

Stromatoporoids have a "plastic" morphology which makes them sensitive indicators of paleoenvironments but which presents problems for stratigraphic correlation. A zone at adjacent outcrops may have different genera and species. Nevertheless, stromatoporoids can be useful to determine the time framework of strata.

An *Amphipora* Zone has been recognized for years in the Mid-Continent North American Middle Devonian. Range charts also have been made previously, and at least one work has established several stromatoporoid zone fossils, but authors have noted difficulties of correlation.

A small fauna was collected from two adjacent localities in the Niagara Peninsula of Ontario, near the contact of the Onondaga Limestone with the underlying Bois Blanc Formation. The fauna consists of seven species belonging to three genera (22 specimens), not a statistically significant number. However, the stratigraphic ranges of previously reported occurrences of the species accurately determine the correct age when equated to the continental European standard section. The plotted ranges are based on systematic works in which descriptions and illustrations can give some idea of the validity of species identifications. Stratigraphic works with species lists which cannot be documented were not considered.

The longest ranging species is *Stromatoporella granulata* from the lower middle Siegenian well into the Frasnian. Other previously described species in the fauna are confined to the Eifelian, especially to the lower Eifelian. Three species (representing 77% of the specimens collected)—*S. granulata*, *S. selwyni*, and *S. tuberculatum*—were all previously reported many years ago from the "Corniferous" Limestone at Port Colborne by H. A. Nicholson. *S. selwyni* has also been reported from the basal Jeffersonville Limestone of Indiana. *Stictostroma excellens* and *Stromatoporella perannulata* are described from the area for the first time. Both have been described previously from the Jeffersonville Limestone; *Stictostroma excellens* from Indiana and *Stromatoporella perannulata* from Kentucky. One specimen is compared with *Stromatoporella composita* Yavorsky. Although Yavorsky's species is not conspecific, it is morphologically similar enough to be of stratigraphic significance. Yavorsky's species comes from the lower Eifelian beds on the margin of the Kuznetz basin.

A question has been raised as to whether Nicholson's fauna reported from nearby Port Colborne came from Onondaga or Bois Blanc beds. Despite of the relatively small number of specimens, one can say that due to strong faunal similarities, Nicholson's material came from the same zone as the material herein reported and further, that both faunas are probably lower Eifelian in age, equivalent to the Edgecliff Member of the Onondaga Formation, which is in agreement with previous correlations based especially on corals and brachiopods.

Although stromatoporoid faunas may differ significantly from outcrop to outcrop at the same stratigraphic zone, and although stromatoporoid faunas are frequently represented in collections by small numbers of specimens, they can give a good indication of their position in geologic time when the identified taxa are compared with the world literature.

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Prediction of Depth and Velocity on VSP Data

The Vertical Seismic Profile (VSP) method can often be used to assist in making drilling decisions. These decisions may involve anticipation of overpressured zones, distance to the seismically determined target, and verification of geologic or geophysical interpretation.

A VSP is recorded with a seismic source on the surface and receivers in the borehole. Both up and downgoing waves are recorded and are separable. Layers beneath the borehole are recorded in the upgoing waves at every receiver position. This redundancy can be exploited to achieve a high signal-to-noise ratio and good quality time-amplitude information. The conversion of amplitude to acoustic impedance gives time and interval velocity with density held constant. Depth is then a function of time and interval velocity.

A VSP has several advantages over surface seismic data in inversion. These include knowledge of attenuation, waveform, and multiples from averaging downgoing waves. The borehole coverage allows use of a control zone for establishing optimal inversion parameters. Averaging of upgoing waves gives an unusually good signal-to-noise ratio so that deconvolution with the averaged downgoing waves yields an excellent estimate of primary reflections. These considerations, combined with the favorable geometry of the VSP, provide for considerable accuracy in estimation of velocity and depth below the bit.

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Morphological Variation of the Ostracode *Krithe*

Ostracodes, like other organisms, react to a changing environment by altering their morphology. This paper reports how the recent ostracode *Krithe* changes when temperature, oxygen, salinity, and depth vary. Eight specimens were chosen from varying localities in the north and south Atlantic Oceans. Although temperature and salinity did change in these locations, they did not vary enough to warrant study. Due to a lack of oxygen data, depth was the only environmental parameter available for examination. The Theta-Rho analysis technique was used to study the specimens. Marginal outline, anterior and posterior vestibules, and pore canals were all examined to see if they changed with depth. The outer margin area did not change in any consistent way with increasing depth. The area of the posterior vestibule decreased with increasing depth, and the anterior vestibule showed a possible trend for the area of increasing with increasing depth. Finally, the pore canals did seem to change with a variation in depth, but no direction for this change was found. It is suggested, in conclusion, that further studies use a larger number of specimens, so that any indicated trends can be better substantiated.

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Application of Strontium Isotopes to Origin of Smackover Brines and Diagenetic Phases, Southern Arkansas

The abundance of the isotope ^{87}Sr is variable in nature, as it is the radiogenic product of ^{87}Rb decay. The relative amount of this Sr isotope that is dissolved in a brine, as expressed by the $^{87}\text{Sr}/^{86}\text{Sr}$ ratio, might be used as a tracer of the origin and subsequent history of the brine, including its diagenetic effects in petroleum reservoirs. Strontium isotopic analyses of 40 brines from oil fields in southern Arkansas have been conducted to investigate the sources of the dissolved Sr, the pathways of brine migration, and the relationship between the brines and diagenetic phases in the Jurassic upper Smackover Formation. The $^{87}\text{Sr}/^{86}\text{Sr}$ ratios of 33 brines from the upper Smackover lime-grainstone range from 0.7071 to 0.7101; seven brines from formations stratigraphically above the Smackover range from 0.7090 to 0.7112. Thus the Sr in these brines is variably more radiogenic than Jurassic sea water