

Doktorgrad om dannelse av labyrintgrotter i marmor

Development of extreme karst porosity - maze cave in marble stripe karst

Karst caves are formed by dissolution of flowing water and are most commonly found in carbonates and evaporites. Maze caves (labyrinths) in marble (meta-carbonate) stripe karst display a reticulate network pattern, comparable to a city street map, since cave conduits in metamorphic rock are dictated by fractures, faults and lithological interfaces. Maze caves form flow nets as they evolve by simultaneous dissolution of the most available fractures, which creates zones of extreme conduit porosity in the rock. This contrasts the common evolution of meteoric (hypergenic) caves as efficient and direct flow routes through single conduits. Understanding of the speleogenetic mechanisms for maze caves is motivated by its importance for capacity and yield from groundwater aquifers, mineralization, and petroleum migration in carbonate reservoirs.

The modelling experiments show that the characteristic conduit pattern of the surveyed caves evolved as a result of ice-contact, either in the outflow zone or parallel with the ice:rock contact. The maze caves had the same hydraulic function during the initial stages of development as during the latest stages of widening.