



The eruption of Katla in 1918, new assessment of tephra distribution, jokulhlaup volume and water transported sedimentation

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The basaltic, subglacial and explosive Katla eruption in October-November 1918 has been considered one of the largest volcanic events in Iceland in the 20th century and the associated glacier outburst flood (jokulhlaup) the largest event of its kind since the 18th century. Contemporary observations were made mainly by locals and no earth scientists were active in Iceland at this time. Various studies have been made in the 100 years since the eruption. However, comprehensive studies defining with acceptable accuracy the key parameters such as erupted volume, jokulhlaup volume and airborne sediment transport, have been hampered by incomplete data. In 2018, we made an effort to address some of these issues. We have combined data obtained in 2018 with a large set of older data on thickness of the tephra layer, and by using new and accurate maps of the 1918 floodplain obtained reliable estimates of the tephra carried by the jokulhlaup and deposited on the outwash plain. Then we have used contemporary records to constrain as possible ice melting in the Katla caldera, size of the peninsula formed into the ocean by the jokulhlaup and other parameters such as timings of events. Moreover, we have used simple models of ice-flow to estimate thinning of tephra layers due longitudinal strain during ice transport. This allows us to correct for this strain and get a better idea of the original thickness near the vents. The results indicate that the Katla 1918 eruption produced the equivalent of similar to 0.8 km³ DRE. A minor part of this was deposited on the glacier bottom inside the caldera. About half of the total was transported with the jokulhlaups, whereof a large part was deposited by the first flood on 12 October 1918. The other half fell as tephra that was dispersed over a large part of Iceland.