

## A surprisingly explosive volcanic history, Snæfellsjökull W. Iceland

Wesley R. Farnsworth<sup>a,b</sup>, Nína Aradóttir<sup>a</sup>, Egill Erlendsson<sup>c</sup>, Esther R. Guðmundsdóttir<sup>a</sup>, Guðrún Larsen<sup>a</sup>, Nicolaj K. Larsen<sup>b</sup> and Kurt H. Kjær<sup>b</sup>

<sup>a</sup>Institute of Earth Sciences, University of Iceland, Reykjavík, Iceland; [WesleyF@hi.is](mailto:WesleyF@hi.is); [estherrg@hi.is](mailto:estherrg@hi.is); [glare@hi.is](mailto:glare@hi.is); [nia1@hi.is](mailto:nia1@hi.is)

<sup>b</sup>Globe Institute, University of Copenhagen, Copenhagen, Denmark; [nicl@sund.ku.dk](mailto:nicl@sund.ku.dk); [kurtk@sund.ku.dk](mailto:kurtk@sund.ku.dk);

<sup>c</sup>Institute of Life and Environmental Sciences, University of Iceland, Reykjavík, Iceland; [egille@hi.is](mailto:egille@hi.is);

Iceland's post-glacial explosive volcanic history is predominantly derived from investigations of soil sections as well as written archives, following human settlement *c.* 870 CE. While this approach provides detail to our understanding of past explosive volcanism, prehistoric knowledge is limited by the development and distribution of Iceland's soil. Knowledge gaps exist during the Early Holocene (prior to extensive soil formation) and in relation to specific understudied coastal provinces (largely flanked by sea rather than soil). As a result, tephra from large explosive eruptions is regularly first identified overseas and locally lacks key details (e.g. specific source province, range in geochemical properties, eruption age). While tephrochronological investigations through the last century have mainly focused on historically active volcanic provinces (e.g. Hekla, Katla, Bárðarbunga-Veiðivötn and Grímsvötn), some volcanic provinces remain understudied. Even despite the risk of explosive eruptions ( $\geq$ VEI 4), not only locally effecting Iceland, but potentially large parts of Europe. The Snæfellsjökull volcano, located on a peninsula extending 100 km off the west coast of Iceland (110 km north of the capital city Reykjavík) is a prime example of one of these understudied provinces. While the glaciated central volcano has no described historical eruptions, there are three explosive events known from the post-glacial era: *Sn-1* ~1.8 ka BP, *Sn-2* ~4.0 ka BP and *Sn-3* ~8-9 ka BP. It is suggested that tephra from at least two of these eruptions has been identified in European stratigraphic archives. Furthermore, numerous other (crypto-) tephra horizons have been identified in Europe that exhibit similar geochemical properties to the Snæfellsjökull province. However, we lack knowledge on the extent of its post-glacial explosive volcanism and the potential range in tephra geochemistry. In this study we present several lake records from the Snæfellsnes peninsula to improve understanding of post-glacial explosive volcanic activity effecting both regional and distal environments.