

Paleoenvironmental settings of peat formation within Padesh Graben, SW Bulgaria, deduced from maceral analysis and geochemical properties of Suhostrel Coal

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Three 0.2-0.6 m thick coal seams, representing seam splits from a locally thicker seam (~1.8 m), comprise the Eocene Suhostrel coal deposit from the S-SW margin of the E₁₋₂-O₁ Padesh Graben. High TOC contents (avg. ~86 wt.%, daf), VR (avg. Ro = 1.05%) and T_{max} (avg. 457°C), argue for high vol. A/medium vol. bituminous coalification rank. Maceral composition is dominated by vitrinite (avg. ~95 vol.%), represented by detrovitrinite (e.g., collodetrinite, avg. 37.5 vol.%, and vitrodetrinite, avg. 19.2 vol.%) and collotelinite (avg. 38.0 vol.%, mostly gelified leaf-derived tissues, e.g. phyllo-vitrinite). Liptinite (avg. ~5 vol.%) includes cutinite and microsporinite. Predominance of mid- and long-chain *n*-alkanes argues for peat formation from a mixture of aquatic macrophytes and terrestrial vascular plants. Low Vegetation Index values (VI = 0.1-3.2, avg. 0.8; Calder et al., 1991) denote major organic matter contribution from vegetation with poor preservation potential. This is compatible with the presence of oleanane, confirming input from angiosperm plants. The absence of resin-derived sesqui- and diterpenoid hydrocarbons argues for an insignificant role of conifers during peat formation. Reconstructed depositional settings (Fig. 1) argue for organic matter deposition under marginal aquatic, marsh/fen-type peatland with meso- to rheotrophic characteristics (Groundwater Index, GWI = 0.3-7.2, avg. 1.4; Calder et al., 1991). High mineral matter contents (ash yields 21-47 wt.%) imply hydrologically active environment with frequent (perhaps seasonal) changes in Eh settings. Low concentrations of hopanoid biomarkers imply limited aerobic degradation of the plant remains. Post-depositional marine influence and downward infiltrating sulfate-rich waters are considered responsible for the presence of dibenzothiophene and its methylated derivatives.

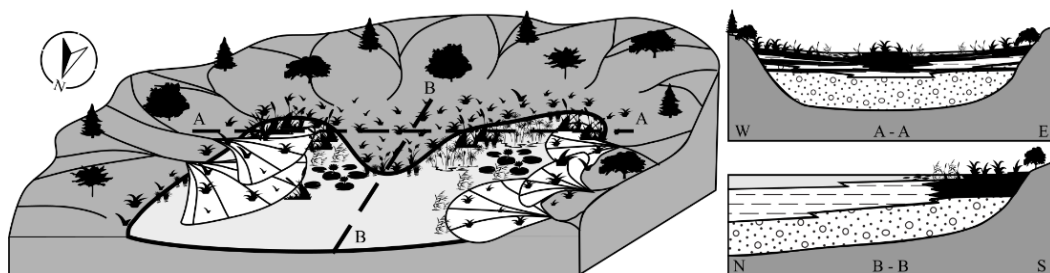


Figure 1. Schematic diagram representing presumed environmental settings during peat formation.

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Reference

Calder, J.H., Gibling, M.R., Mukhopadhyay, P.K., 1991. Peat formation in a Westphalian-B piedmont setting, Cumberland Basin, Nova Scotia: implications for the maceral-based interpretation of rheotrophic and raised paleomires. *Bull. Soc. Geol. France* 162, 283-298.