

Alluvial Fan Project: Relative Age Criteria

Post-Depositional Modification Processes

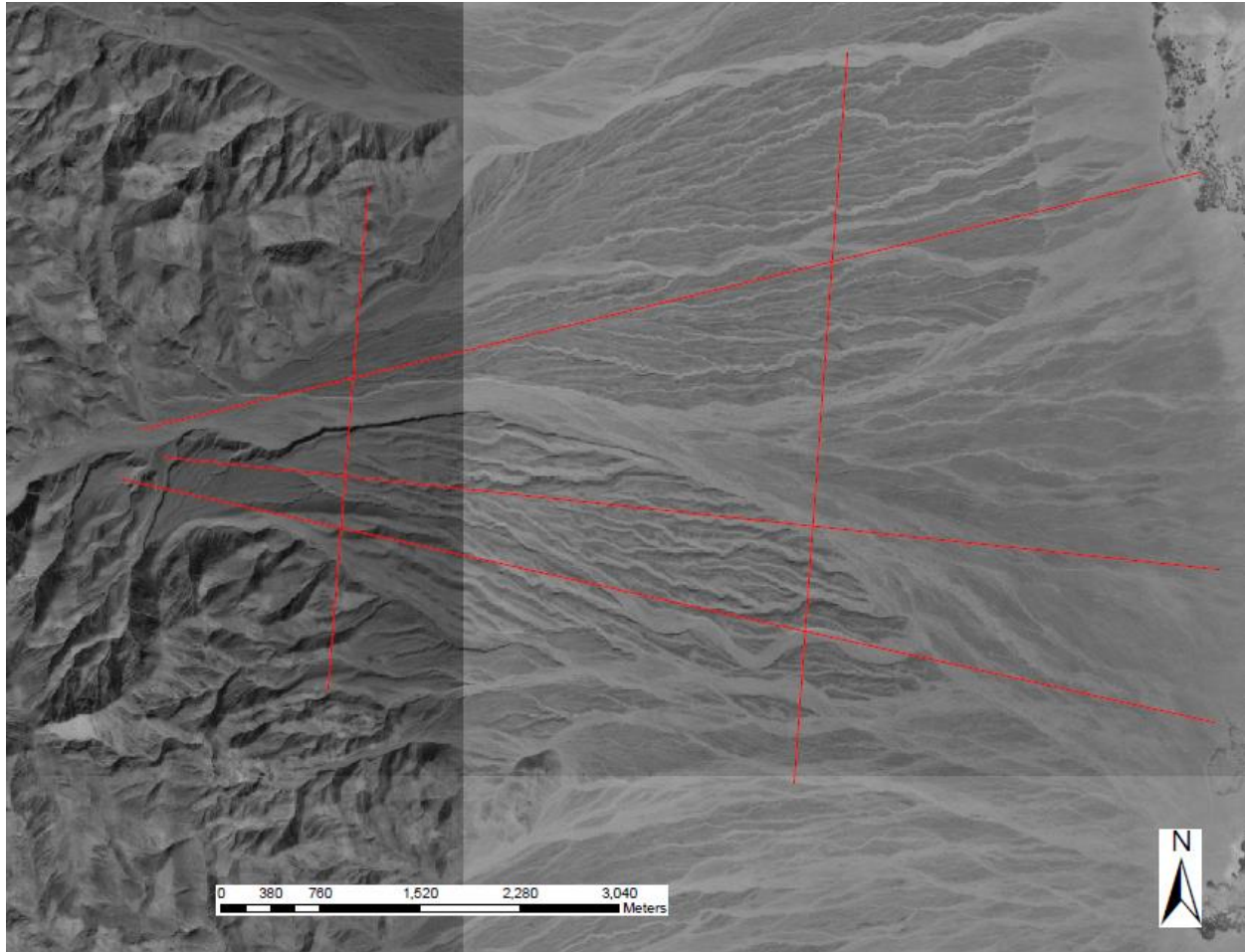
1. Vegetation growth (youngest surfaces, reaches climate-controlled limit fast)
2. Eolian (Wind) erosion (remove fines, sculpt cohesive sediment – yardangs)
3. Eolian deposition
 - a. Dust – changing soil character/color: I_c , caliche, runoff
 - b. Dunes or sandsheets
4. Bioturbation/Soil Creep (lowering highs, filling lows, smoothing out sharp edges)
 - a. Formation of desert pavement (linked to dust deposition and soil creep transport)
5. Weathering (break down of large boulders, soil development, breakdown of weaker clasts -> can change composition of the surface)
6. Formation of Desert Varnish on stable clasts (esp. on desert pavements)
7. Local Runoff: carve Rills and Gullies (younger than original surface, but best as part of surface);
Depth, spacing of Gullies set by:
 - a. Amount of Runoff (R_i , I_c); Time; Local Base level (elevation of surface relative to surroundings); Slope
8. Accumulation of Tectonic Deformation (faulting, folding, tilting – change slope, local base level)

Surface Changes with Age (time since abandonment)

1. Albedo (brightness)
 - a. Some processes Darken surfaces: 1, (2, 3 – if mafic), 5 (clay, oxidation), 6
 - b. Some Lighten surfaces: (2, 3 – if quartz or carbonate), 6, 7 (if expose lighter sub-surface, plus fresh, unvarnished gravel will occupy gully beds)
2. Color (composition – affects both visible and thermal IR)
 - a. Soil development: 1, 5, 6
 - b. Changing surface composition: 2, 3, 5 (concentrate resistant clasts at surface)
3. Large Scale Roughness – Topographic Relief
 - a. Increased by deformation and erosion: 7, 8
 - b. Decreased by infilling of original channels or erosional gullies: 2, 3, 4
4. Small Scale Roughness – Texture
 - a. Some process smoothen: 3, 4, 5
 - b. Some processed roughen: 1, 2, 7 (but rougher surfaces encourage eolian deposition)

Superposition

Cross-Cutting Relationships



Assigned Cross-Section locations. Include two Cross-fan (N-S) sections (at or near these locations one upper fan, one lower fan – you are free to choose the best location). Include a single down-fan (W-E) section at your preferred location, these are suggestions to consider. You are free to choose your favorite location for a radial, down-fan section line.

Example Excellent Unit Description (*the level of detail is the point, not the exact style or descriptions*)

Channel facies

Unit D3

Attribute	Characteristic	Picture
Slope	Intermediate	
Albedo/color	Very light grey	
Roughness	Very high	
Channel network	Braided	
Vegetation	Bushes in channels	
others	Easily to distinguish by color	