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Electron Backscatter Diffraction (EBSD) documents randomly oriented c-Axes in Moonmilk Calcite Fibres – Evidence for Biologically induced precipitation

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Moonmilk represents a conspicuous but controversially discussed precipitate of cave settings. Here, new Electron Backscatter Diffractiometer microscopic and petrographic evidence on the nature of moonmilk calcite is presented. Calcite fibres in a moonmilk mat from the walls of an active cave (Tunnel Cave) in Devonian massive limestones in the northern part of the Rhenish Massif (Germany) show orientations of the c-axis independent from the fibre direction. This observation and the morphology of the fibres are probably indicative for microbially induced calcite precipitation. Carbon-isotope data are higher (1.9-3.3‰) than that commonly measured regionally in speleothem calcite (stalagmites, stalactites, flowstones) an observation attributed to kinetic effects. These findings add to our understanding of the complex interplay of inorganic and bio-induced carbonate precipitation in speloan environments.