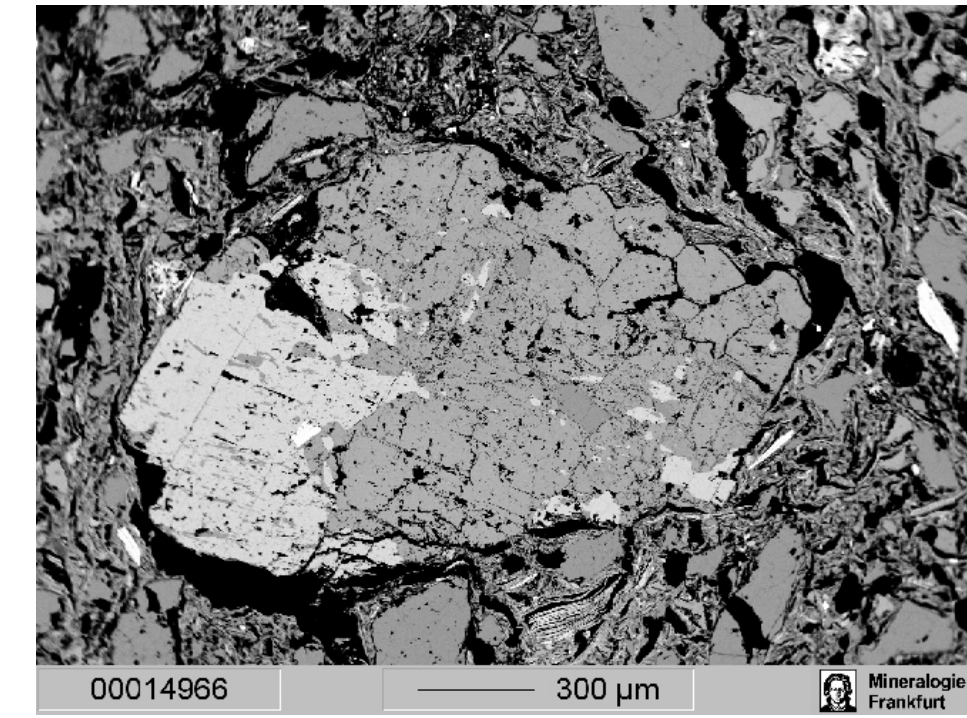
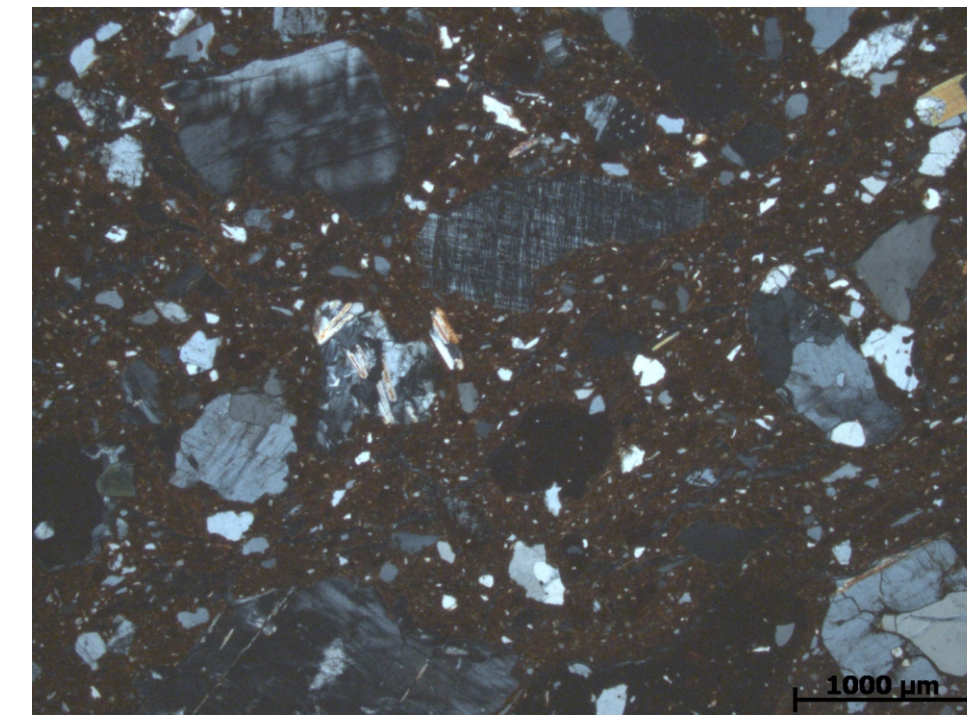
