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Online Resource 4: Statistical analysis of Terrace chert types

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The chert raw material analysis of the Terrace and Shelter areas of the archaeological site of Vale Boi revealed the presence of varied types of local and non-local chert and chalcedony throughout the stratigraphy. However, we identified differences in the percentages of these types throughout the several Upper Paleolithic occupations in the Terrace area.

To explore the statistical significance of these patterns in the Terrace area, a chi-square test of independence was performed to determine whether the chert types are related to the archaeological layer. The results are significant, X-square = 817.79, *p* < 2.2e-16, showing statistically significant differences in the chert types present throughout the occupations. [Figure 1](#fig-mosaicplot) shows a mosaic plot visualising the residuals of the test and [Figure 2](#fig-corrplots) shows the visual correlations between the variables in level and chert type. These show different associations and patterns throughout the different levels and occupations.

In the Solutrean occupations, Type 2 and Type 3 cherts are relatively more frequent in Level 4, and although to a lesser degree, Type 5 is relatively more frequent in Level 4C. For the Solutrean occupations, all positive correlations relate to local cherts.

For the Proto-Solutrean occupations, Type 4 cherts are relatively more frequent in Levels 4E and 4E/5, and Type 1 chalcedony is relatively more frequent in Level 4E/5. Similar to the Solutrean levels, only local cherts and chalcedony show positive correlations. In comparison, Type 6 and 7 are relatively more frequent in Level 5, while Type 4 is relatively less frequent than expected. This shows a significant shift from positive correlations of local cherts to non-local.

The Gravettian occupations, especially Level 6, show markedly different patterns. TL cherts, Type 10, Type 6 and Type 9 cherts (all non-local) are relatively more frequent in Level 6. The same patterns can also be seen in [Figure 2](#fig-corrplots), although there are expanded (although weaker) correlations between non-local chert types and Level 6 and 7.

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| Figure 1: Mosaic plot showing standardized Peason’s residuals from the chi-square test showing the dependencies of the different archaeological levels and chert types. |

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| Figure 2: Correlation plot using Pearson’s residuals from the chi-square test, showing positive and negative correlations between archaeological levels and chert types. |