Climate Significance of Magnetic Material in Windblown Dust Deposits, Palouse Loess WA

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The Palouse loess sediments represent a Pleistocene to Holocene interval in geological time when deposition of eolian silt alternated with soil formation. We are looking at Palouse Loess to signify the climate over the past 2 million years in Eastern Washington. We use particle size and material composition to infer wind strength. We measured particle size of sediment samples collected at 1m intervals at a well-characterized outcrop near Clyde, Eastern Washington. To determine the composition, we measured the magnetic susceptibility of both the bulk samples and particle size fractions. This allowed us to relate the magnetic material composition of loess and the size distribution of windblown particles. Relative wind speeds based on particle sizes from the bulk sediments were between 15m/s (33.5mph, or near gale winds) and 70m/s (223mph, or EF4 tornado winds, according to the Enhanced Fujita Scale). The magnetic susceptibilities are within the range of those observed in Alaskan loess (5 to 10E-07) and are often highest in the sand-sized fraction, which could later be used to give a quantitative estimate of wind speed. The factors researched in this study give us a glimpse into the paleoclimate of Eastern Washington, where flooding, wind, and vegetation growth affected both sediment supply and soil formation.