

Sedimentology and paleoclimate of the Pennsylvanian Hub Cyclothem, Cape Breton

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The Late Carboniferous Sydney Mines Formation near Sydney, Nova Scotia, comprises a succession of cyclothem, 40 m thick on average, which show a basinwide alternation of red mudstones and grey coal-bearing strata. The Hub Cyclothem (Westphalian D - Stephanian), which lies be-

tween the Hub coal seam and the Bonar (or Lloyd Cove) seam, is exposed along 30 km of depositional strike.

The Hub Cyclothem consists of three major units: a lower grey coal-bearing unit, a middle muddy unit with redbeds and a calcrete, and an upper anastomosed river sequence.

The lowest part of the cyclothem, deposited under humid conditions, is typically 20 to 30 m thick and contains brackish-water foraminifera, abundant macerated plant debris, tree trunks, rooted zones, siderite nodules and hydromorphic paleosols, as well as large meandering channel fill bodies and associated splays.

The central part of the cyclothem represents a change from a humid climate to a dry, seasonal climate, as indicated by the transition from coal-bearing strata to calcrete horizons and redbeds.

The upper part of the cyclothem was deposited in an

anastomosed river setting and represents a return to deposition of grey strata in a humid climate, with a relative rise in sea level. The sandstones occupy narrow (less than 50 m wide), U-shaped channel fills. Raindrop imprints, desiccation cracks and reptilian trackways are all common features in the overbank fines. Carbonate cements are common in this unit, but absent in the lower two units. Above the anastomosed river complex, the rocks are similar to the coal bearing strata at the base of the Hub Cyclothem, indicating a return to marine-influenced, humid climate conditions.