fracture and dissolution porosity. These analyses were corroborated by log-derived formation fluid properties, porosity, and petrophysical data, and by petrophysical analyses of Cerro Prieto core conducted under in-situ conditions. The results of these studies were integrated into the Cerro Prieto reservoir model.

These studies have resulted in a better understanding of a major hydrothermal resource. This enhanced comprehension will contribute to the efficient development of not only this geothermal field but will serve as a model for development of similar resources.

NOBLE, JOHN E., and STEPHEN VAN DER HAR, Univ. California, Berkeley, CA

Study of Diagenetic Processes in Sandstone from Cerro Prieto Geothermal Field, Baja California, Mexico

The economic exploitation of a geothermal resource is dependent on an adequate reservoir porosity and permeability and awareness of the distribution of each during development. Exploitable reservoir porosity and permeability are the results of diagenetic alteration of the reservoir's original porosity.

In this study, we have used petrographic, SEM, and X-ray diffraction analysis of well-bore cutting and core to model the diagenetic processes evident in the Cerro Prieto geothermal field. Porosity distribution was matched with lithologic and hydrothermal alteration distribution and a composite distribution model was constructed. This model was then analyzed for porosity trends.

The ratio of fracture to dissolution porosity and the ratio of detrital dissolution secondary porosity to authigenic dissolution secondary porosity were critical to this study. The role of fracture-dominated porosity and authigenic mineral plugging may have been overstated in geothermal system development.

The role of diagenetic studies in any reservoir evaluation is paramount. Diagenetic processes determine porosity from its origins through to distribution of porosity and permeability. Studies of these processes will contribute to better prediction of reservoir porosity distribution and subsequently better management of the geothermal resource.

NORRIS, D. K., Inst. Sedimentary and Petroleum Geology, Calgary, Alta.

Eastern Cordilleran Foldbelt and Foreland of Northern Canada

The eastern Cordilleran foldbelt and foreland of Canada north of lat. 60°N lies between the Tintina trench and the Canadian shield. It includes part of the southern rim of Canada basin and the junction between the Cordilleran and Innuitian orogenes. The sedimentary succession rests with profound unconformity on the westward continuation of the crystalline rocks of the shield, tapering eastward to a zero edge against the shield but truncated northward at the outer edge of the continental shelf. Widespread unconformities within and beneath the succession attest to regionally episodic orogeny and epeirogeny from the Proterozoic into the Tertiary.

In contrast to the tectonic style of equivalent thrust-faulted parts of the southern Canadian Cordillera, the region is characterized by bundles of right- and left-hand en echelon folds cut by two major, right-lateral strike-slip fault systems, the Richardson fault array bordering upon the foreland, and the Kaltag fault zone transecting the foldbelt. Laramide horizontal shortening with concomitant vertical thickening of the sedimentary succession is roughly one-fourth that at the 49th Parallel.

Known reservoir rocks for hydrocarbons include lower Paleozoic platformal carbonate rocks just north of lat. 60°N in both the foreland (Rabbit Lake) and eastern margin of the foldbelt (Beaver River and Pointed Mountain); Middle Devonian reefs (Norman Wells) and lower Carboniferous sandstone traps (Chance) within the foldbelt; and most recently, shale-cored anticlines and growth-fault structures in the Tertiary clastic sequence on the continental shelf at the junction of the Cordilleran and Innuitian Orogens.

NUMMEDAL, DAG, P. SHEA PENLAND, and AMY MAYNARD, Louisiana State Univ., Baton Rouge, LA

Sand Dispersal at Norderneyer Seegat, West Germany

Norderneyer Seegat connects the North Sea and the Wattenmeer between the East Friesian Islands of Juist and Norderney. It is a high wave-energy mesotidal inlet. The mean tide range is 2.4 m and the estimated mean breaker height exceeds 1 m. The sediment dispersal pattern and resultant morphology differ significantly from those of mesotidal inlets investigated along the low wave-energy shores of the southeastern United States.

The seaward margin of the ebb-tidal delta consists of a nearly continuous arc of bars, the "reef-bow." These bars have segregated tidal flow; flood dominates a broad ramp facing into the dominant waves (i.e., the west side), ebb dominates the narrow steep leeside margin. The bars migrate eastward through combined tide and wave action at an average rate of 400 m/year. Bar migration appears to be the dominant mode of inlet sediment bypassing.

The gorge section of the main inlet channel is ebb-dominated as a result of (1) water level-dependent inlet efficiency and (2) net water supply to the inlet drainage basin due to prevailing southwest winds.

Flood-dominated intertidal sand shoals abound in, and landward of, the inlet gorge. Ebb-dominated flanks occur on some of the shoals. The degree of flood dominance increases landward, an effect which is attributed to the difference in celerity between the tidal wave trough and crest.

Both the mechanics of ebb-delta sand bypassing, and the occurrence of tidal-flat flood dominance, distinguish the dispersal pattern at Norderneyer Seegat from that at mesotidal inlets with lower wave energy. Stratigraphic models for tidal-inlet sequences must consider both tide range and wave energy.

NUNN, JEFFREY A., Northwestern Univ., Evanston, IL, and NORMAN H. SLEEP, Stanford Univ., Stanford, CA