

EARLY PERMIAN (MIDDLE-LATE WOLFCAMPIAN) PHYLLOID ALGAL/*TUBIPHYTES* BIOHERMS AND ASSOCIATED FACIES ALONG THE MARGIN OF THE OROGRANDE BASIN, HUECO MOUNTAINS, WEST TEXAS

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Middle-Late Wolfcampian phylloid algal/*Tubiphytes* biohermal complexes have been found exposed in western outliers of the Hueco Mountains of far west Texas. Paleogeographically, the bioherms are located along the fault-controlled shelf margin between the Late Paleozoic Diablo Platform and Orogrande Basin. Although Virgilian and Early Wolfcampian phylloid algal mounds are well-known from the Hueco and Sacramento Mountains, outcropping Middle-Late Wolfcampian bioherms have not been described previously from the Orogrande Basin area.

The biohermal complexes are exposed in three large outliers that lie about 3 miles west of the main Hueco Mountains and extend for about 12 miles in a north-south direction. The shelf margin complexes are in the Hueco Canyon Formation and correlate to well-bedded shelf facies in the main Hueco Mountains based on fusulinid biostratigraphy.

The phylloid algal/*Tubiphytes* shelf margin bioherms contain an upward shallowing facies succession, which consists of, in ascending order: (1) phylloid algal wackestone-bafflestone, (2) phylloid algal bafflestone-packstone, (3) phylloid algal-fusulinid bafflestone-packstone, and (4) *Tubiphytes* boundstones and *Tubiphytes*-fusulinid-phylloid algal packstones and grainstones. Unlike some previously described Wolfcampian phylloid algal buildups, the phylloid algal mound facies in these buildups contain only rare calcisponges, heliosponges, and marine radial fibrous cements. On the crest of the southern outlier there occurs a rather different type of bioherm, which contains nodular boundstones that are composed of encrusting red algae and bryozoans, and in which calcisponges are common. That bioherm is thought to be slightly younger in age than the phylloid algal/*Tubiphytes* bioherms, and it might also have been formed in a deeper-water setting.

Bordering the phylloid algal/*Tubiphytes* bioherms on the seaward side are overlapping tongues and channels of lithoclastic-skeletal debris and skeletal grainstones and packstones. Some of these forereef units extend seaward into slope facies, which consist of dark-gray cherty limestones that generally lack skeletal fossils, but contain a rich ichnofossil assemblage in the shallower upper slope beds. Backreef facies consist mainly of skeletal-peloidal packstones and wackstones.

The Hueco Mountains outlier exposures are significant because: (1) they establish the presence of a Middle-Late Wolfcampian shelf margin with distinct topographic relief in the southern Orogrande Basin, and (2) they provide an easily accessible field laboratory to study Middle-Late Wolfcampian shelf-to-basin facies relationships and shelf margin bioherms. Middle-Late Wolfcampian shelf margin bioherms are of particular interest because they represent an important transitional stage in the evolutionary history of Late Paleozoic reef communities, and because they form important petroleum reservoirs just to the east in the Delaware and Midland Basins.