



Investigating geological processes and their links with geological structures through geomanifestations

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GeoConnect^{3d} introduced the concept of geomanifestations to define any distinct local expression of ongoing or past geological processes. These manifestations, or anomalies, often point to specific geologic conditions and, therefore, can be important sources of information to improve geological understanding of an area. Examples include seismicity, gas seeps, local compositional differences in groundwater and springs, thermal anomalies, mineral occurrences, jumps in hydraulic head, overpressured zones and geomorphological features. Geomanifestations are an addition to the structural framework model also being developed in GeoConnect^{3d}, aiming to show where and how processes and structures may be linked.

Data on geomanifestations are being collected in three areas: the Roer-to-Rhine area of interest in northwest Europe, and the Mura-Zala Basin and Battonya High within the Pannonian Basin area of interest in Eastern Europe. A first assessment of available data showed that groundwater-related geomanifestations in the form of anomalies in chemical composition (enrichment in elements such as Fe, or hydrocarbon gases and CO₂) or temperature (thermal water springs, geothermal anomaly in wells) are mappable in all areas. These geomanifestations point to special geological features in each area, such as proximity to magmatic reservoirs, presence of deep-rooted faults and considerable differences in the subsurface relief (trough–high system of the basement) among others. These anomalies at times define spatial patterns, which might or not be represented in the structural framework model, thus demonstrating whether they can be explained by the current geological understanding embedded in the structural framework. With this first test, we conclude that data on groundwater-related geomanifestations add to the robustness of the structural framework model. Further investigations with other types of geomanifestations are foreseen.

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