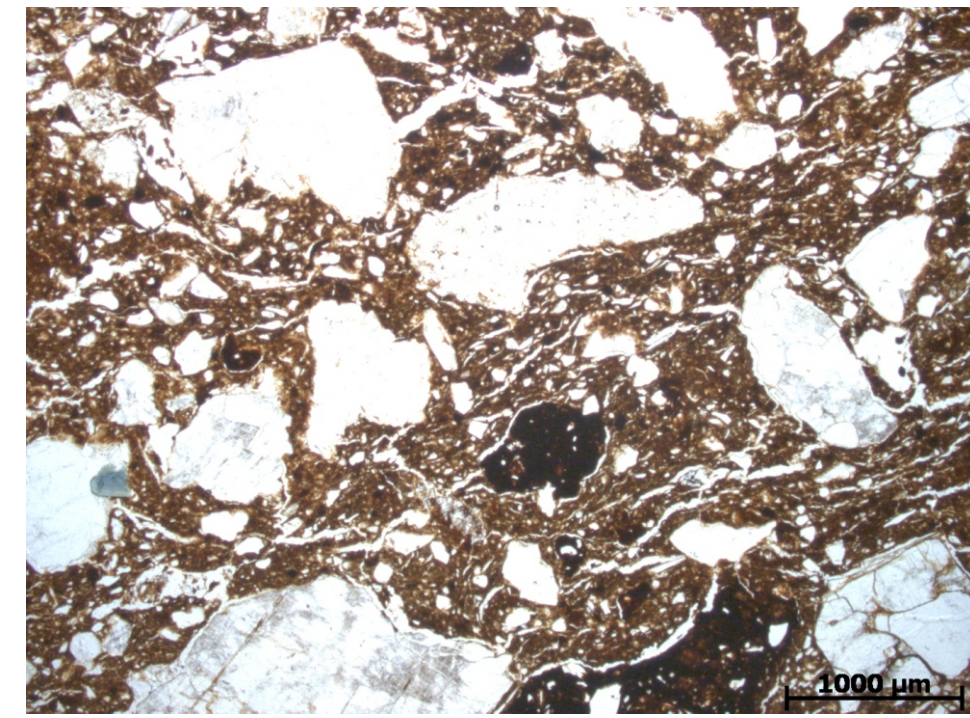
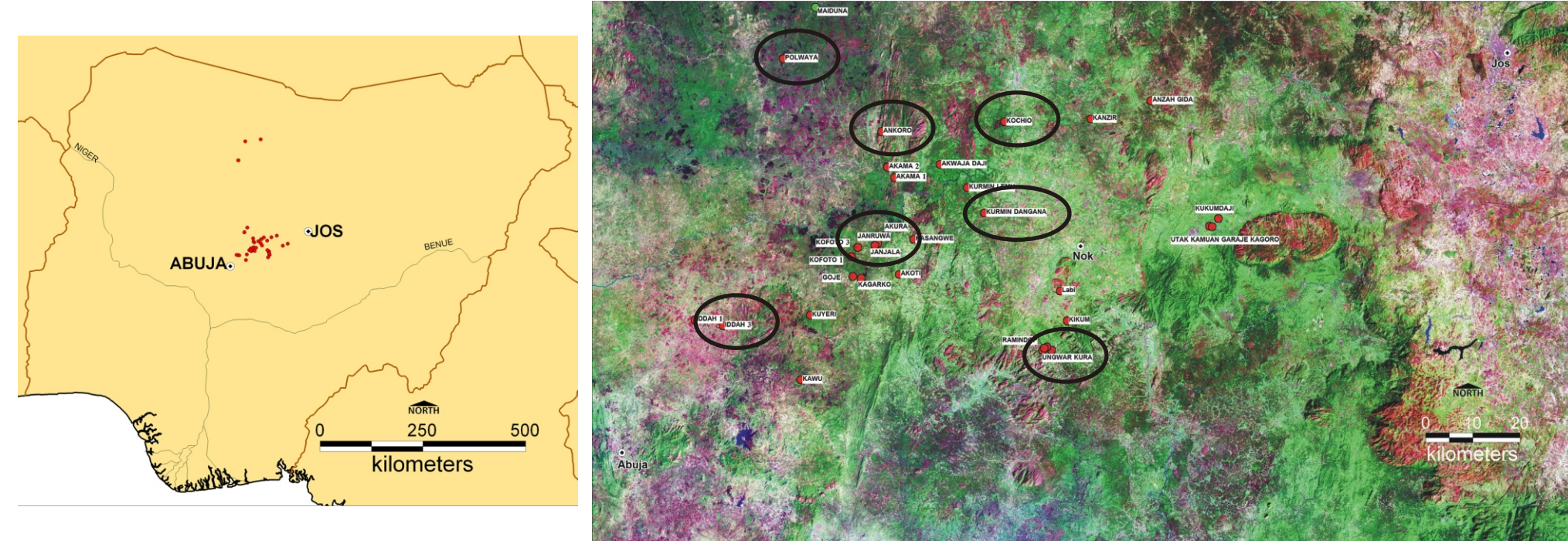


