marks, mud cracks, salt-pseudomorphs, and groove marks accompanied by vertebrate footprints on the same slab.

The set of trace fossils and associated sedimentary structures indicates an origin at the fringes of aquatic areas and at the borders of vegetation zones. These large areas were used by the ruling reptiles as pathways between the water and the vegetation where they found resting, breeding, and feeding places. The smaller vertebrates were living in habitats near the vegetation or at the borders of small channels. The invertebrate traces point out the proximity of water and the fluctuation of water level. The primary sedimentary structures suggest variable water levels and the salt-pseudomorphs suggest marine water. The assemblage of traces suggests very large sandy areas between the sea or lagoons and zones of dense vegetation which favored proliferation of the mobile Archosaurs.

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How Geologic Objectives Should Determine Seismic Field Design

The geologist needs to take an active part in seismic field design so that the results of the seismic survey will answer his questions as clearly as possible. Geologic objectives should provide the basis for field design. A systematic procedure is outlined where the field parameters are defined by (1) the depth of objectives, (2) the expected dip, (3) the required resolution, and (4) signal-to-noise considerations.

Optimizing seismic data quality requires proper design of field acquisition parameters as well as proper execution of the field work. Field parameters are usually chosen as "those that were used last time," even though these may not have been optimum or may have been constrained by hardware considerations that no longer apply. Furthermore, the geologic objectives may have changed.

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Uranium in Tertiary Sediments in Alaska

The early search for uranium in the continental Tertiary sediments in Alaska raised the question of whether the necessary processes to produce epigenetic uranium deposits ever occurred under the paleoenvironmental conditions that existed this far north. Recent discoveries, however, have demonstrated that epigenetic uranium enrichment occurred in these Tertiary sediments.

At present, the most intensely explored and best known uranium occurrences in Tertiary sediments are found in the Healy Creek basin. The richest occurrence found in this area is in discontinuous beds of sideritic nodules near the base of the Oligocene and Miocene Healy Creek Formation where it overlies the Mississippian(?) Totatlanika Schist. The Healy Creek Formation consists of a clay-rich, gray to light-reddish-brown conglomeratic sandstone containing carbonized plant debris. The nodules are 2-5 cm in diameter. They have a reddish-brown, outer goethitic rind, a yellowish-brown, inner sideritic core, and scattered gray areas containing uraninite and manganite. A composite sample of the sideritic nodules contained 717 ppm uranium and 2,000 ppm manganese. A low-grade roll-front deposit has also been reported from this area. The roll front is in the Miocene Suntrana Formation, which consists of coal-bearing pebbly quartz sandstone.

Slight uranium enrichment (12 ppm) had been reported from a thin carbonaceous sideritic bed in a conglomeratic part of the Tertiary Kenai Formation near Camp Creek in the Susitna Lowlands. Additional collections yielded a sample containing 72 ppm.

A uranium occurrence has been reported from the Tertiary Kootznahoo Formation on Kuiu Island in southeastern Alaska. The Kootznahoo consists of arkosic dolomitic sandstone containing carbonized wood fragments. As much as 0.23% gamma eU (0.13% beta eU) was found in the carbonized wood fragments. Some of the samples also contained apatite and siderite.

Siderite and carbonized plant material are common to all the known uranium deposits in Tertiary sediment in Alaska. The siderite suggests alkaline conditions and the carbonaceous material indicates reducing conditions. Tertiary ash beds and other volcanic sediments were the apparent sources of uranium for the Healy Creek and the Kuiu Island deposits. Cretaceous and Tertiary granite and quartz monzonite were the apparent sources of uranium in the Susitna Lowlands occurrence.

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Paleogene Depositional Systems, Western Transverse Ranges, Southern California

Paleogene strata of the western Transverse Ranges include varied clastic facies that prograded southwestward from arkosic sediment sources in granitic and metamorphic terranes of the Salinian and Mojave blocks. Deposition occurred within a complex fore-arc basin whose bathymetry was modified by pronounced uplift of a structural high along the trench slope break, and by internal deformation associated with oblique subduction during shallow plate descent beneath the Laramide cordillera. Integrated depositional systems produced intertonguing deep-marine, shallow-marine, marginal-marine, and nonmarine deposits. Exposed transitions between basinal turbidite successions, deltaic strandline complexes, and alluvial-plain sequences are common at several horizons. Mappable formations and local members are distinguished chiefly by their shaly, sandy and conglomeratic, or mixed lithologic character. Each such stratigraphic unit typically includes several facies associations. Shale-rich facies were deposited on terrestrial flood plains, prodelta and basin-flank slopes, overbank surfaces of subsea fans, and distal basin plains. Sand-rich intervals include thickening-upward cycles of sheet-flow depositional lobes on subsea fans, thinning-upward cycles of turbidite channels on subsea fans, coarsening-upward cycles of prograding shelf breaks, fining-upward cycles of migratory shelf and shoal-water bars, coarsening-upward cycles of distributary-mouth bars, and fining-upward cycles of flu-