

USING A NEW GIS TOOL TO MODEL THE SPATIAL DISTRIBUTION OF PB-ZN DEPOSITS IN THE IRECÊ BASIN, BRAZIL

1FRANCA-ROCHA, W., 2BONHAM-CARTER, G.F. and 3MISI, A. 1Universidade Estadual de Feira de Santana, Feira de Santana, Brazil; 2Geological Survey of Canada, Ottawa, Canada; 3Universidade Federal da Bahia, Salvador, Brazil.

Arc-WofE is a computer tool designed to implement weights of evidence (WofE) modelling in Arcview GIS environment. The WofE method is a loglinear form of Bayes Rule with a conditional independence assumption. It allows the user to explore the spatial relationship between known mineral deposits and a variety of exploration datasets. The Arc-WofE extension includes useful procedures to generate evidential themes from input data (such as creating multiple buffers, extracting selected geological contacts, generalizing multiclass themes), to calculate and graph weights for single themes, and to generate posterior probability maps and various kinds of uncertainty measures with combinations of selected themes. The datasets used for this study of deposits in the Neoproterozoic carbonate sequences of the Una-Bambui Group in the Irecê Basin, NE Brazil, include a geological map, airborne radiometric and magnetic grids, a soil geochemical survey and a LANDSAT image. Thirteen known stratabound Pb-Zn sulfide deposits (used as training points) are hosted by dolomitic shallow water facies in the carbonate sequences and show remarkable stratigraphic control at the end of the first regressive cycle (B1 Unit). Weight ($W+$, $W-$) and contrast ($C=W+-W-$) calculations guided the selection of evidential themes for the exploration model. The single most predictive theme is the proximity to the B1 contact, followed by radiometric thorium, first-cycle ($B+B1$) units and lastly Zn in soil. These results showed that the presence and proximity to a cherty dolomite (B1 unit) is particularly important. The geophysical maps provide regional screening variables, whereas the soil-geochemical map helps to identify anomalies.