Can 'megasequences' help define biblical geologic history?

Carl R. Froede Jr, A Jerry Akridge and John K. Reed

For over two centuries, naturalistic geoscientists have laboured to construct an Earth history from sediments, rocks, and fossils found in nature. Initiated in France in the late 1700s, then subsumed and more fully developed in succeeding years in Great Britain, stratigraphic correlation and geologic mapping spread across continental Europe and subsequently to North America. Problems developed early in the 20th century with correlation discrepancies between North American chrono- and biostratigraphic facies and formal 'British' geologic periods. By mid-century, an apparent resolution came through the application of transcontinental, time-equivalent stratigraphic unconformities, which defined six bounded 'Sloss stratigraphic sequences'. These sequences have been adopted and labelled 'megasequences' by several young-earth creationists. We question the adaptation and utility of Sloss sequences in defining biblical geologic history since the naturalistic-uniformitarian geologic timescale is used to define them and their corresponding unconformity boundaries.

Stratigraphy is the study of rock layers, and more formally:

> "The science of rock strata. It is concerned not only with the original succession and age relations of rock strata but also with their form, distribution, lithologic composition, fossil content, geophysical and geochemical properties indeed, with all characters [sic] and attributes of rocks as strata; and their interpretation in terms of environment or mode of origin, and geologic history. All classes of rocks, consolidated or unconsolidated, fall within the general scope of stratigraphy."[1]

Throughout the early to mid-1800s, French, then British, naturalistic stratigraphers matched sediments and fossils to develop local-to-regional geologic maps and corresponding geologic columns[2] (figure 1). Stratigraphic correlation proved successful across many areas (e.g. Paris Basin, Great Britain), and was applied across North America.[3,4]

An article published in 1949 by several North American geologists noted discrepancies between the British time-stratigraphic and biostratigraphic divisions (as defined by the naturalistic geologic timescale) and North American strata due to differences in facies (i.e. sediments and fossils) as a result of variations in tectonic influences.[5] They proposed a new approach based on the division of strata by transcratonic unconformity boundaries. They divided the strata spanning the North American craton into six 'Sloss stratigraphic sequences'.[6,7] Sloss's ideas regarding unconformity boundaries were later developed through seismic stratigraphy into sequence stratigraphy.

In recent years, several young-earth creationists have begun to advocate use of these Sloss sequences, which they have labelled 'megasequences'. This growing popularity revives the unresolved debate over the role of the naturalistic geologic timescale in Flood geology.[8] Sloss's idea of focusing on unconformities is innovative and intriguing. Can transcontinental stratigraphic sequences be discerned by broad, bounding unconformities, and can they be used in the development of biblical geologic history? We will review the Sloss proposal for multiple stratigraphic sequences, the derivative creationist 'megasequences', and their relevance and application to Flood geology.

The development of stratigraphy

The study of stratigraphy predates today's naturalistic-uniformitarian philosophies of Earth history. In 1671, Nicolaus Steno established the first rules of stratigraphy,[9] which were followed more than a century later with the publication of the first geologic maps of the Paris Basin (1808) and much of Great Britain (1815).[10–12] Through the auspices of the Geological Society of London, these maps were used by deists and agnostics to develop and refine the 'Wernerian' Plutonist philosophy of Earth history as a naturalist alternative to the biblical history of the Earth.[13,14] Under this new philosophy, stratigraphic correlation became the tool to subdivide and refine stratigraphy into a broader, more organized geologic column and corresponding timescale.[15–18]

Time-stratigraphic and biostratigraphic divisions

These ideas also advanced the geologic mapping in North America, and further developed from simply matching sediments and fossils to defining specific 'facies' and 'facies analysis'—reconstructing past environments. According to Sloss *et al.*:

"… problems of sedimentary facies are most logically approached along three interrelated but separate paths: lithology, biology, and tectonics. Synthesis of data from each of these lines of investigation leads to a more complete understanding of the events and paleogeographic conditions responsible for the distribution and character of sedimentary deposits.

