porosity.

Exploration in the deep south Texas Smackover Formation cannot depend upon finding reservoirs consisting of preserved, early types of porosity, but must depend upon defining areas where late subsurface-derived oomoldic porosity formed reservoirs.

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Petrographic Approach for Study of Ancient Potash Evaporites, Salado Formation (Permian), New Mexico

Petrographic analysis of a potash evaporite, the Salado Formation (Permian) of New Mexico and Texas, has allowed distinction of primary sedimentary features, from metamorphic alteration "overprints." Primary sedimentary textures in laminated anhydrite, thin-bedded halite, and muddy halite include vertical growth structures (gypsum "swallowtails" and "chevron" halite), incorporative and displacive intrasediment growth of gypsum, halite, and glauberite, carbonate-gypsum and gypsum-halite couplets, and gypsum wave ripples. The Salado primary chemical and depositional environment, interpreted by comparison with similar features from modern evaporite environments, is a salt pan up to halite saturation alternating with a perennial brine body stage at gypsum and sometimes halite saturation.

A complex diagenetic-metamorphic history has imparted a secondary alteration overprint on the Salado salts. Halite has recrystallized; gypsum has dehydrated to anhydrite, reacted with brine to form polyhalite, or dissolved, leaving a void now occupied by halite or sylvite. Formation of new minerals, the most important being sylvite, carnallite, langbeinite, and kieserite, has occurred as displacive or incorporative intrasediment growth (langbeinite), or as void filling cement (sylvite, carnallite). Further alteration is recorded as reaction of brine with langbeinite to form kieserite, kainite, leonite, and bloedite. From their observed distribution, texture, and mineralogy, and by comparison with experimental data, secondary features in the Salado are interpreted to have resulted from the subsurface migration of alien, nonseawater composition brines at elevated temperatures.

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Tectonic Setting and Eastward Migration of Mesozoic-Cenozoic Sedimentary Basins, Eastern China

Basins of eastern China are characterized by thin crust and alternately arranged NE or NNE-trending regions of subsidence and uplift. During the Indosinian (Late Triassic), the western part of eastern China was depressed relative to eastern areas. Upper Triassic and Jurassic formations comprise the major basin fill of the Sichuan and Eerduos basins, while only minor Upper Triassic-Jurassic rifts and related basins are superimposed on earlier swells in eastern regions. In the Early Cretaceous, the depocenters of the Sichuan and Eerduos (Ordos) basins shifted westward or southward, and soon afterward were uplifted as a whole. In contrast, the most extensive and intensive subsidence in the Songliao basin occurred during the Quantou-Nenjiang stage (middle Cretaceous). To the south, the Huabei basin had a multicyclic, rifted history, but the most intensive subsidence occurred during the Eocene-Oligocene. Still farther east, the present-day marginal seas formed mainly during the Late Cretaceous-early Neogene. Thus, the history of these basins clearly shows the eastwardly migratory nature of the timing of basin formation in eastern China. The development of these basins was influenced not only by subduction of the Pacific plate in the formation of initial stage shearo-compressional swells and depressions, but also by the motion of Tethys-Indian plate northeastward. The latter movements resulted in an eastward component which led to the progressive elevation of the west. Back-arc spreading also played an important role in this process.

Basins of eastern China can be classified into two groups, one formed in compressive or shearo-compressive settings, the other in tensile or shearo-tensile settings. Basins of the former type formed as structural depressions or flexures due to lithosphere deformation. These display foreland fold-thrust belts on their western borders. The tensile group of basins includes: (1) complex rift-depression types (monocyclic or polycyclic); (2) simple rift valleys or minor block-fault depressions; (3) coastal delta-shelf basins on the rifted continental margin; and (4) back-arc spreading basins.

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Succession of "Nonpaleocope" Ostracods Related to Graptolite Biozones, Type Wenlock Series

Analysis of the stratigraphic occurrences of 23 species of podocope, metacope, and platycope ostracods in Wenlockian strata of the type Wenlock area of the Welsh Borderland demonstrates the following. (1) Five species are restricted to the lower Wenlockian; four of these range from the *centrifugus* Biozone through the *rigidus* Biozone, and one ranges from the *centrifugus* Biozone through the *ellesae* Biozone. (2) Five species range throughout or nearly throughout the Wenlockian sequence. (3) Thirteen species are restricted to the upper Wenlockian; eleven of these range from the *lundgreni* Biozone through the *lundensis* Biozone, one ranges from the *nassa* Biozone through the *lundensis* Biozone, and one ranges from the *lundgreni* Biozone through the *nassa* Biozone.

These observations, which are based on the identification of more than 11,000 ostracods, indicate a significant change in the ostracod fauna in the middle of the Coalbrookdale Formation, i.e., in the middle of the type Wenlock Series or near the Sheinwoodian-Homerian boundary. A similar change occurs in the brachiopod succession in the same interval. Because the change in the ostracod fauna is relatively abrupt (i.e., within two graptolite biozones), we believe that it was induced by an environmental change which did not significantly affect the lithology of the stratigraphic interval involved. We conclude that the interval near the Sheinwoodian-Homerian boundary in the type Wenlock area represents the time of maximum Wenlockian transgression, after which regression and shallowing occurred.

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Erawan Field, Gulf of Thailand: A History of Applying Evolving Geophysical Technology to a Complex Geologic Structure

The Erawan gas field, with estimated recoverable reserves of 1.5 tcf of natural gas, was discovered in 1972. The drilling locations have all been selected on the basis of complicated reflection seismograph results. The productive section is a Tertiary sand-shale sequence of fluvial to shallow-marine origin, and individual sand units rarely exceed 50 ft (15 m) in thickness. The Erawan structure is a complexly faulted graben, with fault block rotation producing an anticlinal attitude. High fault density (200 to 500 m separation) and thin productive beds result in many separate hydrocarbon traps. Commercially productive sands occur at depths between 5,000 and 9,000 ft (1,525 to 2,740 m) subsea.

Union Oil Co. of California acquired the acreage in 1968 and