PP12A-07 - Paleoclimatic significance of Permian loess and dust in Variscan basins of eastern equatorial Pangaea

Monday, 9 December 2019

11:50 - 12:05

Moscone West - 2002, L2

Swirl Topics

Editors in Chief Picks - Track

Climate - SWIRL

Abstract

We use sedimentological, geochemical, and geochronological evidence to infer that the Permian Salagou Formation (Lodéve Basin, France) was transported by eolian processes, and accumulated both as loess, and as dust deposited in a shallow lacustrine environment. The ~2-km-thick unit is dominated by internally massive, red mudstone-siltstone with increasingly common evidence for deposition in shallow-water environments upsection, but a lack of channeling throughout. Quartz grain size analyses yield modes of exclusively silt (modes ~27 to 46μm) with minimal spatial or temporal variability. Randomly-oriented slickensides, micromorphological attributes, and CIA values in the mid-upper Salagou Formation signify incipient pedogenesis. To recognize loess-paleosol cyclicity more broadly, magnetic susceptibility was measured at 0.5-m intervals throughout the Salagou Formation. Preliminary analysis of these data shows a well-defined cyclicity that appears to record orbital eccentricity-scale variability in low-latitude climate during the collapse of the Late Paleozoic icehouse. Moreover, Permian dust deposition appears to have prevailed across multiple intramontane rift basins of the Variscan orogen (e.g., St. Affrique Basin, Provence Basin), and at least as far east as the Alps. These strata exhibit analogous sedimentological characteristics, grain sizes, and geochemistry, suggesting a similar provenance and transport history. Detrital zircon data indicate that Variscan basement supplied loess to the Lodéve Basin and potentially to coeval basins of the region. The production of such significant volumes of fine-grained sediment is consistent with the hypothesis of upland glaciation in this region, although more data are needed to further test this hypothesis.

Authors

Lily S Pfeifer
University of Oklahoma Norman Campus

Gerilyn S Soreghan
Univ of Oklahoma

Stephane Pochat

LPGN Laboratoire de Planétologie et Géodynamique de Nantes
Linda A Hinnov
George Mason University Fairfax

View Related