

Massive Bed-Forms, Mega-Furrows, on the Continental Rise at the Base of the Sigsbee Escarpment, Northwest Gulf of Mexico

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Some of the largest deep-water sedimentary bed-forms ever found in the world oceans were recently discovered along the base of the Sigsbee Escarpment in the northwest Gulf of Mexico. Deep-Tow high-resolution geophysical surveys on the continental rise south of the Sigsbee Escarpment have revealed the existence of mega-furrows, ~10 m deep and ~30 m wide, spaced ~100 m apart that occupy an area on the Continental Rise 20 to 40 km wide. A single furrow within a field of furrows in the Green Knoll Diapir area can be traced over a distance of 150 km. The furrows are located at the base of the Sigsbee Escarpment from 90° to 93° West Longitude, from north of Green Knoll to the area just west of Bryant Canyon. The presence of furrows, longitudinal bed-forms, suggests that

unidirectional bottom currents up to 100 cm/sec may exist at the base of the Escarpment. The furrows are inferred to be formed by helical secondary circulation. Allen (1968) produced sedimentary furrows in the lab and found a hierarchy of bed forms ranging from uniform furrows at low flow conditions to meandering furrows and flute casts at the highest flow conditions. All the conditions described by Allen are present in the area due south of Bryant Canyon on the continental rise. In terms of hazards relating to deepwater hydrocarbon exploration and production, the formation of mega-furrows demonstrates the existence of previously undocumented high-velocity currents at the base of the escarpment.