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Deformation bands in non-consolidated sediments (Eisenstadt Basin, Austria)

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We investigated deformation bands in sand and gravels of the Burgstall Schotter (Badenian), in a gravel pit northeast near St. Georgen (Austria), which is situated at the western margin of the Eisenstadt Basin, a subbasin of the Vienna Basin. A major NE-SW striking fault separates the clastic sediments (Burgstall Schotter) in the footwall from the calcarenites of the Leithakalk in the hanging wall. This normal fault is oriented subparallel to the Eisenstadt fault, which represents another major fault bordering the Eisenstadt Basin. In the unconsolidated sediments of the Burgstall Schotter, consisting mainly of coarse sands and gravels, displacement is localized along conjugate sets of deformation bands. Notably, no deformation bands have been observed in the sediments of the hanging wall. The sands within the deformation bands are slightly enriched in clay minerals and have a lower porosity compared to surrounding loose sands, which record high porosity and have essentially no cement. Within the deformation bands, the grain sizes are markedly smaller than those in the host rock. Alteration of the sands and gravels by iron-rich fluids is documented by conspicuous colour variations (Liesegang bands), which in many places emphasize the role of the deformation bands as barriers for fluids migration.

There are several kinematic sets of deformation bands, which have different spatial orientations: The northern part of the quarry is dominated by conjugate set of deformation bands dipping steeply towards ESE and WNW. This kinematic set coexists in the southern parts of the quarry with another set of conjugate deformation bands

dipping towards SSE and NNW. All deformation bands record extensional offset of marker horizons (mostly coarser grained layers or conglomeratic lenses) in the order of a few millimetres to several tens of centimetres. No systematic cross-cutting relationship between these two sets of deformation bands has been observed. Therefore, we favour the interpretation that both sets formed within the same deformation event, which is furthermore supported by the normal fault kinematics of all deformation bands.