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Application of BEMD in Extraction of Gravity Anomaly Implying Geological Structures and Granites at Different Depths within the Bozhushan-the Laojunshan W-Sn-Ag-Zn-Cu Ore Concentration Area of Southeastern Yunnan, South China

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The Bozhushan-Laojunshan W-Sn-Ag (Pb)-Zn(In)-Cu Ore Concentration Area of Southeastern Yunnan located in the western part of the Cathaysia block, being at the intersection region of the western circum-Pacific metallogenic belt and the eastern Tethys metallogenic belt, is one of the most important Sn-W and Zn(In)-Ag polymetallic mineralization areas in China. In this paper Bi-dimensional Empirical Mode Decomposition (BEMD) (Huang et al) [1] was used for processing the gravity data at a scale of 1:200 000 to extract the gravity anomaly components which may show the geological structures and granites associated with mineralization at different depths of the Crust within the study area. Three two-dimensional intrinsic mode function (BIMFs) and one residue (Res (m, n)) images depict four layers of geological architecture at different wavelengths within the study area. (a) The high-pass filtered image (BIMF₁) is conjectured to show the shallow geological architecture showing that the most strong positive gravity anomaly at the central area coinciding with a dome structure marked by the exposed low-grade metamorphic rocks of the Devonian and Carboniferous and the moderate-to high-grade metamorphic and deformed magmatic complex at its core inferred by some former researchers (Wang et al) [2]. The two negative gravity anomalies located at both the SE and NW side of the central positive gravity anomaly correspond to the late Cretaceous Laojunshan granites associated with W-Sn-Zn-Cu mineralization and Bozhusha granites associated with the Ag-Zn-Pb, respectively. (b) One band-pass filtered image (BIMF₂) is conjectured to show the middle-shallow geological architecture where the four obvious negative gravity anomalies bracket a series of positive gravity anomalies with discontinuous distribution, including the Laojunshan and Bozhushan granites mentioned before. (c) The other band-pass filtered image (BIMF₃) shows what we believe to be the middle-lower geological architecture where there is a broad NW-trending negative gravity anomaly zone which shows the existence of a NW-trending granite zone connecting the Laojunshan W-Sn polymetallic deposits to the Bozhushan (Ag-Pb-Zn) polymetallic deposits at middle-lower depth of the Crust. (d) The low-pass filtered image (Res (m, n)) is believed to show the lowest geological architecture where there is one pair of positive and negative gravity anomaly zones reflecting the existence of the north Vietnam basement uplift and the Southeastern basement depression at depth (Huang et al) [3]. The Bozhushan Ag-Zn-Pb deposits are

situated at the south side of the basement depression. The Laojunshan W-Sn-Zn-Cu mineralization corresponds to the transitional zone between the basement uplift and depression.

References

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