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aerogeophysical surveys in part of the Coastal Plain areas of North Carolina, South Carolina and Geogria. The end products are magnetic as well as total count radioactivity-contoured maps.

The aeromagnetic data are characterized by unusually high amplitude anomalies of both short and long wavelengths, anomalies which are similar to those over the Coastal Plain of Maryland and Virginia. These intense anomalies, particularly those in the Coastal Plain south of Virginia, can be contrasted with the relatively low-amplitude anomalies of the adjacent Piedmont belt. This magnetic contrast may be interpreted as representing important crustal differences, possibly those between oceanic and continental rocks.

The aeroradioactivity maps have a wide range in radioactivity values, from zero to more than 2000 counts/sec. Pleistocene beach ridges near the coastline show anomalously high radioactivity values, probably resulting from small concentrations of monazite. As a consequence, these surveys might prove useful in the search for placer deposits of heavy minerals such as titanium. Almost all the Cretaceous and Tertiary formations of the Coastal Plain received minor amounts of monazite from the crystalline rocks of the Piedmont at the time of deposition. As a consequence, the radiometric maps can be used to map the formations as well as exposed old river channels. Also, these maps may become a means of identifying sources of sediments and studying coastal processes and depositional history.

Comparison of the aerorad map with areal photographs of the region around Savannah, Ga., indicates that the highest anomalies probably are in modern and Pleistocene alluvial deposits of the Savannah River. The Pleistocene alluvial deposits seem to be in deltaic or alluvial plains slightly above the present river level. High anomalies of somewhat lesser value occur on old beach ridges on the Sea Islands, as well as on older beach ridges inland from Savannah.

Exploring the Raft River Geothermal Area, Idaho, with the dc Resistivity Method

Adel A. R. Zohdy, Dallas B. Jackson, and Robert J. Bisdorf

A geoelectrical survey consisting of 269 bipole-dipole total field stations and 79 Schlumberger soundings was made as part of a study of the geothermal resources in the Raft River Valley, Idaho. The simple total field resistivity map depicted the following features: (1) the predominance of quasi-horizontal layering around the source bipole, (2) the existence of a low-resistivity layer over a major part of the survey area, and (3) the presence of a resistivity-high coincident with a gravity-high in the northwestern part of the survey area. Subsurface structures, faults, and lateral changes in resistivity were better delineated on a resistivity map normalized to the layering beneath the center of the current bipole. The maximum electrode spacing (AB/2) for the soundings ranged from 914 to 4880 m (3000 to 16,000 ft). All the sounding curves were processed and interpreted automatically, using an inversion computer program. Minor adjustments to some final interpretations were made using Dar Zarrouk curves. The interpretation indicated that up to 2 km of Cenozoic sediments underlie the valley including a low-resistivity layer (2 to 7 ohm-m), about 1 km thick.

A deep test well [drilled to a total depth of 1526 m (5007 ft)] confirmed the geoelectrically predicted depth of 1400 m (4600 ft) to a basement of a metamorphic rocks. Initial temperatures of about 147°C were recorded and hot water flowed at the rate of approximately 2300 liters/minute. In addition, the drilling results of five intermediate-depth (76–434 m) test holes were also in good agreement with the interpretations of the electrical data and confirmed the predicted depth to the top of a low-resistivity (2 to 7 ohm-m) layer which was identified as hydrothermally altered Pliocene sediments.

Field Application of Minicomputers as Used in Economic Mineral Exploration

Kenneth L. Zonge

The use of minicomputers and microprocessors in mining geophysics for obtaining field data is a relatively new endeavor which has been successfully used by the author for several years in the search for economic sulfides. A new field-portable system has been designed which permits use of high-speed sampling and data gathering techniques as well as providing for reduced in-house processing time, smaller bulk storage requirements, higher data integrity, and extended flexibility and adaptability through software control. It is capable of conventional IP, complex resistivity, and time-domain EM measurements, with real-time data processing. The necessarily broad frequency range and fast sample rate was made possible by combining a specially designed arithmetic processor with an existing microprocessor.

Complex Resistivity Case Histories

Kenneth L. Zonge, Jeffrey C. Wynn, and Gary N. Young

Since the fall of 1972, an extensive series of complex resistivity measurements has been made covering both economic and subeconomic mineral deposits over a wide range of geological environments. Coupling-corrected field data are compared in this paper with drill-hole derived geologic sections in order to demonstrate the utility of using this advanced exploration tool in the interpretation of simple and complex polarizing environments.

Some general conclusions are: (1) copper responses vary considerably, for the same volume percentages, depending on the environment and manner in which it is emplaced, and specifically (apparently) on the iron con-