

STATISTICAL ASSESSMENT OF MAJOR ELEMENT COMPOSITION OF MOLDAVITES FROM THE CHEB BASIN.

R. Skála. Institute of Geology, Academy of Sciences of the Czech Republic, Rozvojová 269, CZ-16500 Praha 6, Czech Republic. E-mail: skala@gli.cas.cz.

Introduction: The Tertiary and Quaternary sediments of the Cheb Basin are known as one of the sites where Central European tektites are found in a considerable amount. Up to now, between 1200 and 1500 individual pieces were found there. This constitutes the third most prominent source of moldavites known. The areas in and around the Cheb Basin can be considered a separate sub-field. This sub-field is the closest one to the source crater of moldavites – the Ries impact structure.

Samples and Data Processing: For the current study, totally 24 moldavites from the Cheb Basin, were selected. As a reference, a set of 12 moldavites from three different South-Bohemian localities and 3 Moravian moldavites were chosen. All these samples were prepared as polished (thin) sections and analyzed with an electron microprobe for major elements. Later multivariate statistical tests allowed to exclude outliers. The data with outliers left out were subsequently processed with the statistical packages SYSTAT (version 11).

Factor Analysis was carried out separately for the data collected for the samples from the Cheb Basin and those for South Bohemian and Moravian moldavites. Both groups of moldavites, applying the Keiser criterion, produce two-dimensional factor loading plots with three distinct clusters. These three components accounted for 84 % of the total variance in the case of Cheb moldavites and for 82 % in the case South Bohemian and Moravian samples. Individual clusters for the samples from the Cheb Basin consist of: (1) SiO₂, (2) TiO₂, Al₂O₃, FeO, and Na₂O, and (3) CaO, MgO, and K₂O. For other group of samples, however, the results differ: factor loadings are somewhat rotated and, more importantly, K₂O groups with cluster (2) instead of (3); which is identical to the data given in [1].

Cluster Analysis provided a few relatively well defined and separated groups. The largest distance from remainder of the data was recorded for three samples (Chlum, Jankov, and Štěpánovice). Other samples are well clustered with very small mutual distances – one of the clusters contains almost exclusively the samples from the Cheb Basin whereas the remaining samples are mixed in other cluster.

Conclusions: Factor analysis showed striking difference between the chemical composition of Cheb moldavites and moldavites from remaining part of the moldavite strewn field on the Czech Republic territory. It possibly reflects different composition of the source material. Simultaneously, cluster analysis revealed that some of the Cheb moldavites are chemically close to those from South Bohemia.

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References: [1] Delano J.W. et al. (1988) 2nd Int. Conf. *Natur. Glasses*. Charles University, Prague, pp. 221-230.