

Deep phreatic karstification of lower Cretaceous age and its impact on the industrial usability of Devonian limestones (Wülfrath, Germany).

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Devonian reef limestones of the Rhenish Massif are due to their purity intensively used for industrial purposes (10 Mio t/a). The up to 300 m thick limestone beds of Wülfrath are impacted by deep phreatic lower Cretaceous carstsystems.

Two types of caves have been discovered since 1997. The first type formed a tubelike cave of at least 1km length, a width of 200 m and a height of 20 m. The former cave today is completely filled by middle coarse sands with layers of clay and fusite, formed by forest fires. The age of the continental loose sediments is constraint by well preserved plant remains and is of Barremian to Albian age. Large parts of the cavesystem today are situated below the sea level and covered by more than 200 m of limestone. Erosive horizons with coarse conglomerats point to occasional turbulent conditions of cave sedimentation.

The second type of caves is a 400 m long, 200 m deep and 12 m wide vertical shaft which roof broke down and filled the cave by blocks of Devonian schists and limestones and lower Cretaceous sediments as being described from the first type.

Hence the limestone deposit is surrounded totaly by non dissoluble rocks, the karst processes were presumably developing under conditions of communicating pipes, possibly initiated by hydrothermal brines. Karstified and mineralized crossfaults support this interpretation. The limestone in the vicinity of the fossile caves is dissolved, pulverized and infiltrated with exotic trace elements as Pb, Zn, V, Cr, Co, Ni, Cu, Y.

The huge masses of loose sediments and dehardened limestones impacted seriously the limestone production.