Floating forest hypothesis fails to explain later and larger coal beds

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Recently, there have been two papers that have been critical of the floating forest hypothesis. The first paper demonstrated that there are several geological problems that cannot be resolved with a pre-Flood floating forest biome.[1] Some of these problems included:

1. the lack of hydrological support for a sustainable fresh water lens capable of supporting the biome
2. the lack of a viable explanation for the timing of the lycopod coal beds, as most occur only in upper Carboniferous layers
3. the lack of a reasonable model to explain the deposition of three complete megasequence cycles in North America prior to the beaching of the claimed floating forests, and
4. the lack of any evidence of a floating forest biome in rocks deposited during the closing of the proto-Atlantic Ocean, which was presumably consumed during the formation of Pangaea.[1]

The second paper identified an *in situ* site in Scotland that demonstrated pre-Flood lycopod trees were rooted in soil and not floating atop the ocean.[2] The Glasgow site contains 10 lycopod stump casts that are all rooted in the same horizon and are equidistantly spaced in growth position. Each of the lycopod trunks exhibits a common southwesterly direction of deformation, identical to the paleocurrent direction of the ripples in the encasing sandstone. However, the lycopod tree roots do not show this directional deformation. The

roots also visibly penetrate downward into the mudstone below.[3] These two observations indicate that the roots must have been embedded in the underlying horizon prior to the deformation of the trunks.[2] In addition, this paper demonstrated that living lycopod trees were not as hollow as many have claimed.[2] This paper concluded by suggesting we drop the floating forest hypothesis altogether.

Lycopod fossils uncommon in Cretaceous and Paleogene coal seams

Most Flood geologists are in favour of an allochthonous origin for coal, resulting from transport of vegetation by the high energy of the Flood. Creation scientists point to the tree mat that formed on Spirit Lake from the eruption of Mt St Helens in 1980 as verification of this process. Allochthonous coal is not the issue that is being criticized. The aforementioned papers only question the viability of a pre-Flood floating forest biome, and question the presumption that this environment covered much of the pre-Flood ocean surface. As these papers demonstrated, there is clearly insufficient evidence to support this hypothesis.[1,2] Unfortunately, this issue is sometimes 'muddied' in creationist literature because the term 'allochthonous coal' is sometimes used interchangeably with the floating forest hypothesis.[4] However, these terms are not by any means synonymous. Indeed, the origin of Flood-transported vegetation, similar to the allochthonous log mat observed at Spirit Lake, is not the same as the pre-Flood floating forest biome.[5]

There is another, often overlooked, issue where the floating forest hypothesis fails to provide adequate explanation. Lycopod-rich coal beds are confined primarily to upper Carboniferous rock layers.[1] Coal deposits found in later Flood rocks show steadily decreasing numbers of lycopod trees and more and more conifers and even many angiosperms. In fact, the thickest and most extensive coals in the USA are from Cretaceous and Paleogene rock layers and are almost exclusively composed of conifer-dominant plants, like the metasequoia, and very few if any lycopods.[6]

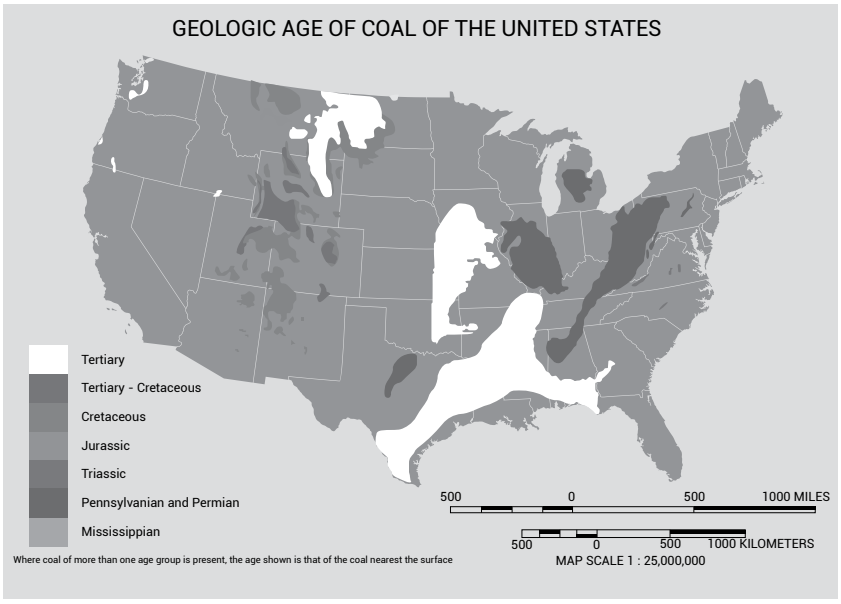

Figure 1. Map of the coal beds in the USA by age. Note the coals in the Western USA are primarily found within Cretaceous and Paleogene Tertiary rocks. The Pennsylvanian (upper Carboniferous) coals in Eastern USA are thin and discontinuous. The map merely outlines the extent of all coal beds, not individual beds. (After USGS map[16].)

