

Vegetation-induced Sedimentary Structures from Fossil Forests in the Pennsylvanian Joggins Formation, Nova Scotia¹

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Vegetation-induced sedimentary structures (VISS) are primary structures formed by the interaction of detrital sediment with *in situ* plants. VISS provide physical evidence of vegetation's fundamental role in mediating sediment accumulation and erosion in clastic depositional systems. Despite the abundance of modern VISS, descriptions from the ancient record are surprisingly rare. Analysis of fossil forests in floodplain strata of the Pennsylvanian Joggins Formation has identified seven types of VISS. Five hydrodynamic types comprise simple forms developed around a single plant (centroclinal cross-strata, scratch circles, upturned beds) and complex forms where structures have amalgamated between several plants (coalesced scour fills, scour-and-mound beds). Two types (mudstone-filled hollows, downturned beds) form by the decay of an entombed plant and represent infilling of an empty hollow and/or soft-sediment deformation. Hydrodynamic types are present in both dryland and wetland settings, whereas decay-related types occur only in dryland settings where the water table was perennially or periodically low. VISS represent significant accumulations of sediment and are present in a high proportion of Joggins Formation strata. The paucity of descriptions from the ancient record suggests that these structures have been overlooked or misrepresented as strictly hydrodynamic. Recognition of VISS in early to middle Palaeozoic strata may provide an important insight into the distribution of early land plants in oxidizing environments where organic material was not preserved.

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