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Mark E. Deptuck[1], David J. W. Piper[2] (1) Dalhousie University, Halifax, NS (2) Geological Survey of Canada (Atlantic), Bedford Institute of Oceanography

Paleocene and Eocene "North Sea-Like" Submarine Fans in the Jeanne d'Arc Basin, Offshore Newfoundland, Eastern Canada

Near-basin-wide coverage of 3-D seismic data, combined with vintage 2-D seismic and well data, provide new insight into the architecture and evolution of Paleocene and Eocene submarine fans in the Jeanne d'Arc Basin (JDB). Several small sand-prone fans were deposited on the slope and floor of the basin, showing close similarities to fans of similar age in the North Sea (e.g. Forties, Frigg, Tay). The dominant seismic facies of JDB fan deposits are mounds, with sub-circular to elongate pod and channel-like planform geometries (both isolated and nested). Similar to the North Sea, well penetrations indicate that the thickest parts of mounds correspond to thick sandstone intervals (35-65 m) that commonly generate a blocky gamma ray response.

Mounds are inferred to originate from a combination of original submarine depositional geometry and post-depositional modification (via compaction and possibly sand injection). Some mounds form at the mouths of erosional channels and gullies, and are interpreted as stacked channel-termination lobes that have undergone varying degrees of differential compaction with surrounding shale. Other mounds are elongated and narrow, and are inferred to consist of compaction inverted channels. Still other mounds consist of nested, semi-intact sandy slide blocks or isolated muddy rotational slumps (both can be correlated up-slope to equivalent failure scarps).

Detailed ultra-high-resolution seismic studies (0.5 m vertical) from similar-size modern fans off eastern Corsica and California provide quantitative information about the original depositional geometry and dimensions of sand-prone lobes and channels, their stacking architecture, and distribution. They also provide a means of evaluating the geological validity of our interpretations for mounds in the JDB, and for assessing the degree to which the modern lobes/channels would need to be compacted in order to produce the mounded seismic geometries observed in the JDB.