"In support of [the] …definition of a facies as an 'aspect' of a designated stratigraphic unit, the writers stress map representations of facies … . Further, the writers are impressed by the value of broad interregional [i.e. transcontinental] facies analysis in establishing the fundamental framework within which more detailed and restricted studies may be oriented.

"Finally, any facies study is initiated by the selection of a stratigraphic unit or interval for analysis. In interregional studies, and in many more local investigations, the established time-stratigraphic units have not proved uniformly useful, since they lack objectively recognizable boundaries. *A tentative solution to this recurring problem is sought in the establishment of operational units which may be recognized and studied over large areas* [emphasis added]."[19]

Among stratigraphers of that time, the concept and terms 'facies' and 'facies analysis' proved too cumbersome and confusing for use.[20] However, the idea that strata could be divided into operational units (proposed at this same conference—see italics above) was thought to provide a possible solution.

'Operational units' and their correlation

Sloss *et al.*[21] defined operational units (i.e. stratigraphic sequences) across the North American craton, specifically between the Rocky Mountains and the Appalachian Mountains, as mutually conformable (i.e. the strata occur in a layer-cake manner across the continent, although they may exhibit interruptions in fossil and lithologic content). Sloss *et al.* stated:

"The writers have sought lithologic horizons which can be correlated over considerable areas and thus segregate units for interregional analysis. Widespread lithologic horizons have been illustrated by Levorsen[22] and Cram[23] who have emphasized the 'layer-cake' nature of the stratigraphy of the Central States and pointed out the individuality of

