

### Mysteriet om tjørvomitten

#### The tjørvomite mystery

Along some of the walls of the Tjørve cave system, beautiful rosettes of tjørvomite can be observed. The tjørvomite rosettes are built up of crystals of the mineral calcite ( $\text{CaCO}_3$ ). Calcite is a mineral that may form over a large range in pressure and temperature; it may form at surface pressure and temperature, for example in an open cave, or it may form deep in the Earth's crust, at elevated pressures and temperatures. However, it is not straightforward to decide whether the calcite crystals of the Tjørve cave system formed near the surface, after the formation of the cave system, or whether they formed deep in the crust, long before cave formation. This article presents one possible model for the formation of the tjørvomite rosettes. It is emphasized, however, that the model has to be reconsidered when new data becomes available:

1) The Tjørve marble formed about 420 million years ago during metamorphism of calcareous sediments/limestones during the Caledonian orogeny (Fig. 5).

2) About 300 million years ago, extensional forces started acting on the crust, resulting in fracturing of the marble. Subsequently, the tjørvomite rosettes crystallized from hydrothermal solutions along the walls of open fractures, at several kilometers depth (Fig. 6a-b).

3) Millions of years later when the marble was exposed at the surface, the cave system developed along the same fractures as the tjørvomites had formed (Fig. 6c). Most of the tjørvomites were dissolved during cave formation, however, some of them escaped from dissolution.