Supplement Material

Table S1: Location and type of environment for reference samples collected in 2012 north-east of Lake Karakul.

Sample	Elevation (m asl)	Latitude (°N)	Longitude (°E)	Type of Environment
1	3949	39.04457	73.59273	dry river channel
2	3947	39.06448	73.59615	former lake sediment
3	3947	39.06448	73.59615	former lake sediment
4	3932	39.07642	73.58897	modern pond
5	3968	39.09715	73.58402	recent aeolian sand
6	3965	39.14516	73.53809	dry river channel
7	3965	39.14702	73.53277	dry river channel
8	3962	39.14986	73.52621	slack water silt/slowly flowing seasonal river
9	4027	39.16245	73.49361	dry river channel
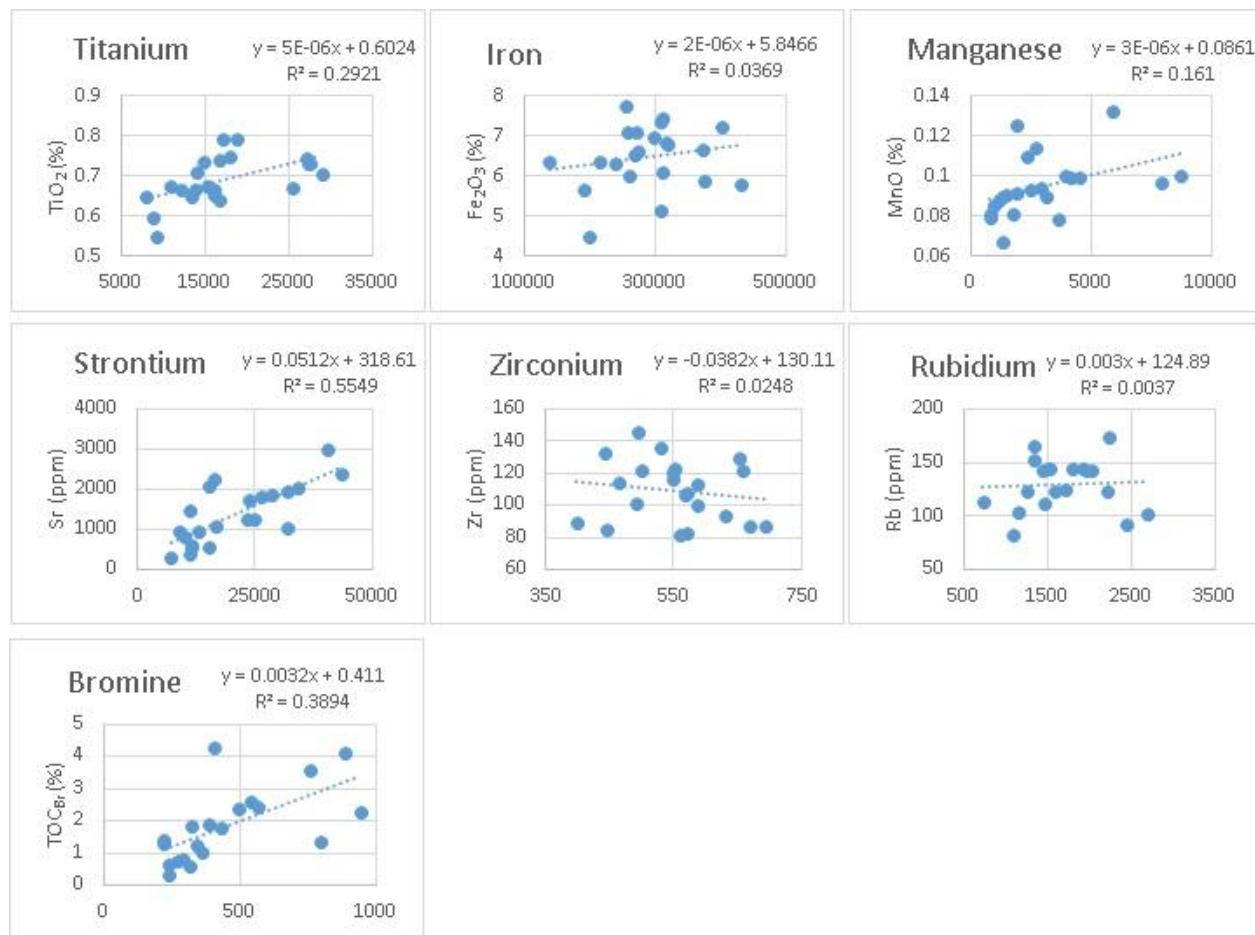
Figure S1: Cross-plots of x-ray fluorescence (XRF) scanner data, averaged over each cm, and XRF single sample measurements for calibration. The coefficient of determination is given in R^2 for each plot, x-axis are given in counts per second (cps).
