

Petrology of Stromatoporoid-Coral Framestones and Rudstones in the Upper Keyser Formation (Silurian) of the Water Sinks Area, Highland County, Virginia

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The Keyser Formation in the central Appalachians spans the Silurian – Devonian boundary, and in Highland County there are two prominent biostromal framestone and rudstone horizons in the upper 35 m comprised principally of stromatoporoids and corals. The upper of the two is best known from a biohermal exposure near the community of Mustoe, about 9 km to the west-northwest of our study area, but the lower horizon in this area has received less attention. Excellent surface and subsurface exposures of these two horizons in the Keyser have turned out to be an important part of the stratigraphic column in the Water Sinks, a complex karst feature in the Williamsville 7½ minute quadrangle in southern Highland County, which we have recently remapped in detail. The lower biostromal horizon is exposed in the stream-washed walls of several passages of the Water Sinks Subway Cave (discovered in November 2007) and in Aqua Cave. It is 2-3 m thick, with a stromatoporoid framestone at the base, which overlies a cross-bedded quartzose crinoidal grainstone that itself overlies the upper beds of the Clifton Forge Sandstone. Most of the stromatoporoids above the basal framestone appear to have been rotated or tumbled, and the few corals in this rudstone horizon also appear to have been transported. This horizon has been extensively but selectively dolomitized in these exposures as well, including numerous baroque dolomite crystals throughout.

The upper biostromal horizon is separated from the lower biostromal horizon by 15 m of massively bedded to cross-bedded crinoidal grainstones, pink in places, and about 3 m of shaley and in places cherty lime mudstones at the base. This upper biostromal horizon is exposed in the passages of two additional caves, Owl Cave and the Old Water Sinks Cave. At about 4 m thick, it is thicker than the lower horizon, and it is a framestone throughout more of its area of occurrence as well, with the stromatoporoids and corals being in growth position in several exposures. Diversity in the upper horizon is higher than in the lower horizon, with corals, both rugose and tabulate, being quite common, and some bryozoans present as well. This horizon has been less dolomitized, but there has been more replacement by chert and chalcedony.