

THREE DIMENSIONAL GROUND-PENETRATING RADAR ANALYSIS OF ALLUVIAL FAN DEPOSITS (DEATH VALLEY, SW USA)

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Although the number of scientific papers on depositional units of alluvial fans is growing, only little is known about the subsurface stacking pattern of these architectural elements. This study wants to test the utility of ground-penetrating radar (GPR) in three dimensionally imaging of alluvial fans, a landform that has had little attention by GPR users.

The study combines high-resolution, high-frequency GPR surveys with sedimentological studies at the cut-faces of incised channels. Using scaled 2D outcrop photo mosaics we quantitatively analysed lithofacies and architectural elements. Architectural elements are grouped to higher-order depositional systems (e.g. braided-fluvial

system or mass flows) and the prevailing depositional processes. The delineated depositional systems, which are separated by bounding surfaces, can be recognized in the outcrops. Depositional packages have been interpreted according to the morphometric base-level concept.

So far four alluvial fans (Trail Canyon Fan, Hanaupah Canyon Fan, Warm Spring and Anvil Spring Fan) have been investigated. The depositional record of all three fans shows overall genetic units, which are either dominated by debris flows or fluvial processes. Irrespective of the lithology in the catchment area, the overall stacking pattern shows increasing fluvial activity towards the top of the successions, by coeval reduced debris flows.