

Supplementary Information

High $^3\text{He}/^4\text{He}$ ratios in lower East Rift Zone steaming vents precede a new phase of Kilauea 2018 eruption by 8 months

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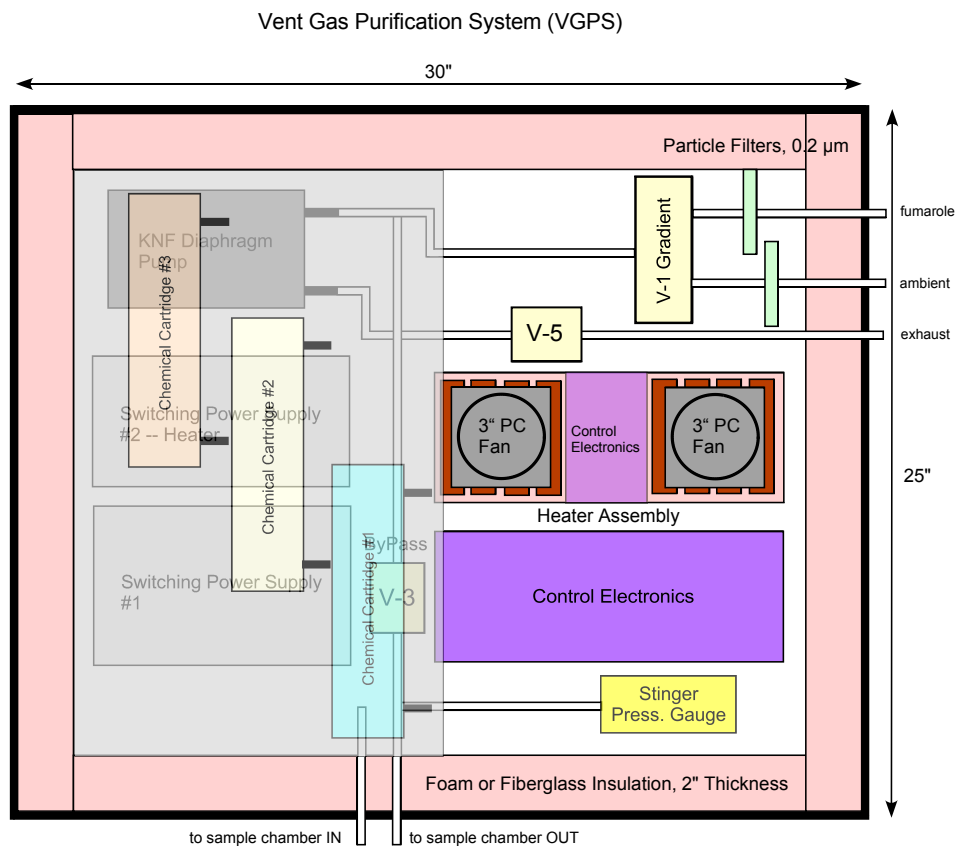


Fig. S1. Schematic diagram of the Vent Gas Purification System (VGPS). All components fit within a portable Pelican™ case. Three removable chemical cartridges clamp onto the top layer, with two DC power supplies and a diaphragm roughing pump located below. Internal Teflon™ solenoid valves direct gas flow. Pressure is measured with an InstruTec™ Stinger convection gauge. A custom command electronics board relays valve openings, temperatures, pressures and roughing pump on/off via a Rabbit™ microprocessor. A small heater assembly is used for extremely cold environments.

