

## **QUANTITATIVE ASSESSMENT OF FAVOURABILITY MAPPING TECHNIQUES**

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This work discusses the problem of quantitative assessment of favourability mapping techniques, which arises when there is a need for comparing the results of different geocomputational prospecting models. Currently, many works which use GIS for geological favourability mapping rely on visual assessment techniques for evaluation of the results, an approach which is ineffective, because of the natural uncertainties of spatial data sets and of the often conflicting results obtained. We present two techniques for qualitative assessment, both based on the hypothesis that there are known mineral deposits on the study area. The first assessment is based on bayesian (conditional) probability, where existing deposits are used to generate a posteriori probabilities for different prospecting models. These probabilities indicate how each method improves the chance of mineral occurrences, thus enabling an evaluation of its explanatory power. The second method is based on Tau coefficient, which measures the improvement of a favourability map over a random assignment and has been originally proposed as a measure of classification assessment for remotely sensed data. In order to use the Tau coefficient for favourability mapping, we use indicator kriging to interpolate the known deposits into a surface, which represents the density of mineral occurrences. These techniques were used to evaluate the performance of five different prospective models (boolean logic, weighted means, fuzzy logic, bayesian mapping and neural networks) in the estimation of radioactive mineral deposits in the Poços de Caldas alkaline complex, Brazil.