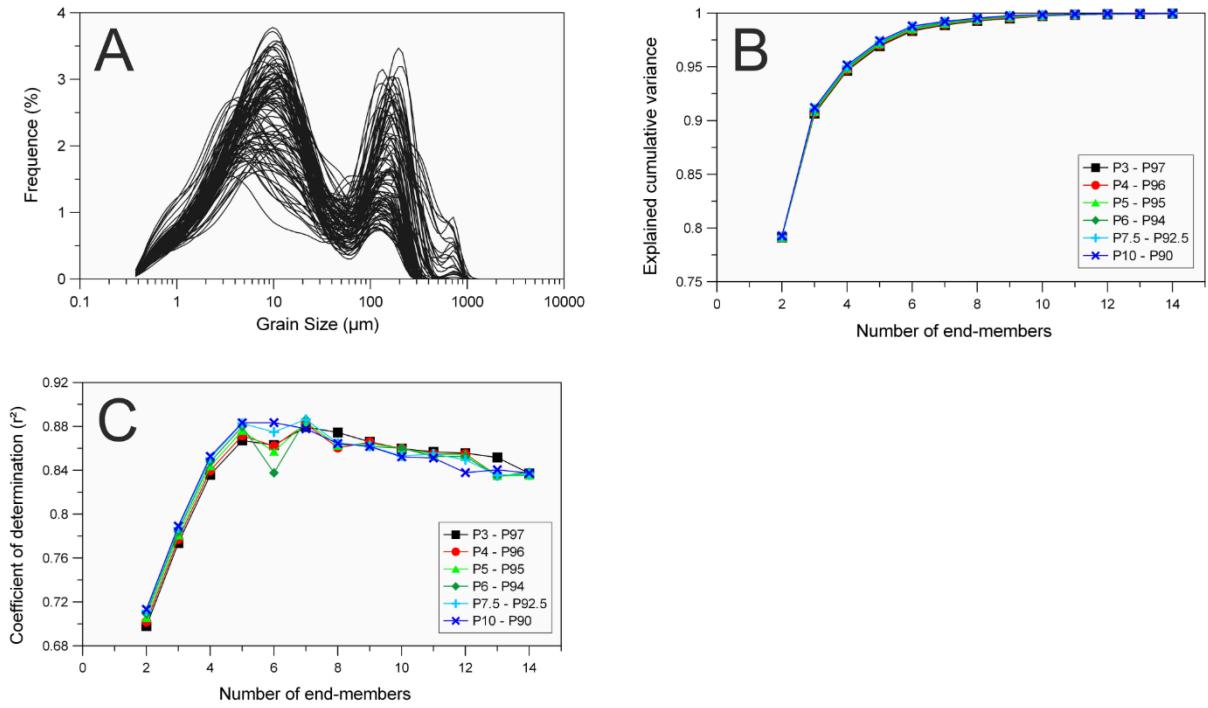
Figure S2: Grain-size distribution and end-member modelling analysis (EMMA) results for core KK12-1. A - Grain-size distribution of 101 measured samples, B - Explained cumulative variance, C - The main coefficient of determination (r^2) as a function of the number of end-members reflects the stability of the model and defines the maximum number of end-members at the maximum of r^2.