



## **Extrinsic controls on inter-basaltic plant ecosystems in the Columbia River Flood Basalt Province, Washington State, USA**

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The impact Large Igneous Province (LIP) volcanism may have had on paleoclimate, fauna and flora is still controversy. Inter-lava field plant ecosystems have the potential to record in detail the effects LIPs had on the environment in the immediate vicinity of volcanic activity. The Miocene Columbia River Flood Basalt Province (CRBP), Washington State, USA, provides excellent exposure of an entire LIP stratigraphy and offers a detailed record of inter-basaltic plant ecosystems throughout LIP evolution.

The CRBP lava field comprise numerous basaltic lava flows that are intercalated with fluvial and lacustrine sediments which formed during phases of volcanic quiescence. The LIP volcanic evolution is characterised by an initial phase of high eruption volumes and eruptions rates, which is followed by waning volcanism associated with longer interbed intervals. Inter-lava field plant ecosystems are expected to correlate with phases of volcanic evolution: short interbed intervals should be dominated by early seral succession, while longer intervals should record more mature seral successions.

The palynological record of the sedimentary interbeds however indicates a decline in successional status within the long interbed intervals of CRBP stratigraphy. An integrated analysis of sedimentary facies and geochemistry suggests intense volcanic ash fall derived from the adjacent Yellowstone hot spot as a major trigger for repetitive successional re-setting. This implies that inter-lava field ecosystem maturity was controlled by extrinsic forcing, and argues against environmental changes solely driven by LIPs of similar scale and magnitude to that of the CRBP.