Mineralogical and geochemical analysis of pottery and terracotta of the Nok-Culture, Nigeria

Sites and methods - thin section and EPMA

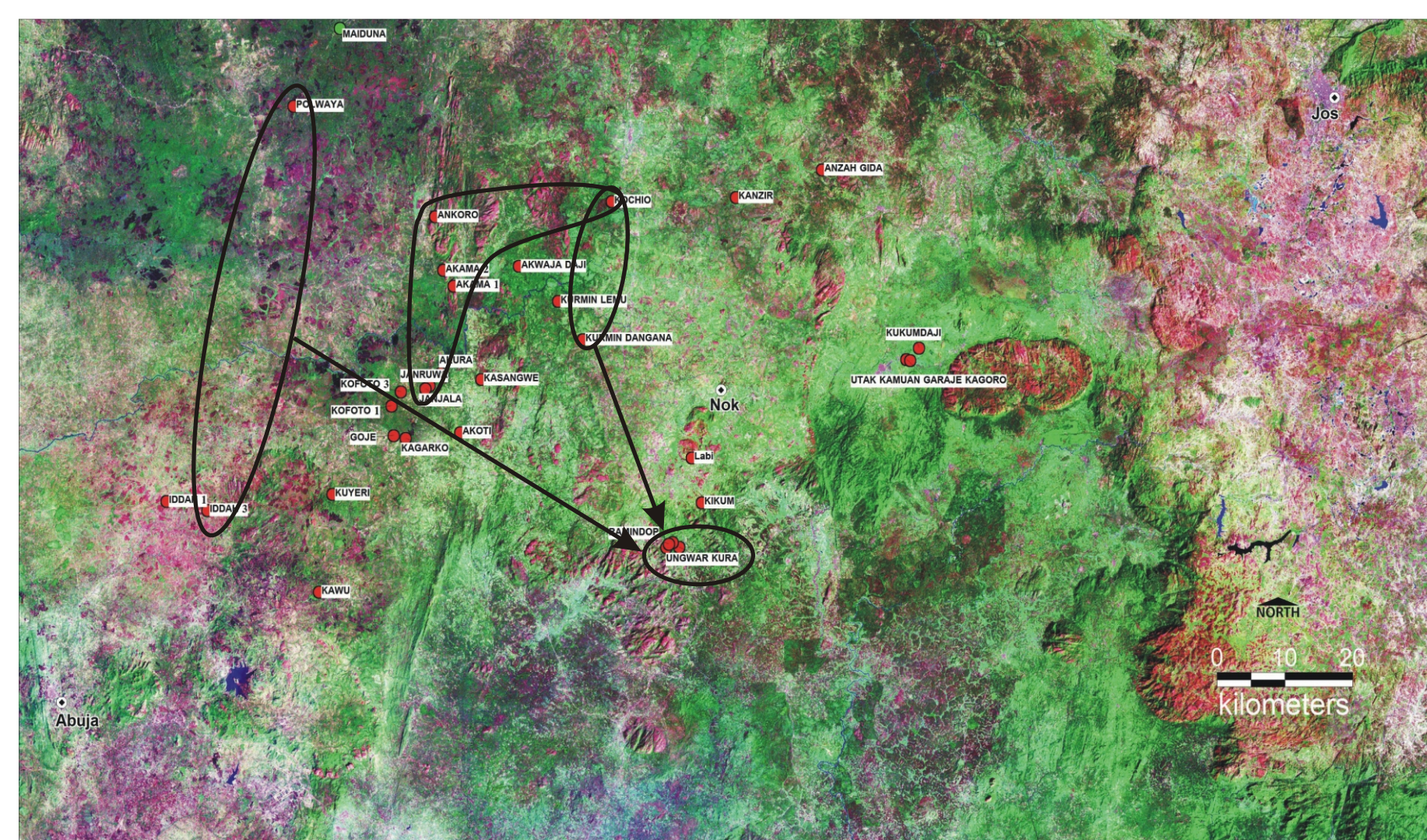
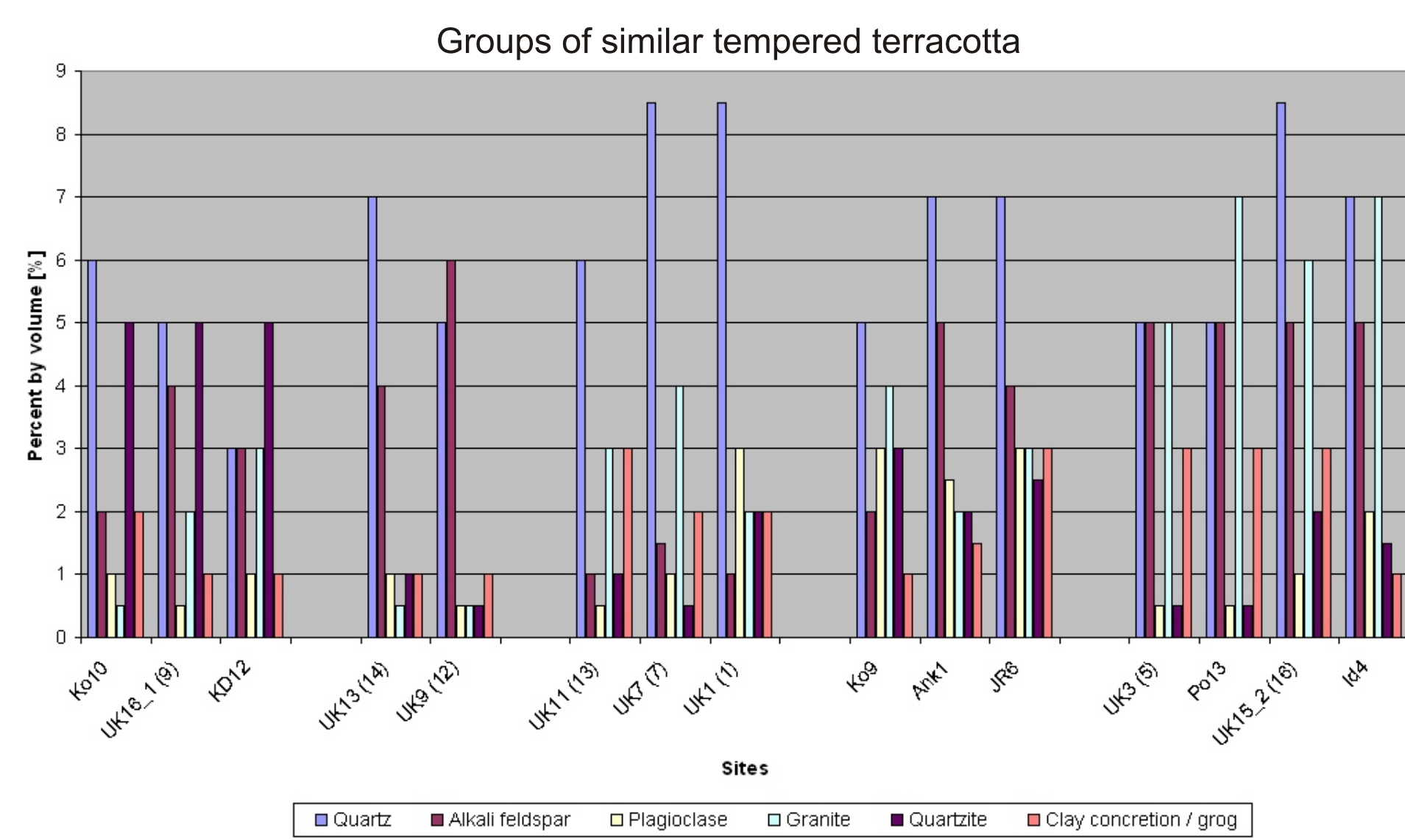


