

Bogdan  
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Shale-rich fan sediments lie atop and are capped by till of the Valparaiso Moraine. The Michigan City indentation of that moraine may represent the fan head. The correspondence of fan sediments and moraine indentation with the edges of the deep shale basin of southern Lake Michigan suggests buoyed, differential collapse and flow of a central lobe core.

Although representing grossly different settings, both examples suggest a dynamic inter- and intra-lobe sequencing of events, involving strike-slip edge effects related to subglacial and ice-produced topography.

**STABLE ISOTOPIC COMPOSITION OF CARBONATES FROM THE LOWER CRETACEOUS HARMON MEMBER (PEACE RIVER FORMATION): EVIDENCE FOR EARLY DIAGENETIC PROCESSES AND FLUID FLOW**

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Carbon and oxygen isotopic analyses of authigenic siderite, dolomite, and calcite from Harmon Member shale and silt indicate mineral formation from fluids with a significant meteoric component.  $\delta^{13}C$  and  $\delta^{18}O$  values for all carbonates range from approximately -15 to +5 per mil and -19 to -4 per mil PDB, respectively.

Isotopic trends reveal that two processes; mixing of meteoric and marine waters, and oxidation of organic matter, were involved in the formation of these carbonates.

The paragenetic sequence of carbonate minerals is early siderite and calcite to later dolomite. The isotopic composition of siderite results from early organic-matter oxidation in a mixed marine/meteoric fluid. The later dolomite isotopic values show a trend that can be explained only by the mixing of marine and meteoric waters.

The oxygen isotopic composition of dolomites and calcites shows a greater influence of meteoric water towards the basin margin. This implies meteoric incursion into the basin from the west-southwest, induced by a relative change in hydrostatic head at the marine/meteoric interface.

**LONG TERM STABILITY IN RECENT FRESHWATER BIVALVE COMMUNITIES (BIVALVIA: UNIONIDAE)**

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The historic unionid fauna of the Tennessee River was the most diverse Recent freshwater bivalve fauna reported in the world. Archaeological assemblages of unionids recovered from along the Tennessee River in east Tennessee and northern Alabama contain evidence of approximately 6,000 years of stability in the unionid community composition. These archaeological faunas are compared with other archaeological assemblages from five tributaries to the Tennessee River and from four other major rivers in the Interior Basin. Changes in the unionid fauna had begun by 1800 AD due to the impact of Euro-American farming, timbering and industry. Today this formerly diverse and stable fauna has been substantially altered by the damming of the Tennessee River. Three species common today,

*Obliquaria reflexa* Raf., 1820, *Megaloniais nervosa* (Raf., 1820), and *Tritogonia verrucosa* (Raf., 1820) are either absent from the archaeological record or are represented by only a few valves. Many of the formerly common species are either extirpated locally or extinct.

**PALEOBATHYMETRICALLY CONTROLLED LITHOFACIES AND BIOFACIES OF THE JACKSBORO LIMESTONE (PENNSYLVANIAN-VIRGILIAN) OF NORTHCENTRAL (JACK COUNTY), TEXAS.**

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Interpretation of the paleobathymetric history of carbonate algal mounds has been of interest to the petroleum exploration industry, but few studies exist that document the lateral and vertical succession of biofacies and lithofacies encountered on the "slopes" of these structures.

Analysis of stratigraphic sections, petrographic thin sections, and *in situ* samples obtained from the Jacksboro Limestone near Jacksboro, Texas has yielded faunal and lithic data on the lateral and vertical relationships of the facies within the unit that indicate the presence of an algal mound. The succession of biofacies and lithofacies developed on the basinward slope, mound crest and backmound have been identified. Six bathymetrically controlled lithofacies and biofacies are present within the limestone.

Preservation of paleotopographic relief 1) supports the paleobathymetric interpretations, and 2) suggests that the areas of high paleotopographic relief are geographically stable, leading to repetitive near-vertical stacking of carbonate algal mounds on the stable shelf in northcentral Texas.

**COMMUNITY EVOLUTION: ITS CHARACTERISTICS**

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The overall characteristics of Phanerozoic communities have been well known since the middle of the past century, although community nomenclature was not employed to describe them until the past few decades. Since d'Orbigny's publications in the middle of the past century it has been understood that there are a finite number of relatively fixed biofacies/time interval (read "community type" for biofacies; read "ecologic-evolutionary unit" for time interval). Within each community type there are a relatively fixed number of genera (in equally sized samples). The species of these genera undergo phyletic evolution, with rate being inversely proportional to overall abundance of each genus. The