

OLD RED SANDSTONE PALEOCONTINENT

j4 Mississippian geology of the ORS paleocontinent

< Bahama Banks modern analog; Tamaroa subsea of the Kaskaskian epeiric sea >

On the North American platform, Pennsylvanian (Upper Carboniferous) coaliferous sediments are disconformable (due to an intervening withdrawal of the Kaskaskian epeiric sea) upon non-coaliferous Lower Carboniferous sediments that are almost horizontal where they crop out extensively in the broad valley of the Mississippi river and which are distinctive enough to justify the retention of the Mississippian as a period name for the time of the Tamaroa sub-sea¹ of the Kaskaskian epeiric sea that they record. Typical exposures, as in the karst terrains of Indiana,² Kentucky (Mammoth cave and Reed quarry),³ and South Dakota,⁴ are of oolitic and shelly limestones. These platform sediments in North America had accumulated during the Mississippian in the ORS paleocontinent realm that was Laurentia formerly.

The abundance of shells of benthonic life in Mississippian limestones in which sessile suspension feeders expanded to their greatest diversity, indicate bottom conditions that were well oxygenated. Shallow-water turbulence is recorded by oolitic limestone with abundant “crinoidal” (crinoid and blastoid) fragments, cross bedding, ripple marks, and scoured structures (and for these fabrics, the Bahama Banks environment provides present-day analogs). The crinoids were in a profusion that included 400 species, with stem lengths that varied between 10 cm to 10 m in length. Other suspension feeders were lacy bryozoans, including the distinctive genus *Archimedes* (which built non-shoaling mounds in the crinoid meadows by trapping sediments put into suspension by storms).

Prior to Mississippian marine submergence, low-lying areas had supported freshwater swamp forests, preserved, as those described by Bill Kachanov, “as stumps, 1-2 feet in diameter and some upright.”⁵ A fossil amphibian locality was discovered in 1985 in a quarry in southeast Iowa.⁶ □

Figure j5.1⁷ The Old Red Sandstone (ORS) paleocontinent during the Late Devonian

Laurentia, Paleobaltica and Avalonia realms of the ORS were sutured by the Acadian and Caledonian orogenies during the Devonian due to the closing of the Iapetus ocean that had separated them when they were two paleocontinents and a paleoterrane respectively.

Preserved continental red-bed molasse areas (black) that record the Devonian orogenies are shown in relation to reference geographic outlines (white lines) of present land areas and USA international boundaries (black dashes).

During the Devonian, the areas of now Scotland and Northern Ireland that were part of Laurentia, were far to the north of where their now southern areas were in Avalonia.