In order to investigate the question whether material and/or regional differences between the pottery and terracotta specimen exist, a total number of 32 samples from seven distinct sites were thoroughly examined.

The mineralogical composition of the samples was analyzed by investigating the particle size, shape, sorting and the percent by volume of each inclusion by means of thin section. Additionally, the composition of the matrix was recorded.

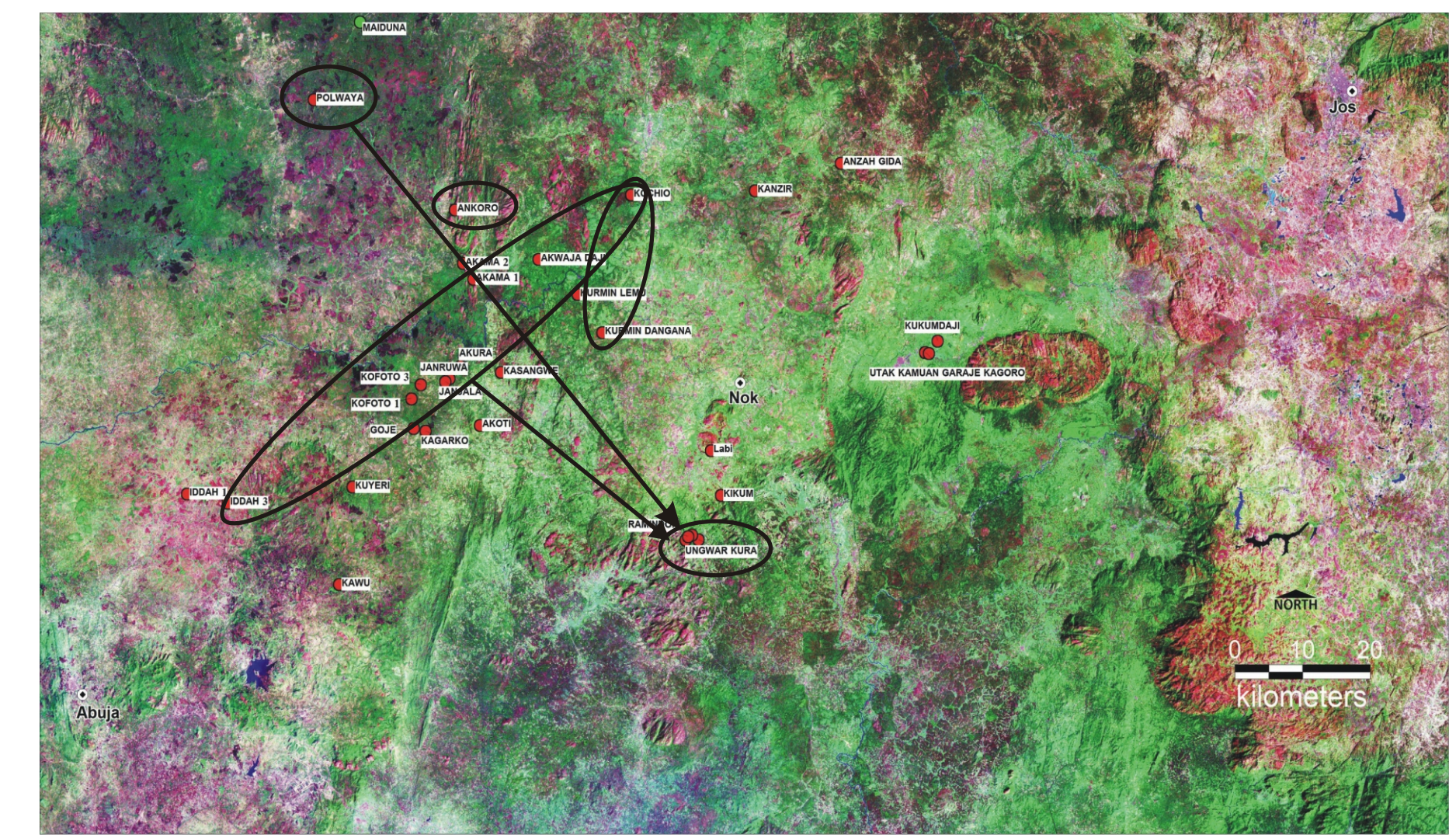
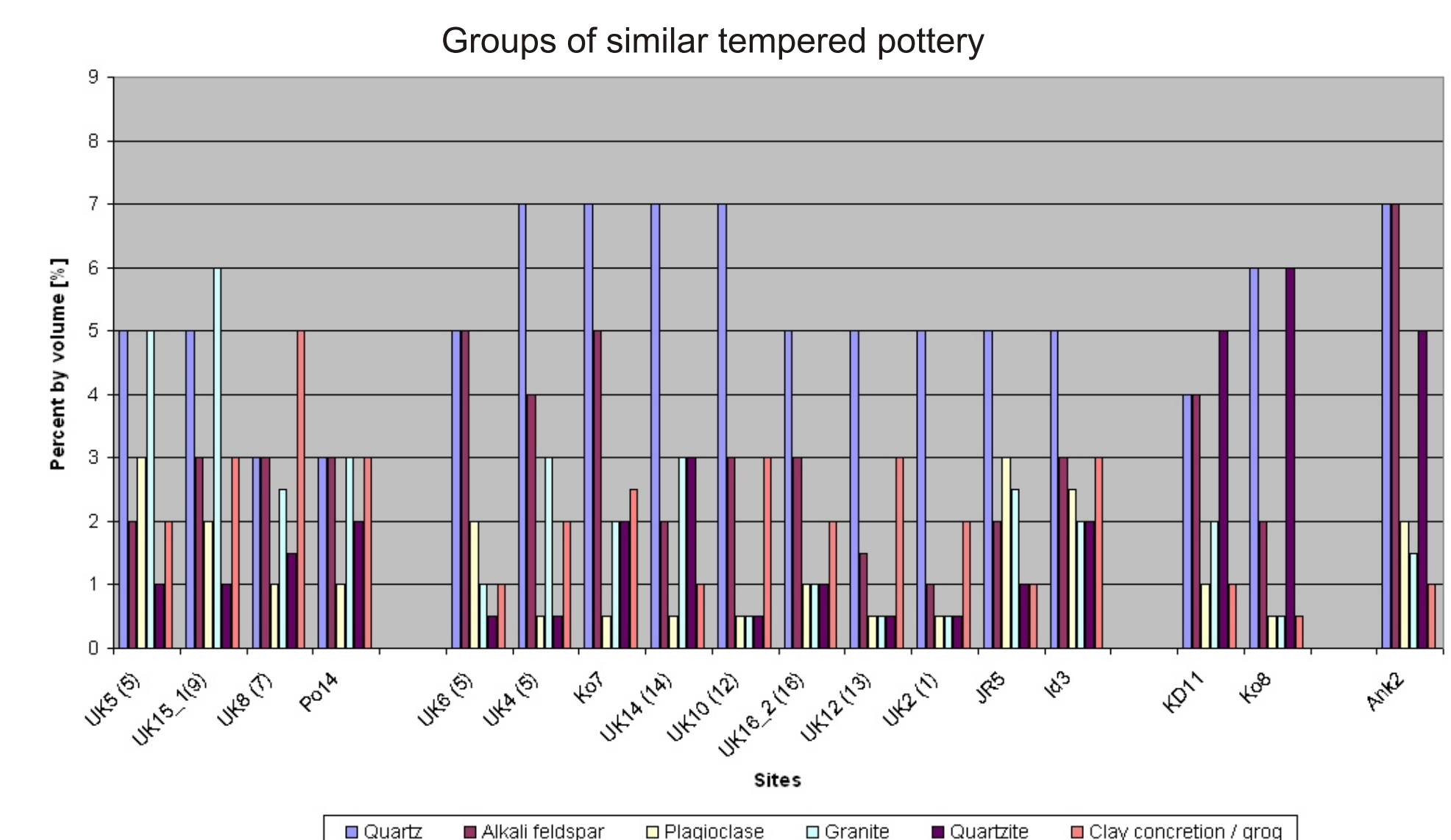
The electron probe microanalyzer (EPMA) was used to determine the chemical composition of the feldspars. Due to the geological formation of the research area, a differentiation of the feldspars was to be expected.

