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## Smectite formation in the Úrkút Mn-ore deposit, Hungary

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During the well-known globally widespread Toarcian Oceanic Anoxic Event (T-OAE), Mn-rich strata were deposited across Europe. The majority of these are just a few mm to cm thick marker horizons, but economically significant deposits also occur. The most remarkable accumulation of this event is the Úrkút Mn-deposit (Bakony Mountains, Hungary).

The Úrkút ore deposit has been investigated in the last 100 years by many researchers. The most commonly accepted models for the genesis of the deposit derive Mn from a far unknown volcanic [1], [2], hydrothermal [3] or hydrogenetic [4] source. The dissolved manganese had precipitated from oceanic water as an oxidic-ore [3], [5]. This ore was then transformed to carbonatic-ore in an anoxic diagenetic environment by bacterial reduction [5].

In the case of the Úrkút deposit geochemical data suggest a volcanic or hydrothermal origin for the Mn, and this seems to be supported by the occurrence of special clay minerals. Smectites appear in the Mn-ore horizon and also in the embedding strata as a unique feature of the location in the whole Jurassic succession from Hungary [6], [7], [8].

We investigated the footwall sections below the manganese beds to estimate the timing of Mn-precipitation and the volcanogenic clay minerals. Our results show that the smectites occur readily in the footwall, sometimes up to 15 meters below the deposit (below the TOAE).

The results of X-ray fluorescence spectroscopic analysis show that if we normalize the data to Al, the Mn, Fe, Co and Zr are significantly enriched in the Mn-rich strata, whereas the other main trace elements are quite constant in the entire studied section. (Fig. 1), and independent of changes in the CaCO<sub>3</sub> content.

These results prove that the presence of smectites is not exclusively connected to the Mn-depositon, and it is not limited just to the anoxic event.

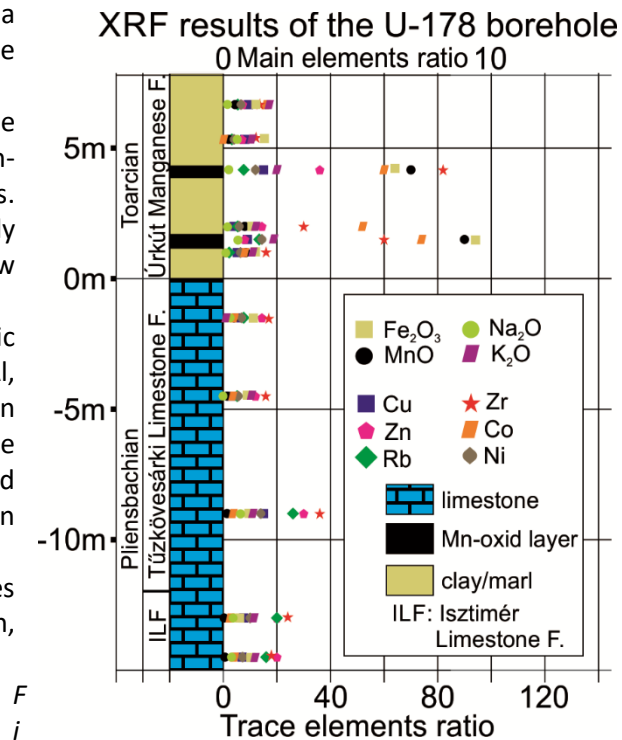


Figure 1: The XRF results were divided with Al<sub>2</sub>O<sub>3</sub> wt%

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