

## Late stage assembly of a voluminous ignimbrite from multiple magma batches as revealed by in-situ Sr isotopic measurements

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The Heise caldera complex of the Yellowstone hotspot track represents a multi-cyclic caldera which was active between about 6.6 and 4.5 Ma. The youngest explosive eruption of the centre produced the 1,800 km<sup>3</sup>, rhyolitic Kilgore Tuff which is exposed to the north and south of the Snake River Plain. As part of a new mapping initiative and building on previous work in the region we are characterising the mineral componentry of the Kilgore Tuff. Previous work has shown that Kilgore Tuff represents the largest low-<sup>18</sup>O rhyolite known with O isotopes homogeneous in quartz and feldspars yet heterogeneous in zircon. Here we investigate multiple mineral phases to decipher the magmatic processes occurring prior to this catastrophic event. In feldspars we analysed major and trace elements and <sup>87</sup>Sr/<sup>86</sup>Sr ratios via in-situ LA-ICPMS, our results show that multiple populations of plagioclase exist within the Kilgore Tuff. The main plagioclase population is between 0.7116 and 0.7118, which is more radiogenic than the reported bulk values of 0.7103-0.7107. The variability observed in plagioclase in the Kilgore Tuff is in contrast both with the hotter rhyolites of the central Snake River Plain further west, and with the older explosive deposits from the Heise centre. Such compositional variety is surprising given the oxygen isotope evidence for magma homogeneity prior to eruption and the relatively high magmatic temperatures (estimated between 800-900 °C) which should act to homogenise isotopic variability. Under such conditions, Sr isotopic homogeneity in plagioclase is likely achieved in 5 mm grains within <10 kyr. The observed Sr isotope heterogeneity in Kilgore Tuff plagioclase may result from isolation of magma batches until shortly before eruption. Such rapid priming of the magma reservoir is increasingly being observed and may be a common occurrence in large-volume volcanic systems.