsunami that is estimated to have travelled across the lake in only 1–2 minutes.

There were no eyewitnesses to the slide, but members of a search- and rescue team saw a white plume rise up above Askja at 23:27. The plume may have been created when the slide exposed shallow geothermal areas in the release zone thereby abruptly lowering the pressure in the geothermal water. In addition, a dust cloud created by the rock slide may have contributed to the plume.