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Low Latitude Cosmogenic 3He Production Rates in Olivine and Pyroxene (14 N̊, Fogo, Cape Verde Islands)

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Terrestrial cosmogenic nuclides are widely used for dating Quaternary geological surfaces (e.g. lava flows, glacial surfaces, river terraces) and determining rates of landscape development (erosion rates, bedrock incision rates). Accurate absolute age determinations of such processes require well-established production rates. The production rate of in situ cosmogenic nuclides is controlled by the latitude and altitude. So far production rates have been determined at several mid- and high-latitude sites and scaled to low latitude. Scaling production rates to different latitudes and altitudes may induce major systematic uncertainties in cosmogenic dating. Currently, production rates at low latitudes have not been determined independently but are needed for calibration of the scaling functions. A network of good calibration sites covering a wide range of geomagnetic latitudes is therefore needed. We will present cosmogenic 3He production rates in olivine and pyroxene phenocrysts from two lava flows on Fogo, Cape Verdes. The low latitude (14 ˚N) makes this the lowest latitude site sampled to date. Primary flow surfaces are well-preserved owing to the arid climate in the rain shadow of the volcano. Eleven samples collected from a single, $\sim$125 ka flow provide an accurate determination of the integrated Quaternary 3He production rate. Nine samples from a second, younger flow covering an altitude of $\sim$1150 m provide constraints on the altitude dependence of the 3He production rate.