Geophysical Research Abstracts
Vol. 13, EGU2011-11398, 2011
EGU General Assembly 2011

Aeolian dust deposition in the Aral Sea – implications for changes in atmospheric circulation in Central Asia during the past 2.000 years

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In this poster, we present Late Holocene aeolian dust deposition in Central Asia using grain size distribution of detrital particles and bulk sediment flux at high resolution from an 11.12-m sediment core from the Aral Sea. Results of principal component analyses (PCA) show that fine silt-size fractions together with Ti, Fe and K are positively correlated with PC1 and related to aeolian dust storms, whereas the clay-sized fraction is positively correlated with PC2 indicating input as sheet wash.
Mean grain sizes show distinct fluctuations with extremely coarse values during the Little Ice Age (LIA, 1400 – 1780 AD), possibly linked to increased dust deposition as also indicated by a increase of bulk sediment flux. These temporal fluctuations are consistent with changes in the Siberian High and air temperature during the past 2.000 years, where low/high annual temperature anomalies correspond to high/low dust supplies in the Aral Sea sediments, respectively. Highest dust accumulation occurred during AD 1610 – 1620, coinciding with the lowest annual mean temperature in the northern hemisphere during the last millennium. A comparison with data from a lake in Turkey shows a similar pattern, indicating that that less moist air entered western central Asia during the Little Ice Age than during the Medieval Warm Period. The latter period was characterized by a higher clay content, indicating a stronger sheet-wash activity caused by more intensive rainfalls.