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### **Loessitic Origin, Provenance, and Paleoclimatic Significance of the Pennsylvanian-Permian Earp Formation Siltstone, Arizona**

Within southern and central Arizona, the Pennsylvanian-Permian Earp Formation and correlatives (Supai Group, Hermit Formation) contain abundant siltstone, but the origin and environmental significance of the silt is unclear. Here we document the depositional facies, areal extent, and provenance of the silt and assess paleoclimatic implications.

The Earp Formation in southeastern Arizona (~ 300 m) comprises cyclicly interbedded clastics and shallow marine carbonates, but the clastics consist almost entirely of silt. Siltstone facies include: (1) structureless siltstone (inferred loessite), (2) hummocky cross-stratified to planar-laminated, calcareous siltstone (marine-reworked loessite), and (3) medium-bedded siltstone exhibiting lateral accretion surfaces (fluvially-reworked loessite). Earp Formation correlatives in central Arizona (~ 175 m) include a larger proportion of silt relative to the southern sections. The basal section (undivided lower Supai Group) contains structureless siltstone (inferred loessite). Very fine-grained, cross-bedded (eolian) sandstone comprises the middle section (upper Supai Group), while the upper fraction (Hermit Formation) consists of planar-laminated siltstone (reworked loessite).

Preliminary detrital zircon geochronology indicates sources from the Yavapai-Mazatzal and Grenville terranes, in addition to other sources farther afield, suggesting both northerly and southerly winds (paleocoordinates). We are conducting additional detrital zircon work and whole-rock geochemistry to further constrain provenance and weathering issues.

Volumetrically significant silt in the subject strata suggests relatively arid conditions, despite the equatorial location. Provenance data suggesting both northerly and southerly winds might reflect seasonality, possibly related to Pangean monsoonal circulation. The origin of the silt is unclear; obvious ties to peridesert conditions are lacking, and other possible modes of silt formation should be considered.