

Abstract Example

Using GIS Site Suitability Analysis to Study Adaptability and Evolution of Life: Locating Springs in Mantle Units of Ophiolites

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GIS is a powerful tool that can be used to locate springs sourced in ophiolites. The unique features associated with these springs include a reducing subsurface environment reacting at low temperatures producing high pH, Ca-rich formation fluids with high dissolved hydrogen and methane. Because of their unique chemical characteristics, these areas are often associated with microbes and are thought to be similar to the features that enabled life to evolve on Earth. Locating and sampling these springs could offer a deeper look into Earth's deep biosphere and the history of life on Earth. Springs have traditionally been located using expensive and time consuming field techniques. Field work can be dangerous. The goal of this study was to develop a model that could locate these unique geological features without first going into the field, thus saving time, money and reducing the risks associated with remote field localities. A GIS site suitability analysis works by overlaying existing geo-referenced data into a computer program and adding the different data sets after assigning a numerical value to the important fields. For this project, I used surface and ground water maps, geologic maps, a soil map, and a fault map for four counties in Northern California. The model has demonstrated that it is possible to use this time of model and apply it to a complex geologic area to produce a usable field map for future field work.

Keyword: numerical value, field localities, geologic maps, geo-referenced data.