Mineralogical analysis - distinction of sites

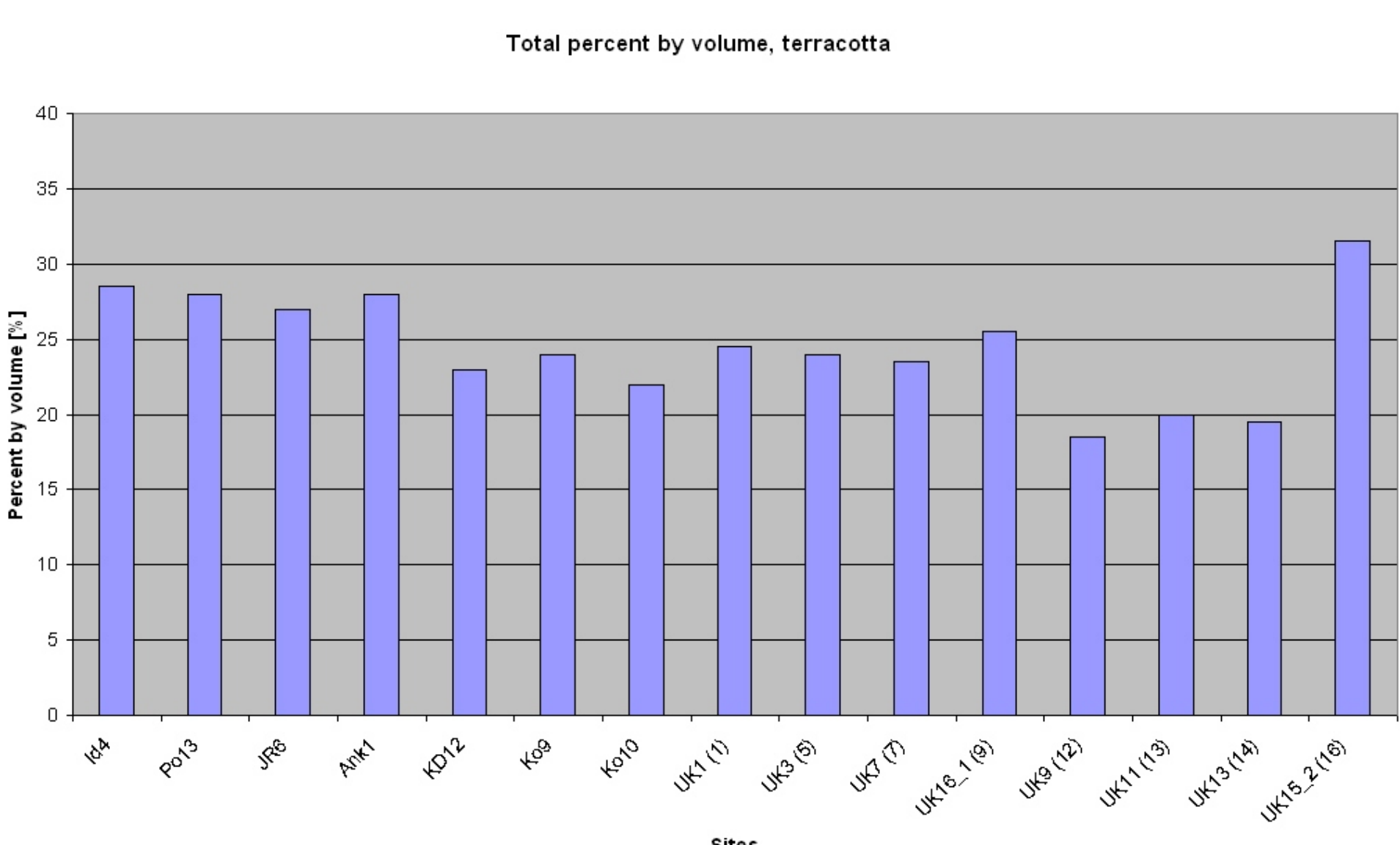
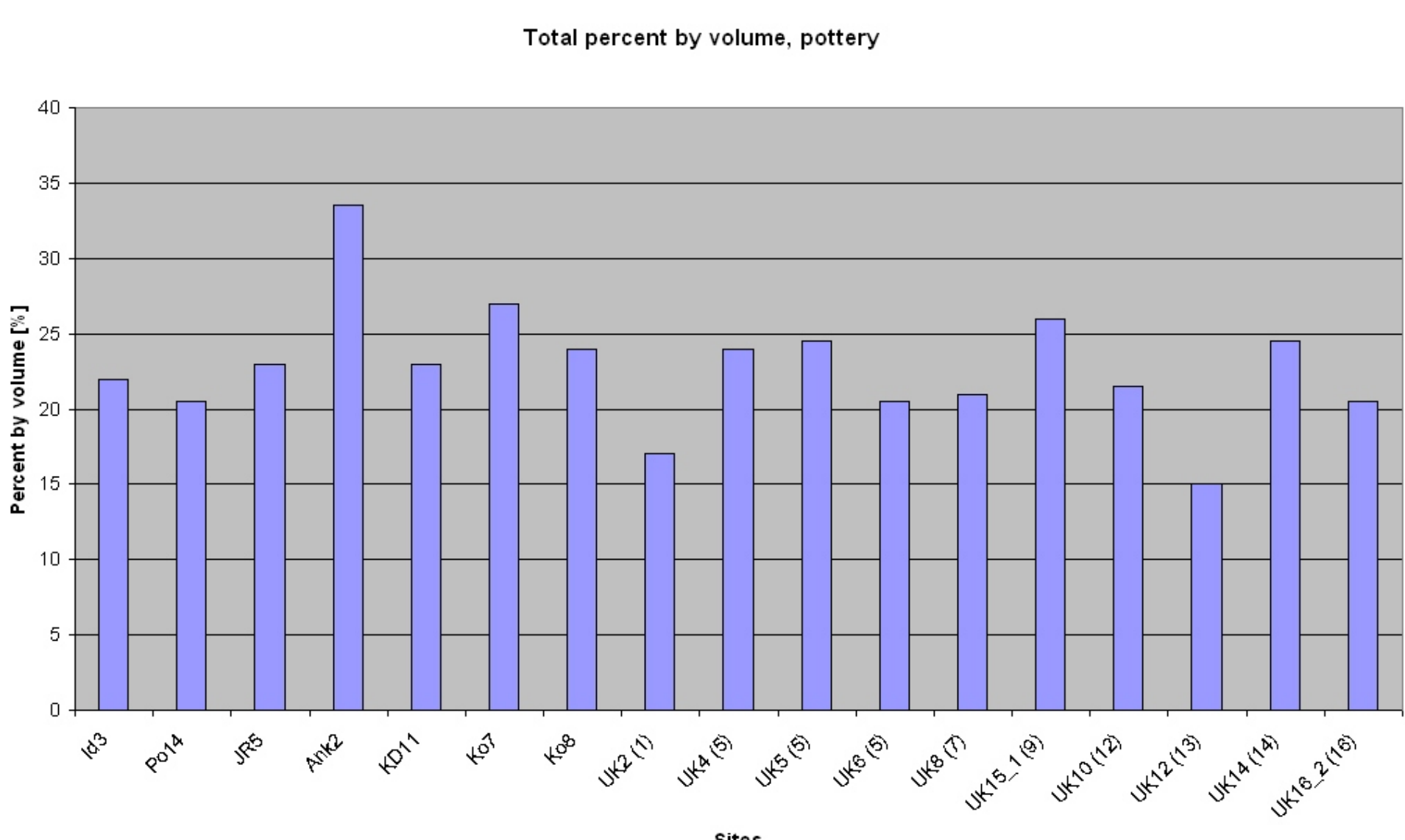


