Geophysical Research Abstracts,
Vol. 11, EGU2009-5887, 2009
EGU General Assembly 2009

Aeolian Transportation effects on Loess Mineralogy and Magnetic Susceptibility

N. Catto

Memorial University of Newfoundland, Geography, St. John's, Canada (ncatto@mun.ca)

Aeolian sediments and paleosols represent the principal forms of sedimentation and hold the record of climate change events in many unglaciated regions. Previous investigations have identified contributions from both local and distal sources to aeolian deposits, through textural, magnetic susceptibility, tephro-stratigraphic, and mineralogical analyses. The interplay among these parameters has led to the development of two distinct models of magnetic susceptibility (MS) response: the pedogenic model, in which MS values are higher in palaeosols than in loess; and the wind-vigour model, in which stronger winds transport heavier ferruginous minerals, resulting in higher MS values in loess units. As recognition of less prominent palaeosol units is in part predicted on MS analyses, differentiation of the effects of aeolian transport on mineralogy from pedogenic effects is potentially useful. In addition, the differentiation of loess source areas through consideration of texture or mineralogy also has implications for the analysis of MS results.

Investigation of loess, and aeolian sandy silt and silty sand deposits with known sources from several locations in Canada and Russia, has indicated that texture and ferruginous mineral content are linked. Significant variations occur within the same depositional stratum. Detailed mineralogical analysis is a necessary component in the interpretation of both aeolian transportation dynamics and MS analysis. The distinctive regional nature of some loess deposits is in part a function of their mineralogical composition.

Detailed investigations in the upper Danube basin have identified both local and regional effects in the climate signals preserved in loess. Hence, it is important to assess the relative contribution of each in the other key localities of the upper Danube and Elbe basins, in order to filter out local effects. Identification of the mineralogical influences on the MS and textural signals in the loess will facilitate correlation across central and eastern Europe eastward to the loess-palaeosol successions of the Central Russian Plain, Siberia, and China.