

Permian loess and dust in the Lodève basin (France)

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French Carboniferous–Permian sedimentary basins record intramontane paleoequatorial climate during Pangean assembly, ice-age collapse, and megamonsoon inception. Herein we present data to elucidate the provenance, depositional character, and climatic signals recorded in the ~1.5 km-thick Permian Salagou Formation (Lodève Basin, southern Massif Central, France). The Salagou Formation predominantly consists of fine-grained red beds – Transitioning up-section from internally massive red mudstone (with local pedogenic features) to mudstone commonly interbedded with sedimentary structures that record intermittent shallow water. We interpret these strata to reflect eolian transport and ultimate deposition as loess, or in shallow, ephemeral lacustrine environments. Provenance analyses record rapid (1–17mm/year) exhumation of local Variscan basement during early Permian syn-orogenic extension. The coarse-grained nature of protoliths and geochemistry data that suggests minimal chemical weathering suggests that the generation of silt occurred by physical (cold-weathering processes). This work adds to a record of voluminous loess across low-latitude Pangea that archives a dusty atmosphere, potentially linked to glaciated alpine terranes. Finally, analysis and modeling of rock magnetic data records Milankovitch-scale paleoclimatic variability (predominant orbital eccentricity-scale, ~10-m-thick) through the middle to late Cisuralian (ca. 285–275 Ma) and optimal sedimentation rates between 9.4–13 cm/kyr.

Key words : Permian, loess, Lodève Basin, Provenance, Variscan Mountains