The composition of the inclusions facilitated a significant differentiation between the seven sites. In particular, the granite and quartzite proved to be a meaningful indicator to distinguish the sites in the west (mainly tempered with granite) from those in the east (mainly tempered with quartzite). The results for the other inclusions show these regional characteristics as well (to some lesser extent). Samples from sites located between these two groups have a mixed composition of granite and quartzite.

After the separation in material groups (terracotta and pottery) the findings became even more conclusive. Especially the terracotta samples constitute five well defined groups that are clearly associated with their geographical origin. This shows that the pottery and terracotta from one site were manufactured from the same tempering material, but were based on different material compositions. Ungwar Kura shows as well granite as quartzite tempering, but no differentiation within the site.

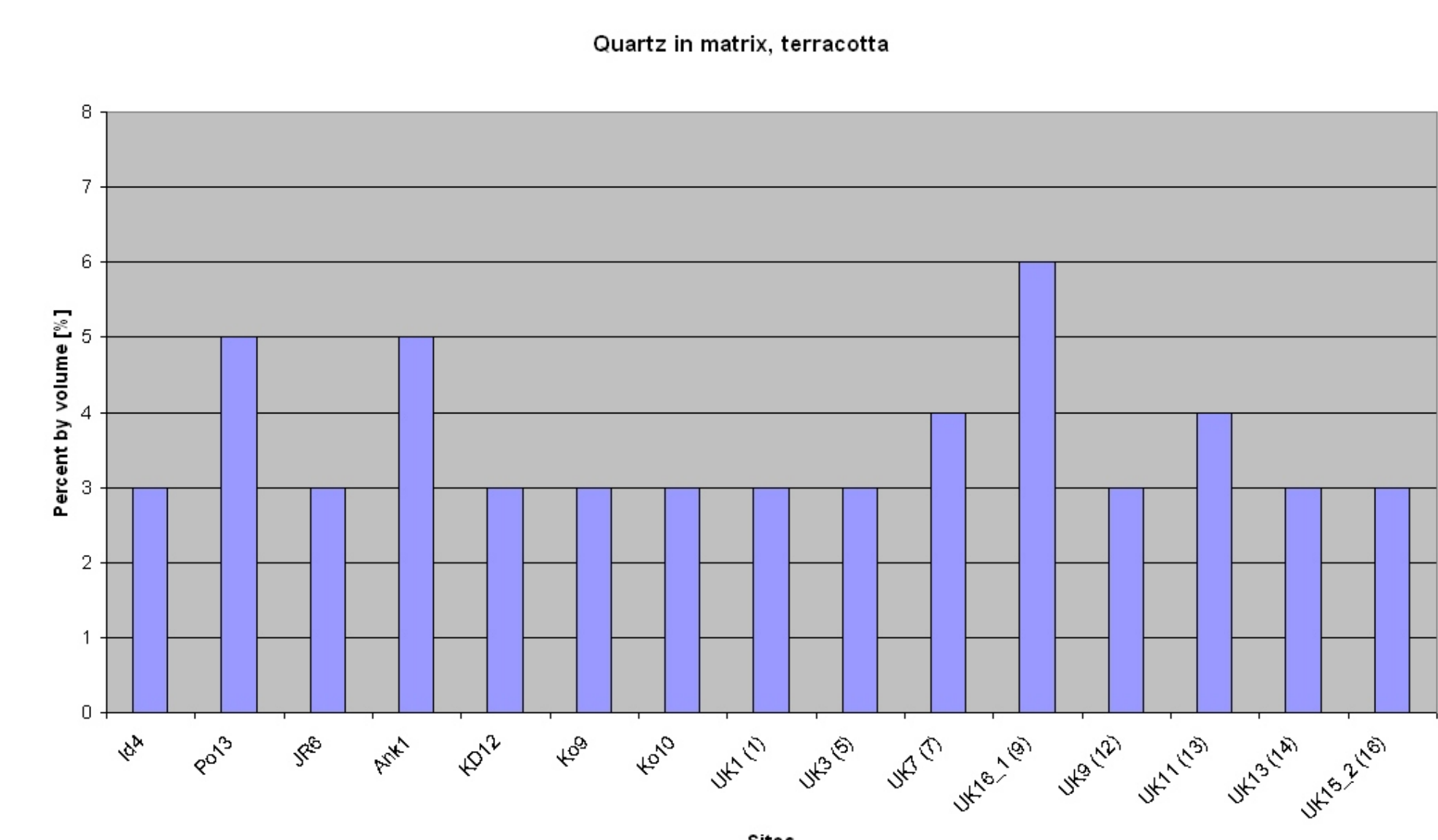
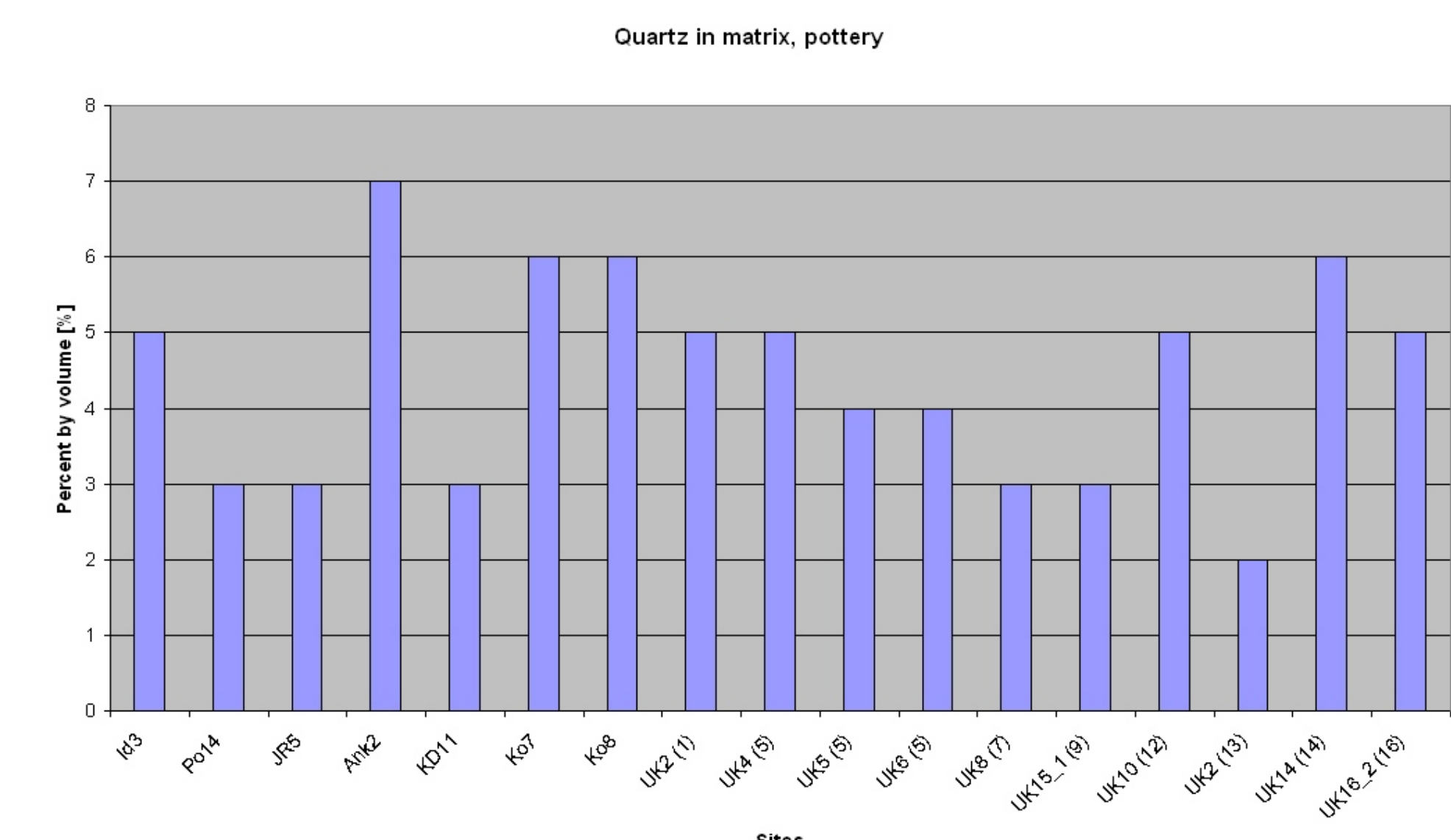


Mineralogical analysis - distinction of material groups



The total percentage of inclusions in the clay matrices showed a clear difference between the two material groups. While the total percent by volume of the inclusions in the pottery samples fluctuated between 15 and 33%, those of the terracotta samples was relatively stable between 20 and 27%. The proportion of the tempering material influences the forming, drying and firing properties of the clay, with approximately 25% of inclusions being the optimal composition for forming complex figurines. Thus, the narrow band found for the terracotta indicates the manufacturer's awareness of these properties. In case of the pottery, the amount of inclusions does not play such an important role.

The amount of quartz in the matrix (which is naturally occurring in the clay) demonstrates that the clay used for the terracotta is more consistent and uniform in the composition. This could hint at a specifically selected clay source that was used for the manufacturing of terracotta, while the pottery was made out of readily available clay.



Geochemical analysis

The geochemical analysis shows that the composition of the alkali feldspar is uniform in all samples. The plagioclases in the pottery from Ungwar Kura are more consistent in their composition than those from the other sites. The result of the measurements of the terracotta shows a similar but less differentiated picture. This hints at the use of just a single granite source at Ungwar Kura.

