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# Lightning during volcanic eruptions in Iceland

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Eyewitness accounts of volcanic eruptions sometimes describe near-continuous lightning activity in the ash plume, especially in subglacial or submarine eruptions. The interaction between magma and water is considered responsible for electric charge separation, leading to positively charged vapor and negatively charged ash. In the Katla 1755 subglacial eruption, two persons were killed by volcanogenic lightning some 30 km away from the volcano. Lightning data collected during the latest three volcanic eruptions in Iceland; Grímsvötn 1998, Hekla 2000 and Grímsvötn 2004, are reviewed. Fortunately for our data collection, no "weather" thunderstorm activity was occurring close to Iceland during these eruptions. The lightning in the Grímsvötn 1998 subglacial eruption were measured by both the LLP Icelandic lightning location system and the ATD sferics system of the UK Met Office. During the eruptions of Hekla 2000 and Grímsvötn 2004 we collected data from both these lightning location systems as well as from our EFMS wave recording station, located in Reykjavík. The station records variations in the vertical electric field with a sampling interval of 200 ns. We note a good correlation between the lightning activity and the intensity of the eruptions as indicated by the height of the ash plume observed by weather radar. The lightning data collected during these three brief volcanic eruptions gives valuable insight into the character of volcanogenic lightning and how they differ from weather lightning.