

Characterization and interpretation of Late Cretaceous to Eocene erosional features and associated submarine fan deposits in the Jeanne d'Arc Basin, offshore Newfoundland

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Several canyons, channels and incised valleys have been identified, characterized and mapped in Late Cretaceous to Eocene successions of the Jeanne d'Arc Basin. Erosional features act as conduits which funnel sediment into deeper marine settings during lowstands in relative sea level. Their lo-

cation and timing have important implications for the distribution of reservoir rocks in the Jeanne d'Arc Basin. Seismic and sequence stratigraphic methods reveal three periods of canyon, channel and incised valley development. Each period is associated with a regional unconformity.

During the latest Cenomanian to Coniacian, a deltaic succession (Otter Bay member) and a basinwards condensed section (Petrel Member) developed. In the Santonian, a drop in relative sea level initiated the development of an unconformity with a north-trending canyon and branching channel system. Clastics and carbonates were eroded from the south-southwest and ponded towards the north. A rise in relative sea level during the Santonian to Maastrichtian caused a second deltaic phase (Fox Harbour member) and basinwards condensed section (Wyandot Formation) to develop. A significant drop in relative sea level during the Early Paleocene caused the incision of three east-trending basin periphery canyons and

several smaller gullies. These eroded clastics of the Fox Harbour member and re-deposited them basinwards in an Early Paleocene basin floor fan and wedge. Minor north-trending channels, along the eastern periphery, indicate that sediment was also entering the basin from the southeast. During the Latest Paleocene to Early Eocene, relative uplift of the Cormorant Horst caused the incision of several southeast-trending gullies and incised valleys. These transported sediment across a basement high into a thick clastic wedge in the southern Jeanne d'Arc Basin. In the central Jeanne d'Arc Basin, canyon activity continued to feed Early Eocene submarine sands into the basin.