# Accepted Manuscript


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| PII: | S1464-343X(18)30020-7 |
| DOI: | 10.1016/j.jafrearsci.2018.01.012 |
| Reference: | AES 3126 |
| To appear in: | *Journal of African Earth Sciences* |
| Received Date: | 07 September 2017 |
| Revised Date: | 13 January 2018 |
| Accepted Date: | 18 January 2018 |

Please cite this article as: Mohammad Parsa, Abbas Maghsoudi, Controls on Mississippi Valley-Type Zn-Pb mineralization in Behabad district, Central Iran: Constraints from spatial and numerical analyses, *Journal of African Earth Sciences* (2018), doi: 10.1016/j.jafrearsci.2018.01.012

# Controls on Mississippi Valley-Type Zn-Pb mineralization in Behabad district, Central Iran: Constraints from spatial and numerical analyses

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## Abstract

The Behabad district, located in the central Iranian microcontinent, contains numerous epigenetic stratabound carbonate-hosted Zn-Pb ore bodies. The mineralizations formed as fault, fracture and karst fillings in the Permian-Triassic formations, especially in Middle Triassic dolostones, and comprise mainly non-sulfides zinc ores. These are all interpreted as Mississippi Valley-type (MVT) base metal deposits. From an economic geological point of view, it is imperative to recognize the processes that have plausibly controlled the emplacement of MVT Zn-Pb mineralization in the Behabad district. To address the foregoing issue, analyses of the spatial distribution of mineral deposits comprising fry and fractal techniques and analysis of the spatial association of mineral deposits with geological features using distance distribution analysis were applied to assess the regional-scale processes that could have operated in the distribution of MVT Zn-Pb deposits in the district. The obtained results based on these analytical techniques show the main trends of the occurrences are NW–SE and NE-SW, which are parallel or subparallel to the major northwest and northeast trending faults, supporting the idea that these particular faults could have acted as the main conduits for transport of mineral-bearing fluids. The results of these analyses also suggest that Permian-Triassic brittle carbonate sedimentary rocks have served as the lithological controls on MVT mineralization in the Behabad district as they are spatially and temporally associated with mineralization.

***Keywords***: *MVT Zn-Pb mineralization*; *Structural controls*; *Fractal analysis; Fry analysis*; *Iran*.

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