
INTERNATIONAL EXPLORATIONISTS

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BRUCE K. LEVELL—Biographical Sketch



Bruce K. Levell, Geology Manager of Mid-Continent Division of Shell Western E&P Inc. received his B.A. and Ph.D. degrees at Oxford University. Dr. Levell's dissertation was on the Sedimentology of Late Pre-Cambrian rocks from Finnmark, North Norway.

Bruce K. Levell joined KSEPL (Shell) Rijswijk as a research geologist in 1978 working on the Seismostratigraphy of Brunei and on Permo-Carboniferous

glacial sediments of Oman. Bruce was transferred to Miri, Sarawak as an exploration geologist for Sarawak Shell Bhd in 1983. His responsibilities included offshore acreage acquisitions, regional geology and seismic interpretation of Sabah and Sarawak. He was transferred to Shell Western E&P Inc. in 1986 as a project leader of Anadarko Basin, Mid-Continent Division. Bruce Levell heads the geology group in the Mid-Continent Division since 1987.

OIL OCCURRENCE IN OMAN: OIL-BEARING SEDIMENTS OF GONDWANA GLACIATION

More than 3.5 billion bbl of oil in place have so far been discovered in reservoirs of the Al Khlata Formation of the Permian-Carboniferous lower Haushi Group in south Oman.

Glacially striated pavements and boulders in exposures at Al Khlata in east-central Oman confirmed previous interpretations that the formation is, at least partly, of glacial origin. Core and wireline-log data from some 500 wells that penetrate the formation show that glacial facies are widespread in the subsurface. Shales with varve-like laminations and dropstones are present in two main layers which extend over the larger part of south Oman and are perhaps the most diagnostic facies. Diamictites are also widespread, and some, which can be correlated as sheets over thousands of square kilometers, are interpreted as true tillites. Other diamictites are interbedded with shales with varve-like laminations or unbedded siltstones and are interpreted as subaqueous glacial deposits.

Ten sedimentary facies have been described in cores and outcrops. An important result of this study is a formal scheme to interpret these facies from wireline logs using quantitative analysis of density and neutron logs and qualitative information from other logs.

Lateral facies relationships are complicated by syn-depositional salt withdrawal and dissolution, paleorelief on the basal unconformity, and intraformational unconformities beneath regionally extensive tillites. At least three glacial phases can be recognized; an early phase, represented only by erosional remnants of diamictites, and two later phases, the last of which extended over the whole of Oman south of the Oman Mountains. Deglaciation is represented by a regional shale bed sharply overlying the diamictite sheet of this last glaciation.

Oil occurrence can be related to three northwest-southeast striking facies belts. (1) In the South Oman salt basin, deposits consist of sands, pebbly sands, and diamictites deposited in glaciofluvial environments. This sequence lacks good seals. (2) In the downdip part of the basin's eastern flank, interbedded sands, silts, shales with varve-like laminations, and diamictites represent glacio-lacustrine deposition at ice margins and in meltwater deltas. This belt contains interbedded reservoirs and seals, and includes the largest number of oil accumulations. (3) Updip in the eastern flank area, several-hundred-meter thick siltstones and claystones with thin turbiditic sandstones represent a belt of persistent glacio-lacustrine deposition, probably in the axis of a salt dissolution syncline. This belt contains few oil accumulations.