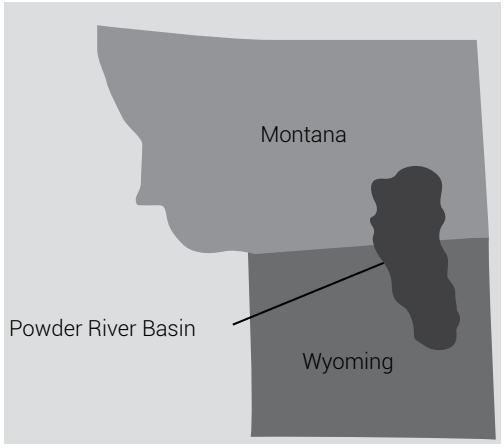

Figure 2. Map showing the outline of the Powder River Basin, Wyoming and Montana, USA (after Luppens *et al*[9])

Most of the coals in the USA west of Kansas, Nebraska, and South Dakota are found within Cretaceous and/or Paleogene rock layers and contain few, if any, lycopod tree remnants (figure 1).[7] In contrast, the coal beds in Eastern USA, which are composed primarily of lycopod trees, are found almost exclusively within Carboniferous rock layers (figure 1). These include the Pennsylvanian (upper Carboniferous) coals in Illinois, Michigan, and the Appalachian region. The Carboniferous coal beds in Eastern USA are usually 3.0 m or less in thickness. Whereas, the non-lycopod-rich coal beds in the Colorado Plateau and Northern Rockies usually exceed 3.0 m, especially in the Powder River Basin of Wyoming where beds are often thicker than 15 m over significant areal distances.[8]

Indeed, the Powder River Basin (PRB) coals, which are all within Paleogene system rock layers, contain the largest reserves of low-sulfur subbituminous coal

in the world (figure 2).[9] Roughly 42% of the present coal production in the USA comes from the Powder River Basin.[9] At least six or more coal beds in the PRB exceed 30 m in thickness and some individual beds have been shown to extend for over 120 km.[10] Some of these coal beds can exceed 70 m thick in places, such as the Big George coal layer.[9] The USGS has estimated that the total in-place coal resources of the PRB are approximately 971 billion tonnes, with just ten individual beds making up about 80% of that value.[9,11] The vast majority of the PRB coals are found in Cenozoic rocks such as the Tongue River Member of the Paleocene Fort Union Formation.[9,12] These coals contain virtually no lycopod trees and are instead derived from metasequoia trees and other semitropical rooted plants.[6]

The massive extent and volume of Cenozoic coal beds is not exclusive to the USA. Cenozoic coal beds in South America (SA) are also the thickest and most extensive across that continent too.[13] It is estimated that the Cenozoic coal beds alone make up about one-half of all coal in SA, and the tonnage is estimated to be greater than any other geologic system or combination of systems.[13]

Floating forest hypothesis cannot explain coal

One of the primary purposes of the floating forest hypothesis is to try and explain the coal beds found in Carboniferous rocks globally.[4,5] However, recent research has demonstrated that the floating forest model fails to explain the origin of these thinner Carboniferous coals.[1,2] To make matters worse, the advocates of the floating forest hypothesis have made no attempt to account for the thickest and most extensive coals in the world. Coals found in Cretaceous and Paleogene rocks globally have been largely ignored. Creation scientists should not dogmatically hold on to a hypothesis that cannot adequately explain even the smallest subset of coal deposits,[1,2] let alone later and thicker coal beds.[8,10] An acceptable Flood-based coal model should provide an explanation for *all* coals.

New Flood model for coal

Recently, a new model for allochthonous coal formation has begun to be developed.[1] This new model harkens back to, and is not too dissimilar from, the concepts of the early pioneers in creation science.[14,15] Acccording to this model, forests of lycopod trees apparently fringed the lowest elevation levels of the pre-Flood continent(s).[1] As the water levels rose during the Flood (Genesis 7:17–21), these trees were likely torn loose and deposited *en masse*, becoming coal within the Carboniferous rock layers.[1] A few lycopod forests, like the site in Glasgow, Scotland, were merely sheared off, transporting the tree trunks while leaving the rooted stumps in place.[2] Later, as the Floodwaters increased in height, trees like the metasequoia that grew at higher elevations were torn loose, transported, and deposited as allochthonous coal beds in the later Flood rocks of the Cretaceous and Paleogene systems. These later deposits became the thick coal beds in the Powder River Basin of Wyoming and Montana, USA.

References

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3. Mudstone is merely a descriptive term; it is not necessarily a Flood deposit. Clay-rich layers buried in Flood sediments likely lithified into mudstone.
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11. In fact, the USA has 22.1% of the total proved coal reserves in the world (252 billion tonnes), whereas all of Europe (excluding the Russian Federation) has 14.2%, according to BP Statistical Review of World Energy June 2017. If the Russian Federation is included, the European total goes up to 28.3%.
12. Interestingly, Germany, one of the largest coal producers in Europe, has approximately 65% of its coal reserves in Cenozoic rocks, largely devoid of lycopod trees. These data taken from Open University Course S278: Earth's physical resources: origin, use and environmental impact, 2006.
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