

Palaeoecology and Sedimentology of Fossil Lycopsid Forest Successions in the Classic Upper Carboniferous Section at Joggins, Nova Scotia¹

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Standing lycopsid trees occur minimally at 50 horizons within the 1425 m thick coal-bearing interval of the classic Carboniferous section at Joggins, with one of the most productive intervals, discussed here, occurring between coals 29 (Fundy seam) and 32 of Logan (1845). The majority of trees, invariably rooted within an organic-rich substrate, are entombed by heterolithic units in the order of 5m thick that can be traced to distributary channel bodies of similar thickness. The heterolithic strata are inferred to represent the recurring overtopping of distributary channels, from which they record highly oblique paleoflow. Flooding surfaces are represented by thin bivalve-bearing beds. The sequence stratigraphic motif of the fossil forests is one of stacked parasequence sets; the virtual absence of sequence boundaries reflects the excessive rate of basin subsidence. Candidates for erect lycopsids (dbh 25 to 50 cm, spaced ≥ 1.14 m) from prostrate compressions include *Sigillaria*, *Lepidodendron*, *Lepidophloios* and *?Paralycopdites* (*Ulodendron*), representing a broad range of ecological preferences. Permineralized, charred trunks of *?medullosan* affinity occur rarely. Associated compression flora includes lycopsid, calamite, pteridosperm, fern and progymnosperm litter. Sudden burial of lycopsid trees by onset of heterolithic deposition resulted in the demise of entire stands. Disturbance adapted calamites persisted in the episodically accruing sediment, apparently able to regenerate adventitiously from branches with exposed apical meristems. The faunal record of this fossil forest interval includes a Megasecoptera, whip spider, *Dendrerpeton* described by Carroll *et al.* (1998) and several tetrapod ichnotaxa, including an undescribed species that may represent the top predator at Joggins.

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