

**OUTCROP GAMMA-RAY LOGGING OF DEVONIAN SHALLOW MARINE DEPOSITS:
EXAMPLES FROM THE GRAZ PALEOZOIC (AUSTRIA).**

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Recent geological investigations focused on the Upper Nappe System of the Graz Paleozoic (Upper Silurian to Upper Carboniferous) include the recording of outcrop gamma-ray logs in addition to standard methods yielding "conventional" lithological parameters.

Individual formations (lithostratigraphic units) differ considerably with respect to their gamma-ray signatures, showing a distinct relationship with their lithological characteristics. Outstanding fluctuations of gamma-log data (measured in profiles predominantly built-up of carbonate rocks) are correlated with lithological changes (e.g. limestone-marl alternations, intercalation of tuffite-layer, lydite, phosphorite-nodules horizon etc.).

Striking features of some gamma-ray logs are outstanding values (minima or maxima) that cannot be attributed to such lithological criteria at the basis of field observations.

The "Barrandekalk"-Formation (a sequence of fossiliferous limestones interbedded with marls) was selected to explore the geological reasons for such unexplained "odd" gamma-values. The gamma-values observed in this section are significantly correlated with the quantity of insoluble residue (as expected) but some data suggest the existence of additional control mechanisms. This can be demonstrated by rocktype-specific analysis of data: some of the marls yield lower gamma-ray values than the limestones within the same profile.

The relationship between gamma-ray values and

- insoluble residue
- microfacies type ("energy dependence")
- calcite / dolomite - ratio
- content of S, C-org
- trace elements

was subject of our investigation. The correlations of the parameters listed will be demonstrated.