Supplementary data #1

Detailed description of methods used for unit identification

Initial mapping was performed on high-resolution orthophotos (0.5m per pixel) and was based on color and texture differences between identified mapping units. This was followed by actual field characterization of fluvial fan surfaces which was carried out according to the following criteria:

Relative age:

- Surface roughness: Examination of the maturation degree of desert pavements and advancement of surface smoothing process was used as criteria for unit definition. Comparison of pavement development, surficial particle size, spacing between the particles, and preservation degree of original flow pattern (bar and swale) were used as criteria for distinguishing between the mapping units and constraining their relative age (Bull, 1991).
- Soil development: Characterizations of soil profiles, developed on top of the fluvial surfaces, are useful for comparison and definition of mapping units. The gypsic–salic Reg soils in the study area (Amit et al., 1993) can be used as relative age indicators by comparison of three main soil properties: A. The thickness of the Av horizon (Gerson and Amit, 1987); B. The degree of gravel shattering by salts (Amit et al., 1993); and C. Depth of accumulation and thickness of the salt and gypsum horizon (Amit and Yaalon, 1996).

Lithological composition:

- The different lithological components of the fluvial sediments were examined and identified. Lithological composition can be used to determine the bedrock source that supplied the material and was thus exposed during the deposition period. Tracing of bedrock sources of fluvial sediments can also be used to infer possible flow directions at the time of deposition.

Sediment characteristics

Enhancement of sphericity, roundness, and sorting of the sediments is generally an indication of fluvial sediment transportation maturity. Increase or decrease in channel power typically results in growth or decay, respectively, of sediment particle size. Variation between grain supported

and mud supported bedding horizons can indicate changes from a high energy flow regime to a low energy flow, respectively. However, the short transportation distance in the mapped basins does not allow the full development of such distinct sediment characteristics, which were therefore only used as an aid in the mapping process and not as a unit defining parameter.

- Cross-bedding patterns: Examination of cross-bedding patterns (such as bedding thickness variation, formation of lens type bedding, bedding dip and dip direction) within the fluvial sequences can indicate changes in channel power, flow direction, and sediment supply variations within the drainage basin.

Supplementary data #2

A photo of the normal fault offsetting SQ1 sediments and the underlying sandstone bedrock (total vertical slip of ~1.5m; Location $29^0$36'28''N; $34^0$56'11''E).

Supplementary data #3

Detailed OSL results of the Shehoret basin. The grain size used for all OSL measurements was 90-125 microns.

Supplementary data #4

Detailed OSL results of the ZSF basin. The grain size used for all OSL measurements was 90-125 microns.