Production and weathering of loess in late Paleozoic tropical Pangaea and implications for iron delivery to the glacial ocean

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Loess(ite), or eolian siltstone, is abundant throughout the Permo-Pennsylvanian record of western equatorial Pangaea (western North America), occurring in units 10s to ≥ 1000 m thick. These various stratigraphic units consist of loessite alternating with paleosols and are inferred to record glacial and interglacial intervals, respectively. Provenance analyses (whole-rock geochemistry and detrital zircon geochronology) indicate the loess was derived, in part, from (largely granitoid) crystalline basement uplifts of the Ancestral Rocky Mountains. The Chemical Index of Alteration (CIA) through successive loessite-paleosol couplets from several different loessite accumulations varies systematically, from lows of 50-56 in loessite to highs of ≥ 70 in paleosols. These data indicate that each episode of loess deposition resulted largely from physical weathering of crystalline basement, and production occurred anew within each glacial cycle, resulting in fresh influx of highly weatherable material. High CIA values of paleosols reflects both (1) influx of primarily clay-rich dust during pedogenesis and (2) *in situ* weathering associated with soil formation.

Coeval marine (carbonate) systems distal to loess-producing regions also preserve a record of very fine-grained eolian dust deposition. Dust that accumulated during glacial lowstands in one such system (the Late Pennsylvanian Midland basin of Texas) record high ratios (0.66-0.78) of highly reactive iron (Fe_{HR}) to total iron (Fe_T). We hypothesize that the Fe_{HR} was derived from deflation of loess or loess-rich soils. Given the (1) large volume of loess deposition during this time interval, and (2) potential enrichments in Fe_{HR} associated with the loess and/or loess-rich soils, we hypothesize significant impacts on the carbon cycle owing to increased silicate weathering of the highly weatherable parent loess, and stimulation of productivity through delivery of Fe_{HR} to both continental and marine ecosystems.

Early Paleozoic granitoids of the Argun, Mamyn, Bureya terranes of the Central Asian fold belt

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In the structure of the eastern part of the Central-Asian fold belt a series of continental blocks (terranes) is distinguished. These are: the Argun, Mamyn, Bureya blocks (terranes) composed of granitoids of different ages but their age has being remained disputable for quite a long time. At present a series of age datings are obtained (U-Pb method). Basing on that datings we can say with certainty that the Early Paleozoic granitoids are widely developed in their structure.

In the eastern part of the Argun terrane we determined the age of subalkaline leucogranites of the Kovekta massif as being 467±6 Ma (MSWD=0.025). Within the Mamyn terrane we obtained the age of 495±3 Ma (MSWD=1.5) for granites of the Gar'-Ultuchi massif and that for quartz-diorite of the Oktyabrsky massif of 510±3 Ma (MSWD=0.8). In the Bureya terrane we obtained the age of 509±11 Ma (MSWD= 0.8) for granites of the Ust'-Isa massif and Kailan massif.

Similar age values are also given for granites of the Jyamusy terrane -515±8 Ma [3] bordering with the Bureya terrane. In this connection it cannot be excluded that all above mentioned Early Paleozoic granitiods belong to a single orogenic belt.

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