An upper Viséan (Mississippian) unconformity in southern New Brunswick, Canada and its significance

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The Carboniferous succession in southern New Brunswick is interrupted by several unconformities of both local and regional extent. The tectonic setting of the Carboniferous in New Brunswick relates to the evolution of the Maritimes Basin and a regime controlled by orogenparallel strike-slip faults superimposed on the Appalachian tectonic collage, culminating with the Alleghanian orogeny at the end of the Pennyslvanian. The sub-Pennsylvanian unconformity is marked by a tectonic break and depositional hiatus between the red beds ascribed to the Mabou Group (mid-Serpukhovian) at the top of the Mississippian, and fluvial, locally coal-bearing deposits of the Cumberland Group (mid-Bashkirian, Langsettian). Many of the large strike-slip faults also cut the Mississippian rocks, but either run beneath Pennsylvanian strata without offset, or show markedly less offset of Pennsylvanian rocks.

Around Little Lepreau Habour (southwest New Brunswick) a Carboniferous succession has red breccias and marine carbonates (Windsor Group, Parleeville Formation) unconformable on Brookville terrane. An upward fining succession from red cobble conglomerate to siltstone and shale lies above this. Conglomerate clasts are dominated by metamorphic rocks and vein-quartz. Limited palynomorphs indicate a Viséan–Serpukhovian age (Brigantian–Pendleian) for part of this unit. At Ragged Point this succession is overlain with angular unconformity by a second cobble to boulder conglomerate unit, with clasts of porphyritic intermediate to felsic volcanic rocks and granitoids derived from the the Chance Harbour nappe to the south (Dipper Harbour Formation). This same conglomerate contains clasts of the Parleeville Formation. Both red conglomerate units are overlain with marked angular unconformity by the Lancaster Formation (Langsettian–Cumberland Group). The Alleghenian nappes in this area bring crystalline basement (including the Dipper Harbour Formation) over Lancaster Formation. This indicates a two-stage history in these classic Alleghenian allochthons: (1) Uplift and unroofing of the Dipper Harbour Formation and plutons prior to deposition of the Lancaster Formation, and (2) post-Lancaster Formation translation.

This uplift and erosion event is marked by a late Viséan (mid-Serpukhovian) unconformity around Little Lepreau, and is also evident elsewhere in southern New Brunswick. In the Hillsborough area major strike-slip faults like the Clover Hill Fault, and reverse faults/thrusts like the Dorchester Fault cut down into basement, and offset sedimentary formations up to the Mabou Group, while having little or no effect on Pennsylvanian rocks. The last phase of major movement on these faults appears to be during, rather than at the end of the 'Mabou' cycle. This event is distinct from that responsible for the sub-Pennsylvanian unconformity.

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