



E-man Part II: Application of Neural Networks for Classification of Bauxite

**K Viswanath¹, R Sambasiva Rao², Ch V Kameswara Rao³, K Rama Krishna³,
B Rama Krishna¹ and G E G Santhosh⁴**

¹Dept of Geology, ²School of Chemistry, Andhra University, Visakhapatnam 530 003, India

³Department of Chemistry, Gitam Institute of Science, Gitam University, Visakhapatnam, 530 017, India

⁴School of Earth Sciences, SRTM University, Nanded, Maharashtra, India

E-mail: rsr.chem@gmail.com

Dedicated to Dr V Anantha Ramam, Professor of Chemistry, Andhra University, Visakhapatnam, India

ABSTRACT

E-man (Evolution of Mimics of Algorithms of Nature) comprises of mapping of processes in nature (animate/inanimate) onto mathematical algorithmic domain. The software implementation of mimicking nature in functioning of brain, foraging, social interaction, hereditary, evolution and mating brought renaissance in parametric/nonparametric data processing into information in all science/ engineering/ technological research. The classification of bauxite based on ICP-MS chemical elemental quantification in different locations is modeled using single layer perceptron (SLP-) neural network (NN) procedure with Trajan software. The processing of data set (NP=30) using five rock types in central and northern blocks with IPS, a fast solution choice of Trajan, resulted in SLP with eight hidden neurons. The classification results endorse the superiority of data driven NN over soft PC analysis. A progressive classification data analysis of high quality instrumental data is performed from hard linear correlation, soft dimension-reduction of correlated variables (PCA) and model free data driven supervised NN, a subset of natural intelligent computational paradigm. The two classes are unequivocally detected employing training, verification and test protocols.

Keywords: Geochemistry, transition metal/lanthanides, ICP_MS, Neural network, PCA, bauxite, classification, E-man, ore-benefaction
