

**Morphology, timing, and implications of ancient submarine canyons
in the Carson Basin, offshore Newfoundland, Canada**

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The Carson Basin underlies the Grand Banks, offshore Newfoundland, and is composed of several depocenters, the deepest of which holds over 10 km of Mesozoic and Cenozoic sediments. To date, only four exploration wells have been drilled. The basin lies to the southeast of the more intensely studied and developed Jeanne d'Arc Basin, which contains the Hibernia production platform and other developing oil-fields. A basement high separates the Carson Basin from the Jeanne d'Arc. The basins formed in response to the opening of the North Atlantic Ocean in a complex series of rifting events. Uplift and erosion which accompanied the rifting phases created unconformities and deposited clastic sequences.

Submarine canyons and erosional scours have been recognized in the northern end of the Carson Basin and

mapped using industry seismic profiles. Work to date shows two canyon complexes trending east-west. The canyons are at least 6.5 km wide and 1000 m deep, and are covered by more than 1100 m of sediment. The erosional features have a wide range of implications, including possible subaerial exposure of the continental shelf. The size and morphology of the canyons infer large scale clastic deposition in submarine fans basinward. Synthetic seismograms created from the exploration wells allow correlation of seismic reflectors with formations, lithology, biostratigraphy, and unconformities present in the well data. By relating the reflectors to the major tectonic sequences of deposition and erosion, the formation of the canyons can be temporally constrained. Work is in progress to determine which of the Late Cretaceous, Early

Palaeocene, or Early Eocene erosional unconformities excavated the canyon complexes.