

Spatial Predictive Mapping of Gold occurrences in Londoni – Sambaru Area in Central Tanzania, using Artificial Neural Network based advangeo® software

Author: Terence Thomas Ngole

Geological Survey of Tanzania (GST)

The Londoni - Sambaru area in central part of Tanzania is one of the active gold artisanal small scale mining (ASM). The gold mineralization is basically localized in NW trending shear zone and mostly hosted in sheared mafic rocks. Besides the fact that it involves a significant number of artisanal small scale miners, however, the spatial distribution of the mineralized ore is not clearly known leading into some difficulties for the miners to locate new areas for digging.

The trends and patterns of mineralization is one of the very complex geospatial phenomena which requires sophisticated tools to model or predict. In this study, artificial neural network (ANN) based software namely advangeo® was used to predict the distribution of gold occurrences using known gold occurrences as training sample. These gold occurrences were integrated with structural data (extracted from geological maps and magnetic data), radiometric and geochemical data to efficiently predict the spatial distribution of gold in the area of study.

This approach was able to add considerable value to the existing data by predicting new areas with high possibility of gold mineralization. These new predicted areas were previously not known by Artisanal small scale miners and therefore it has provided an additional input to the pre-existing mineral occurrence information. The output of this study can be used by artisanal small scale miners to locate new areas for gold digging.

Complexity of relationships between the phenomena itself and the controlling parameters, as well as by limitations of our knowledge about the nature of physical/ mathematical relationships and by restrictions regarding accuracy and availability of data, makes the task of mapping spatial distribution of mineral occurrences to be a tough job. It is highly recommended therefore, to deploy artificial neural network based prediction system like **advangeo®** to efficiently predict unknowns by using known occurrences.

KEYWORDS: Predictive Mapping, artificial neural network (ANN), **advangeo®** and artisanal small scale miners (ASM).