

Geophysical and geochemical methods applied to uranium exploration in Argentina: A case study.

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ABSTRACT

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The exploration of uranium in Argentina had its beginning in the early 1950s and the radiometric method was the mostly used by then. Indeed, by combining airborne radiometric studies with ground evaluation of radiometric anomalies, the majority of the country's known uranium deposits have been discovered. Even though uranium can be directly detected through its gamma radiation, currently many deposits are completely buried, masking any such response and making necessary the application of different and innovative geophysical and geochemical techniques.

Therefore, the CNEA has been implemented Aeromagnetic, Electrical and Electromagnetic methods particularly to delineate subsurface structures and geology having bearing on ore localization. Airborne magnetic data interpretation and Ground Resistivity/IP sounding using rectangle method have been applied to delineate geophysical signatures for the exploration of hydrothermal polymetallic-U deposits at the Precordillera area. Resistivity profiling/IP surveys using a dipole–dipole array configuration allowed us to identified zones of palaeochannels which host U mineralization in the sedimentary basin of the Cerro Solo district. The Audiomagnetotelluric technique was capable of identifying the depth of the U host sandstone and allowed to design the subsequent drilling plan at the Tonco-Amblayo district.

Positive results were achieved through the application of geochemical analysis of groundwater, surface water and stream sediment in the Alipán U granite-related deposit to define exploration targets. In Neuquen Basin prospects, geochemical analysis of mobile fraction extracted by selective leaching of soil samples and measurement of radon emanation in soils using solid state nuclear track detectors were successfully applied.

It can be pointed out that the existence of favorable basins and different uranium mineralization models configure promising conditions to develop new uranium resources. As the integral exploration at basin level has not been carried out in the country, the application of geophysical and geochemical techniques must be strengthened for the follow-up U exploration projects.

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