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Use of Markovian Properties for Identification of Latent Zonality of Breccia Structure of Hydrothermal Eruption

Analysis of structural and material associations as well as structural and material parageneses of epithermal deposits gives ability to show confinedness of different genetic types of mineralization to any given linear or circular elements of ore field structure but also to get some knowledge of ore deposition dynamics.

Availability of consanguinity of hydrothermal eruption breccias with small radial and concentric fractural structures enables to suppose that there are varieties in structure, texture, and breccia analysis which correlates with the fractural structures consistence. To identify such zonality, analysis of Markovian properties has been applied. The approach selection depends on the fact that it is one of the most serious statistical techniques which help to get into dynamic structure of processes described as well as event sequence.

In this context, event is availability of random intersection of breccia in one fixed point. Only one specific real-type of clast or cement is meant.

Plotting of Markovian properties of breccia composition was performed by means of sample taking with following recording within several random intersections (on seatings under binocular microscope) of a series of rotating breccia fragments. Both composition and fracture dimensions are used as classifying parameters. Determined characteristics of Markovian properties (Markovian behavior and functions of transition probabilities) were plotted as contour lines.

It is shown that within them latent zonality of hydrothermal eruption breccias is has been registered. If in the central part of circular breccia structures consist of unscreened fractures, towards periphery of circular structures screening improves, and fracture size lowers.

Hence, plotting of Markovian properties helps not only to show latent zonality of breccia bodies but also to obtain information on breccia structure.