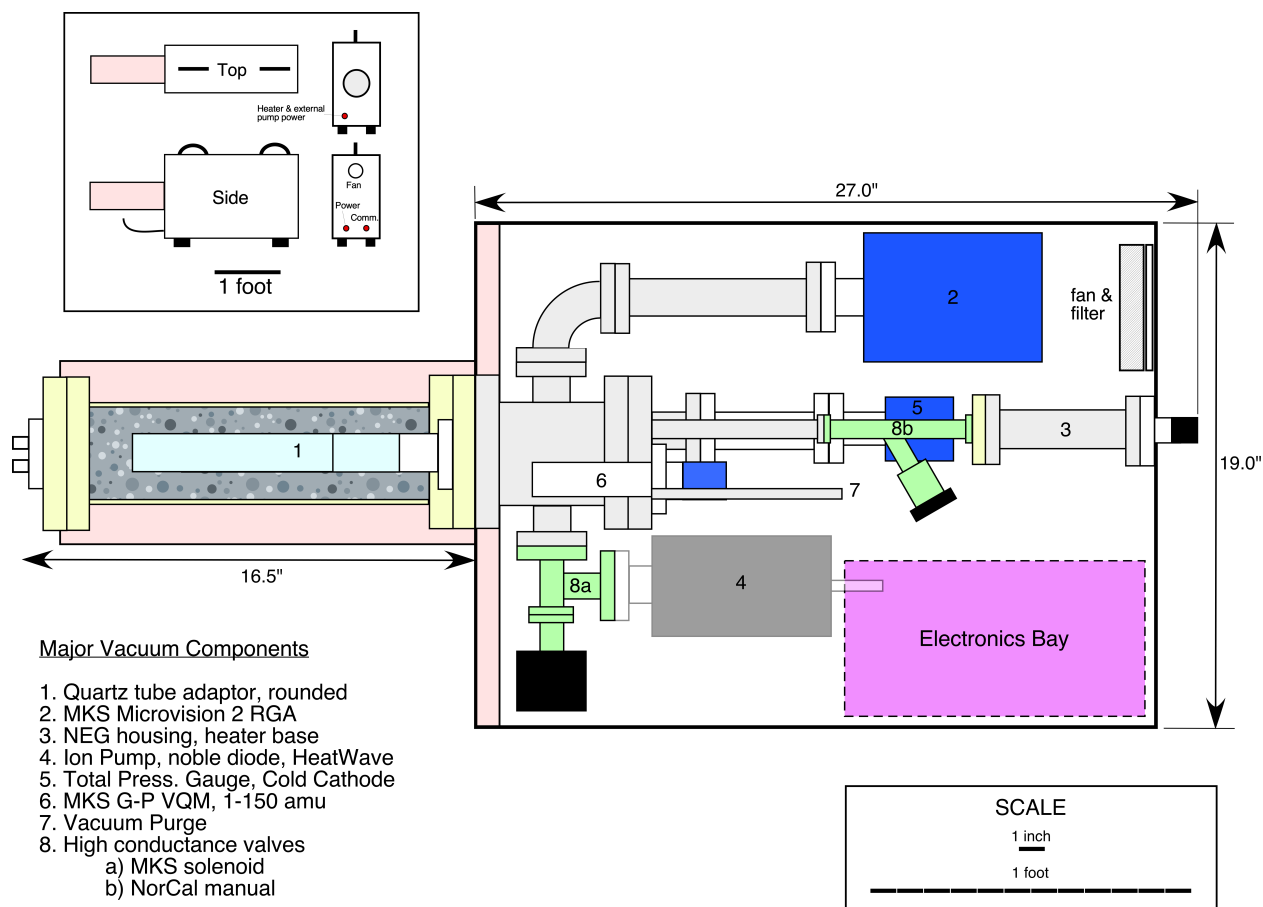


Fig. S2. Schematic diagram of portable field helium isotope detector, showing major vacuum components. A detailed description of the working procedure for this instrument can be found in McMurtry et al. [16].

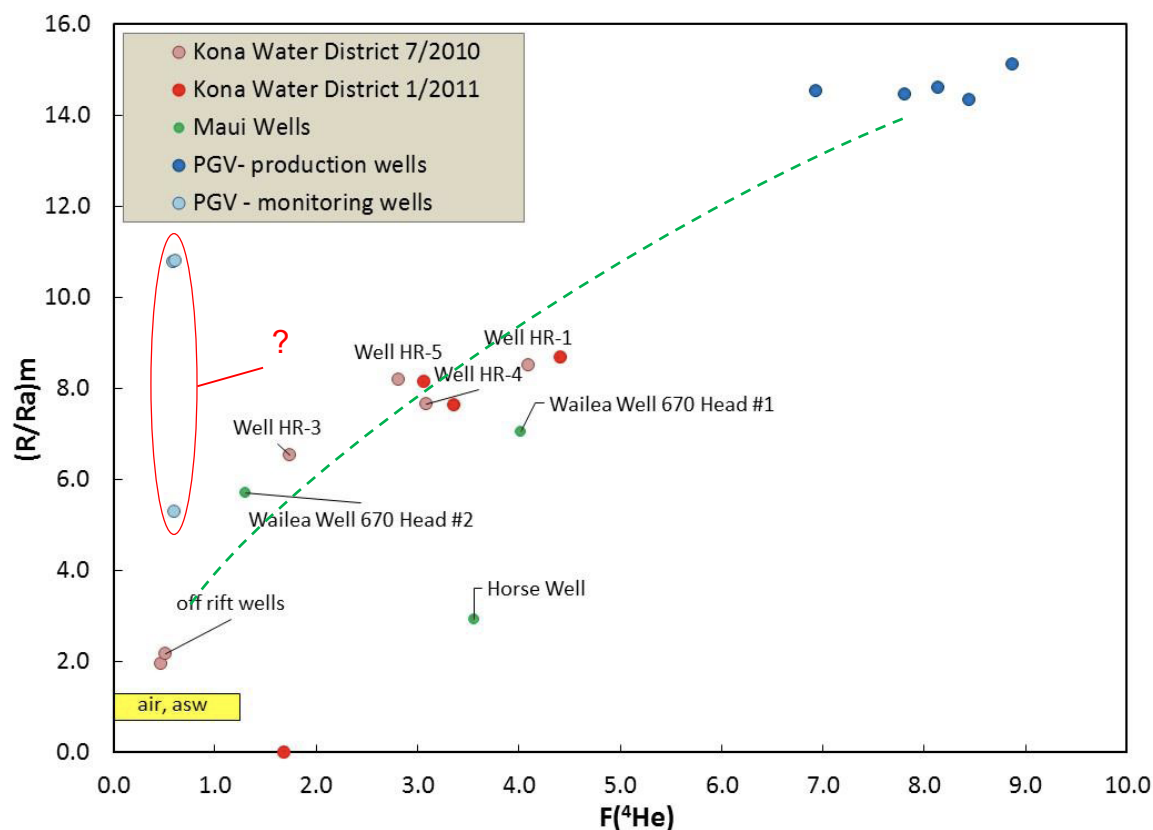


Fig. S3. Measured air-corrected helium isotopic compositions $[(R/Ra)_c]$ in waters as a function of the 4He enrichment factor $[F(^4He)]$, where $F(^4He) = (^4He/^{36}Ar)_{mantle}/(^4He/^{36}Ar)_{air}$. Data trend for Hualalai and Wailea samples is consistent with mixing of magmatic helium enriched components with air-saturated water (dashed green line). Anomalous groundwater samples ($n=3$) from PGV monitoring wells are circled in red. Figure modified from Fercho et al. [21].