



The impact and significance of fire systems in deep time

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Evidence of fire from the occurrence of fossil charcoal is first found in the late Silurian. It is only in the late Devonian and Early Carboniferous, however, that fires become widespread. This is in part due to the evolution of trees and hence the more widespread availability of fuels but also with increasing atmospheric oxygen contents. Widespread fires may have had an impact on the sedimentary system, giving rise to extensive post-fire erosion and depositional events that may have impacted upon the terrestrial and marine ecosystems. Increasing regularity of fire may have played a role in the spread of some plant groups and the subsequent colonization of new ecological niches. Evidence suggests that the diversification of ferns and pteridosperms in the Carboniferous may be linked to the evolution of fire systems. Likewise, the spread of vegetation into upland areas in the Pennsylvanian is also accompanied by the spread of wildfire. Such fires will have played a major role in influencing the nature of soil systems. Rising atmospheric oxygen contents during the Pennsylvanian and Permian allowed for extensive fire systems to develop in wetland ecosystems. The further diversification of fire systems in the Cretaceous and Tertiary may have played a significant role in the diversification of herbaceous angiosperms and grasslands respectively and will have helped maintain particular biomes.