SLOSS, L. L., Northwestern University, Evanston, Illinois

BASEMENT INFLUENCES ON TECTONIC CYCLES IN BASINS

Although direct information from deep boreholes and indirect data from geophysics add significantly to interpretations, the geometry and composition of the basin fill remain the most fruitful fields from which to draw inferences on the behavior of major sedimentary basins. Geometric and compositional data are capable of analysis to yield interpretations through geologic time of the rate of subsidence in basins, their degree of differentiation from surrounding neutral and positive elements, the positions and stability of the hingelines along which such differentiation is accomplished, and the position and character of source areas contributing to the basin fill.

Evaluation of the sedimentary record of basins in the interior of the North American craton indicates that, for the period since late Precambrian, such basins, in harmony with the rest of the craton, have been involved in six major sedimentary cycles. Four of these, corresponding with the times of accumulation of the Sauk, Tippecanoe, Kaskaskia, and Zuni Sequences, exhibit records of five distinct stages that appear to have simultaneous effects on all cratonic basins. None of the cratonic cycles shows any systematic correlation in space and time with orogenic events in extracratonic mobile belts.

These essentially stratigraphic deductions raise questions that require consideration in the development of geologically meaningful basin models. Such models must include simultaneous consideration of the composition, structure, and dynamics of the continental crust and upper mantle.

SMITH, J. R., AND ARNOLD, R. G., Saskatchewan Research Council, Saskatoon, Saskatchewan, Canada

X-RAY FLUORESCENCE DETERMINATION OF NI, CU, AND ZN IN ROCK POWDERS WITH VARIABLE MATRICES

A precise and rapid X-ray fluorescence technique has been devised for measuring concentrations of Ni, Cu, and Zn in the range from zero to 5,000 ppm in undiluted and unfused samples of powdered rock. The crux of the method is the use of primary WLα radiation coherently scattered and partly absorbed by the sample as a measure of the absorption characteristics of the sample for the X-ray wavelengths concerned. The method was calibrated by adding known amounts of Ni, Cu, and Zn to rock powders with a representative range of absorption characteristics, thereby establishing a family of linear calibration curves, each labeled with the associated intensity of the WLα line. Measurement of WLα line intensity could then be used to predict the slope of the calibration curve for any sample.

It was found that WLα line intensity could also be used to predict and correct for "instrumental contributions" of CuKα and NiKα line intensities, and to predict rather than measure background counting levels, thereby shortening analytical time appreciably.

The total time required for the determination of Ni, Cu, and Zn in one sample is about 15 minutes. The method has a precision (standard deviation of a single determination) of about $\pm 4\%$ for Zn, $\pm 5\%$ for Ni, and $\pm 8\%$ for Cu at a concentration level of 70 ppm. Determinations by this method (SRC) are compared with recommended values (USGS) for standard rocks W 1 and G 1 in the following table.

Element	*Concentration*		*ppm by weight*	
	G 1		*W 1*	
	SRC	*USGS*	*SRC*	*USGS*
Ni	11	<10	93	82
Cu	19	13	138	110
Zn	35	40	65	82

The method has greatly accelerated studies of the distribution of traces of ore metals in Precambrian country-rock in Saskatchewan.

SONNENFELD, PETER, Texas College of Arts and Industries, Kingsville, Texas

FAMENNIAN REEFS IN ALBERTA, CANADA

The lowermost 200 feet of the Wabamun group of Famennian age may sporadically display an unusually abundant fauna in the subsurface of Alberta northeast of the then slowly submerging Poaco River landmass. This fauna, composed of stromatoporoids, coralline algae and various rod- and tube-shape bioclastic fragments in a sparry cement, is completely absent in nearby boreholes that show primarily carbonate muds with only rare dwarfed *Foraminifera*, some ostracods, and crinoid stems.

Irregular mounds of medium to coarse cystalline dolomite, which contain stromatoporoids (*Labechia* sp. and *Pseudolabechia* sp.) and relic tube- and rod-shape fragments suggestive of coralline algae and other potential reef builders are found encased in Wabamun carbonate muds. These mounds are restricted to the region of complete or partial dolomitization of the underlying Graminia formation south of this Poaco River landmass. Identifiable specimens of reefal organisms still stand out, even if they are only moderately common in the severely dolomitized sections; they are completely absent in adjacent pelleted or unpelleted carbonate muds. The muds contain a negligible clastic admixture and are populated only by some individual *Foraminifera* of the Nodosaria family, Dasycladaceae such as *Mizzia* sp., ostracods, and crinoids, with an extreme scarcity of biogenic remnants being the really paramount feature.

The Wabamun dolomite mounds appear to occur preferentially near Wabamun thins, on the slopes of the Wabamun sea floor. Such reefal developments are found on slopes formed by the Wabamun being comparatively thicker over buried Frasnian Woodbend reefs, due possibly to some negative adjustments within or below these older reefs during Graminia and Lower Wabamun deposition. Unlike their undolomitized and tight equivalents, the Wabamun dolomite mounds have been cored frequently and thus are accessible to detailed study; they are economically important as attractive gas reservoirs with porosities to 13 per cent, permeabilities up to 200 millidarcys. Dolomitized biostroms previously reported by others from Palliser outcrops near Banff, Alberta, are exposed equivalents of similar magnitude; the carbonate mud encasement renders them akin to Silurian reefs on Lake Erie and James Bay in Ontario.

STEVENS, CALVIN H., Department of Geology, San Jose State College, San Jose, California

PALEOECOLOGIC IMPLICATIONS OF LATE PALEOZOIC FAUNAL ASSEMBLAGES IN WESTERN UNITED STATES

Stratigraphic and paleontologic studies of interfingering marine and non-marine Late Paleozoic rocks in a