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Comparison of tephra from a crater row, pseudocraters and tephra fall-out, all tephra from a large effusive eruption, the Þrengslaborgir - Lútentsborgir eruption 2300 BP in Mývatn, N-Iceland

T. Dolvik (1), Á. Höskuldsson (2), P. V. Kolka (2)

(1) Nordic Volcanological Center, Institute of Earth Science, University of Iceland, Askja, Sturlugata 7, IS-101 Reykjavik, Iceland (tore@hi.is), (2) Institute of Earth Science, University of Iceland, Askja, Sturlugata 7, IS-101 Reykjavik, Iceland

The Þrengslaborgir - Lútentsborgir eruption dates back to about 2300 BP. The eruption took place along a 16 km long fissure SE of lake Mývatn. It is among the more voluminous eruptions in Iceland with an estimated lava volume close to 3 cu km. The total length of the lava flow is 52 km, and the lava covers some 220 sq km. Within the Lake Mývatn basin the lava flowed into marsh land and early Lake Mývatn. Outlines of early Lake Myvatn have been suggested to be indicated by the aerial extent of pseudocraters in the area. Pseudocraters form when there is an interaction between a lava flow and water trapped underneath it. The process can produce a considerable amount of tephra. During fieldwork during the summer of 2006 we sampled tephra near the eruptive crater-row (3 samples), from the pseudocraters (12 samples) and within the tephra sectors preserved in the soil cover around Lake Myvatn (30 samples). The pseudocraters sampled for this study are at 5-15 km distance NW of the eruptive crater row, whereas the soil sections are sampled at 10-20 km away (W-NW). The soil sections were sampled west (SW, W and NW) of Lake Mývatn. However, soil cover and younger lava flows limited soil section sampling towards the east. Irregularities in tephra thickness and maximum grain size indicate that several tephra lobes extend out from the pseudocraters, in accordance with pseudocrater clusters observed within the lava flow field. The pattern shows that the pseudocraters are the main provider of tephra west of Lake Myvatn. In a soil section less than one km from the eruptive crater row the juvenile tephra is only about 2 cm thick and thins out rapidly. This further sup-

ports that the tephra in the soil sections at a distance of 10 to 20 km from the crater row originate from the pseudocrater clusters. The difference in lobe directions shows variation in wind during the eruption, and it further shows that the pseudocrater clusters were not active at the same time. The samples from the crater row are dominated by light brown, glassy tephra (>96 %), they are skewed towards coarser grains and very poorly sorted. In contrast to the juvenile tephra from the eruptive crater row, the tephra from the pseudocraters is denser and richer in tackylite. The tephra grains do also show microcrystalline structures on the surface, structures that are not observed in the juvenile tephra. Frequently the tephra grains from the pseudocraters are covered by diatomite. Grain size characteristics of the two tephra groups differ in some way. The juvenile tephra has a peaked distribution while the pseudocrater tephra is flat topped, otherwise both groups show normal distribution being skewed towards coarser grains and are they are poorly sorted. Our study shows that a clear distinction can be made between the two types of tephra and that it can be linked with physio-chemical conditions of the magma at the time of eruption.