

The extinct discocylinid *Pseudophragmina clarki*, which is present throughout the shallow-marine (transgressive) facies including the "Stewart bed", is indicative also of warm waters less than 100 m depth (Vaughan, 1945). Abundant lenticulinid and elphidium benthic foraminifers from the shallow-marine facies are indicative of neritic depths (Schymiczek, 1983a, this volume).

Outer Shelf to Slope Facies

The outer shelf to slope facies occurs in the upper middle part of the formation. It is nonresistant and very poorly exposed. It consists of bioturbated siltstone with a minor amount of massive sandstone. Stipp (1943) referred to rocks within this interval as "worm impression shale". Locally, this facies encloses isolated sandstone bodies (see outer shelf to slope channel facies). Megafossils are scarce, but foraminiferal assemblages are diverse (Schymiczek, 1983a, this volume).

Discussion

The presence of isolated channels (filled with turbidite deposits) within the siltstone is one of the main evidences for an outer shelf to slope environment interpretation for this facies. According to Mutti and Lucchi (1972) such an association is one of the characteristics of slope environments. Other sedimentological evidences are the clay to silt grain size and nearly total lack of physical sedimentary structures. Modern outer

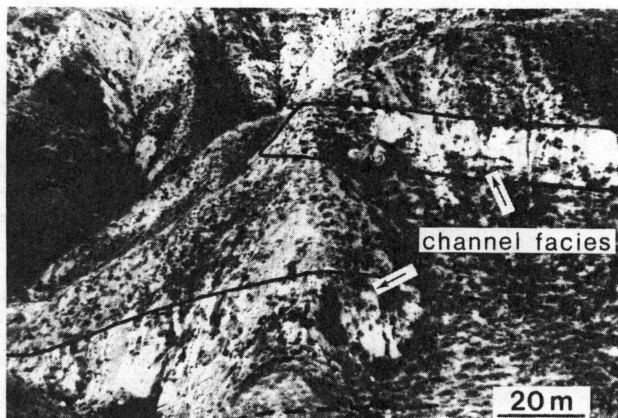


Figure 14. Outer shelf to slope channel facies, north side of Chivo Canyon.

shelf-slope deposits are usually silty clay to clayey silt (Folk, 1974; Reineck and Singh, 1975). Open shelf sediments are subject to extensive reworking by bottom-dwelling and feeding animals, and, in the process, the sediments become thoroughly bioturbated (Allen, 1973). Cassidulinid, gyrogonid, and agglutinated benthic foraminifers from this facies also are indicative of the slope environment (Schymiczek, 1983a, this volume).

Outer Shelf to Slope Channel Facies

This facies consists of isolated lenticular sandstone bodies surrounded by outer shelf to slope siltstone. The sandstone bodies are usually about 200 m across and 20 m thick. Best exposures are

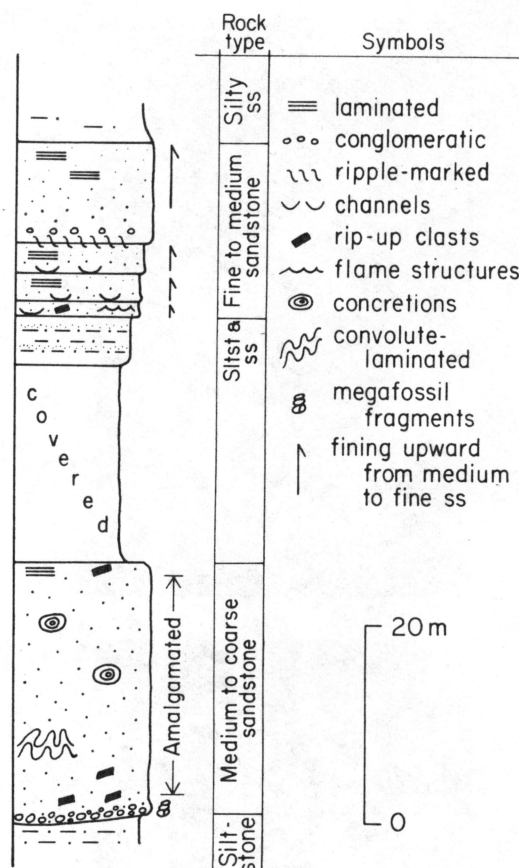


Figure 15. Stratigraphic column of vertically stacked, outer shelf to slope channels shown in Figure 14. (From Squires, 1981).

present in Chivo Canyon about 1.2 km east of the type section where there are two stacked channelized sequences (Figs. 14, 15). Several sandstone bodies also are present between Bus and Sycamore Canyons along the south side of Simi Valley.

The sandstone is medium- to coarse-grained subarkose, fairly well sorted, and subangular. Typically, the sandstone is massive and amalgamated (Fig. 16A). In some cases, there are cycles of Bouma (1962) Tabc sequences. These sequences typically consist of massive to laminated, medium sandstone at the base, grading upward into laminated or ripple-marked fine-grained deposits that locally show flame structures (Fig. 16B). Body fossils were found at only one place, and they were restricted to a poorly sorted, basal conglomeratic unit just above an erosive surface cut into the underlying siltstone.

Discussion

This facies is interpreted as localized turbidite deposits which have filled small-scale channels incised into outer shelf to slope siltstone. The thick-bedded, massive, amalgamated sandstone (facies B of Mutti and Lucchi, 1972), with poorly sorted conglomeratic units containing displaced shallow-marine body fossils is similar to ancient shelf channel deposits described by Howell and Link (1979) and Dott and Bird (1979).