Fire ecology of a Late Carboniferous floodplain, Joggins, Nova Scotia

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The facies distribution and palaeobotanical identity of fossil charcoal is described from the Upper Carboniferous (Westphalian A-B) Joggins section, Nova Scotia, in order to examine the fire ecology of early Westphalian floodplains.

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Three charcoal assemblages are noted. Assemblage (1) consists of channel sandstone bodies, containing beds of calcrete breccia, cordaite logs (up to 3 m long), and coniferopsid wood charcoal. This assemblage records upland coniferopsid forest fires which altered basin hydrology and promoted flooding in downstream floodplain rivers. Assemblage (2) consists of thin (1 to 8 mm thick) coals containing hollow, sigillarian tree stumps and lepidodendrid and medullosan plant compressions. Fifteen of the 29 stumps observed have a 2 to 5 cm thick basal layer infilling the stumps, composed entirely of sigillarian charcoal. Sigillarian and medullosan charcoal is also scattered around the outside of these stumps. This assemblage represents fire in lowland peat-forming communities dominated by Sigillaria and medullosan pteridosperms. These forest fire profiles were slowly buried in floodplain mud. Assemblage (3) consists of a heterolithic sheet sandstone body containing a 2.5 m high sigillarian tree trunk with an internal, basal trunk deposit of sigillarian charcoal and a lightly charred bark rind. This also records fire in lowland sigillarian forests, but, in contrast to (2), this forest fire profile was buried rapidly in a distributary lobe.