ized by more than 50% sand-grade matrix. Beds are less than 200 cm thick, parallel-sided, and have an uppermost sand-silt layer with convolute lamination.

Type Ia is interpreted as a deposit from mass flow of coarse granular debris where internal shear was extensive enough to allow development of grading. For the transport of Type Ib beds, a slide mechanism is favored.

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DOWN-CURRENT BED THICKNESS AND GRAIN-SIZE VARIATIONS ALONG GRAYWACKE BEDS, GAULT FORMATION, EASTERN ALPS

Paleocurrent directions indicate that deposition of 52 continuous graywacke beds in the 200 m thick Gault Formation (Lower Cretaceous) was from a western source. Down-current decrease in bed thicknesses over 115 km along the Eastern Alpine flysch belt is slight and usually cannot be detected within individual layers. Bed-by-bed correlation between each section, however, provides a basis for mathematical treatment of the thickness data.

If calculated as average deviations from a standard section, most individual sections show a systematic down-current decrease in graywacke bed thickness. The standard section was obtained by using the average thickness of each graywacke bed and each claystone layer and should, therefore, theoretically provide a medial section approximately midway between the proximal and the distal sections. The decrease in thickness appears more pronounced, if thickness ratios (thickness of the graywacke bed divided by thickness of the overlying claystone layer) are taken into account. The average deviation of these thickness ratios from the standard section thus provides an index for the proximality.

Similarly slight down-current changes were observed in grain sizes. For instance, a feldspar-rich marker bed shows a nonuniform decrease of the median grain size at its base from 535μ in the west to 176μ at the easternmost section, 115 km east.

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BARRIER BAR SEDIMENTATION IN UPPER CRETACEOUS FACIES SEQUENCE, SOUTHEASTERN USA

Upper Cretaceous (Campanian) clastic strata in eastern Alabama indicate deposition in a shallow-marine littoral environment. Fluctuations of strand in a predominantly regressive cycle have produced at least 4 heteropic facies, one of which includes sediments of barrier-bar origin. Interpretation is based on detailed studies of sedimentary petrology supported by paleontological evidence.

Distinguishing characteristics of the facies sequence recognized from top to bottom are: (1) barrier bar (regressive)—moderately sorted, medium-grained sand; *Ophiomorpha;* low-angle crossbedding; lag concentrates; channels; (2) offshore clay (transgressive)—calcareous, sandy clay grading upward to clayey fine sand; high planktonic to benthonic ratio; (3) marginal shelf sands (transgressive)—fine- to medium-grained, calcareous, glauconitic sand; distinct burrows; high faunal diversity; and (4) delta front (regressive)—very poorly sorted, sandy, carbonaceous silt; bioturbate; low faunal diversity; low planktonic to benthonic ratio.

The delta-front deposits accumulated as part of a clastic wedge which was built out into eastern Alabama. Sediment source was the Appalachian Mountains and the Piedmont Plateau. A reduction in supply of detritus allowed transgression which reworked the delta-front sediments and resulted in the development of marginal-shelf sands and/or offshore clays. Sand transported from the east by longshore currents became concentrated as barrier bars wherever waves, tidal currents, and longshore currents attained a balance with available sand.

The filled channels, large-scale crossbedding, and lag concentrates suggest that some of these clean sandstone bodies of the barrier-bar facies may be complex shoal deposits or inlet channel fillings resulting from destruction and reworking of barrier islands.

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NEARSHORE FACIES RELATIONS, EOCENE LAKE UINTA, UTAH

Fluvial through "deep" lacustrine transitions are present in the Green River Formation (Eocene) of the Uinta basin, Utah. Characteristic sedimentary features useful for reconstructing specific subenvironments are (in approximate order of usefulness):

Fluvial Channel.—Small- and medium-scale cross-stratification; horizontal stratification; channels; poorly sorted sublitharenite, lithic arenite and subarkose; intraformational and chert-pebble conglomerate.

Fluvial Floodplain.—Earthy silty claystone; paleosoil.

Lagoonal.—Thin horizontal lamination; waxy claystone; clastic lenses of oolitic sandstone; algal mat; carbonate pebble conglomerate.

Shoal.—Horizontal and small- to medium-scale cross-stratification; oolite; algal mat; ripple marks; shrinkage polygons; chert-pebble conglomerate; ripple stratification; bone fragments.

Beach, Shoreface.—Horizontal and small- to medium-scale cross-stratification; quartz-arenite and subarkose; ripple marks; incomplete shrinkage cracks; ripple stratification; burrowing; chert-pebble conglomerate; large-scale cross-stratification; disturbed bedding; small channels.

Nearshore.—Horizontal and wavy stratification; fine-grained sandstone and siltstone; small-scale cross-stratification; disturbed bedding; incomplete shrinkage cracks; ripple marks; ripple stratification.

Offshore.—Horizontal stratification; varves; oil shale and claystone; syneresis cracks; oolitic sandstone; stromatolites.

Sedimentary cycles are present in each of these depositional environments. Lacustrine cycles consist of a lower regressive clastic phase and an upper transgressive carbonate phase. Specific lithologies and sequences differ in each lacustrine subenvironment. Fluvial cycles consist of a basal erosional episode followed by channel filling and floodplain development. Fluctuations in the level of Lake Uinta are interpreted to have caused these cyclical deposits.

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EVAPORITES—CLUE TO CHEMISTRY OF SEAWATER DURING PHANEROZOIC

(No abstract submitted)