



Facies, facies architecture and formation processes of a calcareous, self-build tufa channel (Steinerne Rinne) from Engelthal, Southern Germany

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‘Steinerne Rinnen’ are self build travertine channels and represent an exotic form of calcareous tufa deposits. Within the karst area of the Franconian Alb they appear at several places, but are restricted to Upper Jurassic limestone successions (Oxfordian to Tithonian).

Those built-ups are composed of small and elongated, slot like channels placed on a wall of moss tufa that has a strong geometric architecture. This suggests that their formation is controlled by a balanced interplay of inorganic and organic processes, whereas most of these processes are still unknown.

In this study, emphasis is given to the microfacies types and their distribution in the wall structure of a stone channel near the village of Engelthal. Stromatolitic facies types are restricted to the channel, whereas phytoherm moss tufa facies are the most common types in the external wall. Phytoclastic and peloidal tufa are restricted to small intercalations within the phytoherm built wall.

The distribution of cements and the grade of re-crystallisation is reflected by the carbonate contents that is rising from amounts of 40 to 65 wt.-% at the surface to amounts between 70 and 90 wt.-% within the wall. The contents show a slow increase at the first centimetres and a sudden rise between 8 and 12 cm below the wall surface. While the organic carbon has amounts of 14 to 21 wt.-% at the surface and is consistently decreasing to amounts amongst 5 and 10 wt.-% towards the interior.

The facies and the diagenetic features suggest that two types of carbonate formation take places in the wall. First carbonate is precipitated on the surface produced by biological and chemo-physical processes and it is driving process for the growing of the structure. The second formation occurs inside the wall and is produced by seepage water leading to a high cementation rate and re-crystallization. This process leads to the stabilization of the structure.