marine or glacial environments, but must be evaluated in terms of interactions between the two.

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Glacial Origin of Megachannels of Upper Yakataga Formation (Pliocene-Pleistocene), Robinson Mountains, Gulf of Alaska

A tidewater glaciomarine depositional model is proposed for the upper Yakataga Formation in the Robinson Mountains, eastern Gulf of Alaska. The upper 2,000 to 3,000 m of the Yakataga Formation is characterized by major channels (depth >90 m) cut into and filled with both fluvial and/or marine rocks. The channels are elongate and steep walled, and appear to be confined within or parallel with paleotopographically low areas. Detailed studies of five channels show maximum dimensions of 430 m in depth and about 3 km in width. Channel length was not determinable.

Channel margins are in places grooved and striated. Channel-base conglomerates exhibit foreset bedding inclining down the channel axis, and are interpreted to be subglacial melt-water deposits. The channel fill is dominated by interbedded siltstones and pebbly siltstones (diamictites). The siltstones contain abundant in-situ marine fossils, commonly encrusting the tops of dropstones. These deposits are interpreted to be proglacial marine sediments and ice-rafted glacial erratics. Thin sandstones interbedded within the siltstones are graded and exhibit traction features. These are believed to originate as gravity-flow units from oversteepened clastic wedges deposited by subglacial melt-water discharge at the grounded terminus of a glacier. Diamictites are of two major types: (1) poorly sorted sandy siltstone units with patchy distribution of angular clasts (nonmarine tillite); and (2) moderately sorted, muddy siltstone units with in-situ fossils and evenly dispersed, slightly rounded clasts (marine tillite). Some of the diamictites are highly contorted, particularly those underlying younger channel bases. The contorted character is probably the result of loading sediments by an advancing ice lobe.

Nonmarine sandstones and conglomerates are present as interbedded lenticular packages, and are interpreted as fluvial units deposited within a braided glacial-stream complex. These units occur both within channels and as clastic wedges within marine-shelf sequences. The channels are interpreted as fiords, and the modern fiords of the Yakataga area (Icy and Yakutat Bays) serve as modern depositional analogs.

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Glacial-Marine Trace- and Body-Fossil Associations, Upper Yakataga Formation (Pliocene-Pleistocene), Gulf of Alaska

Glacial-marine deposits of the Yakataga Formation are characterized by six associations of trace and body fossils. These associations can be directly compared to modern associations within the tidewater-fiord and marine-shelf environments in the Gulf of Alaska, and allow definition of specific paleoecologic conditions.

Inner-shelf sandstones are extensively bioturbated by a community characterized by the infaunal pelecypods *Siliqua* and *Spisula* and the epifaunal gastropod *Neptunea*. Distinct trace fossils are absent.

Open-shelf siltstones are also extensively bioturbated. Epifaunal body fossils of the gastropod *Colus* and small ophiuroids are abundant. The infaunal pelecypods *Mya* and *Panomya* are locally common. Trace fossils include rare small vertical burrows and large pelecypod burrows parallel with and oblique to bedding planes.

Major channel systems within the upper Yakataga Formation are interpreted as fiord deposits. The fiord deposits have three rock-fossil associations. Rhythmically bedded siltstones and sandy siltstones have an infaunal community of the pelecypods *Acila* and *Macoma*. Distinct trace fossils are absent. "Massive" siltstones are extensively bioturbated, have locally abundant large burrow networks, and typically have locally abundant body fossils of the epifaunal gastropods *Beringius*, *Colus*, and *Musashia*, as well as small ophiuroids. Within the siltstone sequences of fiord deposits are thin, graded sandstones. These thin sandstones have an associated body-fossil community of shallow-burrowing *Nuculana* and *Clinocardium* and trace fossils of small vertical escape burrows, bed-top pelecypod resting impressions, and pelecypod foot-push trails.

A sixth faunal association consists of epifaunal organisms such as serpulid worms and barnacles that are attached to the upper surface of glacially derived dropstones.

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Pleistocene Submarine Canyons of Northwest Gulf of Mexico—Study in Seismic Stratigraphy

Parts of six submarine canyons and canyon complexes on the shelf of the northwest Gulf of Mexico were studied using seismic stratigraphic techniques. These canyons were eroded during the late Pleistocene, probably by subaqueous processes acting on channels formed subaerially during a low stand of sea level. They have since been infilled and are now buried beneath as much as 6,000 ft (1,830 m) of sediment. The reflection patterns produced by the sediments infilling the channels range from parallel to mildly chaotic, and the reflections are variable in intensity. The sediments appear to have undergone considerable modification by slumping or flowage. They are mostly shale with some silt and lesser amounts of sand nearshore. The sediments that were deposited at the mouths of the canyons are mostly shale and, where undisturbed, display subparallel reflections. Individual canyons ranged in size from 2 to 20 mi (3.2 to 32 km) wide and were as much as 3,500 ft (1,068 m) deep before being infilled.

Oil or gas accumulations may be associated with these canyons in two ways. First, there may be hydrocarbon accumulations within the sediments deposited in deeper water at the mouths of the canyons. Second, the