missing data, conflicting data, and fuzzy or nonstandard data definitions.

TRAUTWEIN, CHARLES M., Technicolor Graphic Services, Inc., Sioux Falls, S.D.

Analytic and Interpretive Procedures for Geologic Applications

The extraction of geologic information from remotely sensed data, which consist of encoded radiometric signals detected above the terrain, is procedurally governed by the same logical sequence and argument employed by a geologist when the data are typical ground-based observations and measurements. Each respective data set relates physical and compositional conditions of the geologic environment. In either situation, the sequence of problem definition, data collection, data reduction, interpretation, and testing is followed and, commonly, dictates the geologist's success or failure in arriving at an adequate geologic interpretation.

The most useful data format for geologic analysis and interpretation is an image display in which both radiometric and geometric relations in the data can be correlated with conditions on the earth's surface. The objectives of applying a systematic approach in obtaining geologic information from images are: (1) to provide a framework in which geologic interpretations are logically derived from the imaged data; (2) to separate the more objective aspects of image analysis from the subjective considerations imposed on a geologic interpretation; and (3) to facilitate the efficient reduction of imaged data by separating tasks, concentrating attention, and thereby minimizing omissions.

In geologic investigations, imaged data are analyzed and their geologic significance is interpreted; consequently, both spectral and spatial aspects of the data are considered in deriving geologic information. Preceding the interpretation of geologic relations, the data must be grouped according to their spectral characteristics. Subsequently they are reduced into landscape elements based on their spatial distribution and association. These two actions, the spectral classification and spatial reduction, constitute the two phases of image anlysis. The interpretation of geologic information from the analyzed data must be made by a person trained in geology. Beyond this, the individual must be able to correlate and interpret the geologic significance of the landform, drainage, and cover patterns that are products of image analysis.

TUCHOLKE, BRIAN E., Lamont-Doherty Geol. Observatory, Palisades, N.Y.

Geologic Significance of Sedimentary Reflectors in Deep Western North Atlantic

Several major seismic reflectors in the deep western North Atlantic have been calibrated according to age and physical and lithologic nature by JOIDES drilling. These reflectors result from geologically abrupt changes in depositional conditions and lithofacies. Within the limits of biostratigraphic resolution, the reflectors are approximately but not strictly synchronous, and sediment accumulation, although commonly changing in rate, was continuous across the seismic boundaries. Major reflectors include horizon B, which ranges between Hauterivian and Barremian in age and correlates with an upward change from limestone to black clays coincident with a rise in the calcite compensation depth (CCD). In middle to late Maestrichtian time, a brief, sharp depression of the CCD caused widespread deposition of chalks that correlate with horizon A. This reflector commonly conforms to preexisting topography, a fact which suggests its pelagic origin. Widespread deposition of sediments enriched in biogenic silica occurred during the Eocene, and diagenesis formed chert beds in the upper lower to lower middle Eocene section. The top of these cherts matches horizon A^C, which is one of the most laterally extensive reflectors in the western North Atlantic. Across the western Bermuda Rise, an overlying reflector, horizon A^T, correlates with the top of a sequence of turbidites deposited prior to and during uplift of the rise in the latter half of the Eocene. Limited biostratigraphic data at JOIDES boreholes suggest that the reflector is diachronous; this probably results from gradual westward offlap of the turbidites as the Bermuda Rise was uplifted. One major reflector, horizon A^U, is not within a continuously deposited sedimentary section, but corresponds to a major unconformity eroded between late Eocene and early Miocene time by abyssal currents along the lower continental rise. Sedimentation patterns mapped from the distribution and spacing of these reflectors are used to interpret the paleo-oceanographic conditions in the basin.

TURCOTTE, DONALD L., Cornell Univ., Ithaca, N.Y.

Models for Evolution of Interior Basins

The structure of many interior basins is dominated by lithospheric flexure. A wide range of observations has confirmed that the outer shell of the earth, which has a temperature of less than about 600°C, behaves elastically on geologic time scales. This behavior is consistent with theoretical and laboratory studies of rock rheology. The linear structure of the Appalachian basin and the near circular structure of the Michigan basin can be attributed to lithospheric flexure under loading. In general, the structure of sedimentary basins with horizontal scales of a few hundred kilometers can be attributed to lithospheric flexure. The time evolution of many sedimentary basins appears to be governed by the thermal time constant of the lithosphere (i.e., about 100 m.y.). A simple model for the subsidence of sedimentary basins assumes that the lithosphere is initially hot; as the lithosphere cools its density increases and it subsides. This simple model explains the subsidence record of parts of the Los Angeles basin. This mechanism does not appear to be sufficient, in itself, to explain the subsidence of interior basins such as the Michigan basin. An additional mechanism such as a thermally activated phase change is required.

TURNER, MORT D., Natl. Sci. Foundation, Washington, D.C.