

The Origin of Enigmatic, Tubular, Lake-Shore Karren: A Mechanism for Rapid Dissolution of Limestone in Carbonate-Saturated Waters

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Physical Geography Volume 23, Issue 1, 2002 pp. 1-20

<http://www.tandfonline.com/doi/abs/10.2747/0272-3646.23.1.1?tab=permissions#tabModule>

Abstract

Vertical, upward tapering, closed tubes (here termed "röhrenkarren") have been observed in abundance in limestone exposed in the epiphreatic zone around several lakes in Ireland. Röhrenkarren form by condensation corrosion within air pockets trapped by seasonal floodwaters. This promotes rapid limestone dissolution where lake, or cave, waters are at or near saturation with respect to calcium carbonate. Their abundance testifies to the large-scale dissolution of limestone and simultaneous enhancement of carbonate precipitation in carbonate-saturated environments where dissolution directly by lake water is very limited. Lake-specific differences in röhrenkarren morphometry provide a unique record of the long-term water chemistry at each site. The underlying mechanism has implications for other solid-liquid interfaces.