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# Geothermal potential of small sub-volcanic intrusions in a typical Icelandic caldera setting

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Geothermal exploration targets large magmatic intrusions as heat sources because of their size, longevity, and amount of stored energy, but as shallow volcanic plumbing systems comprise numerous smaller intrusions, their geothermal potential warrants consideration. Here, we evaluate the geothermal impact of dykes and sills on caldera-infill rocks. We present geological data and geothermometry on intrusions in the eroded Breiðuvík caldera in Northeast Iceland, which serves as an analogue to the active, and geothermally exploited, Krafla volcano. This data informs 2D finite element models of dyke and sill intrusions that consider heat transfer in porous media. Our results indicate small intrusions create considerable thermal anomalies in their immediate vicinity. These anomalies are larger-magnitude and longer-lasting for individual thick sills and dykes, but networks of smaller sills and dykes emplaced close in time and space can create more widespread thermal anomalies that may be viable economic targets for decades after their emplacement.