

ABSTRACT

A relatively recently exposed road-cut section of the late Early Cambrian Shady Dolomite/Rome Formation was logged at Porters Crossroads, Virginia, to assess whether the section contained a paleoclimate record relevant to the onset of global greenhouse conditions. The cut exposes 300 meters (900 feet) of cyclic peritidal carbonate parasequences and several distinctive redbed units that formed on the peritidal portion of a carbonate ramp with periodic siliciclastic influx. The carbonate parasequences are 0.3 to 5 m thick (1-15 feet). The major facies comprise red mudrock (terrestrial or intertidal mud-flat), red and white sandstone (intertidal sand-flat), microbially laminated dolomite (upper intertidal flat), thick-laminated dolomite (lower intertidal), fenestral pelletal packstone/mudstone (intertidal to subtidal), and burrowed dolomite/wackestone-mudstone (subtidal).

A Fischer (accommodation) plot shows that the succession preserves the late highstand (Sequence 1) of the Shady carbonate platform and the transgressive systems tract (Sequence 2) of the overlying Rome Formation. The parasequences commonly stack into groups of 4 to 6 upward-shallowing and upward-thinning cycles, which make up parasequence bundles. The roughly 5 to 1 bundling suggests precessional cycles stacked within short-term eccentricity cycles. These high frequency fourth- and fifth-order, upward-shallowing parasequences are classic greenhouse platform deposits, suggesting that the exposed Shady-Rome section formed on a relatively ice-free earth over about 2 m.y. This study extends the greenhouse climate that typifies the Middle to Late Cambrian back into the late Early Cambrian.