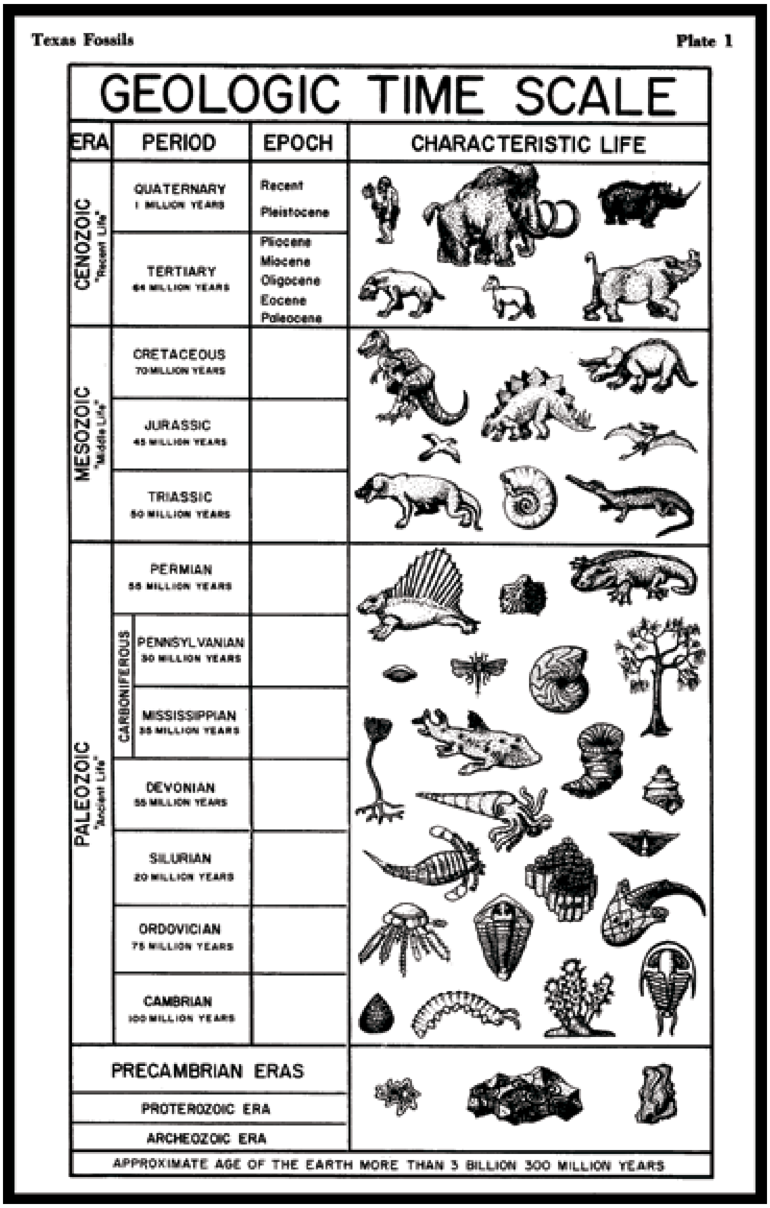

Figure 1. This figure conveys a snapshot in time from a 1960 publication about fossils in Texas (USA). It is an accurate portrayal of the conceptual evolutionary framework behind naturalistic-uniformitarian stratigraphy. Previous to the advent of radiometric dating, rocks and sediments were age-dated by their fossil content—specific types of animals correlate to specific geologic periods. Certain fossils, identified as 'index fossils', provide ironclad age-dates to specific sediments and strata. It is the paleontological content of sediments that creates the illusion of layer-cake stratigraphy across North America. Note the age of Earth is currently dated by naturalists to 4.55 billion years, using radiometric methods, and not the 3.30 billion years listed at the bottom of the figure.[85]

the structural aspects of each layer. To the writers, the horizons or surfaces separating these complex units of strata represent repeated episodes in the history of the mid-American craton during which the tectonic behavior of the craton abruptly changed, causing significant changes in the character of deposition. *These abrupt changes are reflected by marked discontinuities in the stratal record of the craton which may be traced and correlated for great distances on the objective bases of lithologic and faunal 'breaks', and continuity in distribution and facies, of the transgressive strata found above the discontinuities* [emphasis added]."[24]

More simply stated, the naturalistic assumption of any transcontinental unconformity boundary would require the assumption of continent-spanning erosional events correlated through application to their geologic timescale (see Appendix I).

Emphasis on unconformities

The idea of dividing strata into stratigraphic sequences developed because the formal stratigraphic divisions of the British-derived geologic timescale did not directly correspond to North American regional unconformities.[5,7,25,26] To alleviate this problem, Sloss and his co-authors decided to name each stratigraphic sequence after a Native American tribe.[27] This resulted in six sequences, which he named (oldest to youngest): 1) Sauk Sequence, 2) Tippecanoe Sequence, 3) Kaskaskia Sequence, 4) Absaroka Sequence, 5) Zuni Sequence, and 6) Tejas Sequence.[5,7] The genius in this approach was a change in focus to unconformities, and that the laborious identification of fossils and the correlation of sediments was of less emphasis. Strata could be grouped together and tied to the timescale solely from matching bounding transcontinental unconformities. Sloss[28] was careful to craft this new concept in a manner that did not challenge the British-derived geologic timescale:

"Although sequences have a greater time stratigraphic significance than classical rock units … there is no implication in the sequence concept of an attempt to establish a North American, as opposed to a Western European, time scale."

An important point recognized by Sloss *et al.*,[29] but commonly overlooked in the subsequent work of others, was that the unconformity boundaries are not chronostratigraphic:

"… the horizons or surfaces separating these complex units of strata represent repeated episodes in the history of the mid-American craton during which the tectonic behavior of the craton abruptly changed, causing significant changes in the character of deposition. These abrupt changes are reflected by marked discontinuities in the stratal record of the craton which may be traced and correlated for great distances on the objective bases of lithologic and faunal 'breaks', and continuity in distribution and facies, of the transgressive strata found above the discontinuities. *These discontinuities were not formed simultaneously over the entire area of their extent, since the tectonic and environmental conditions they represent were initiated earlier in some areas than in others. Therefore, these surfaces or horizons must not be considered as time planes universally referable to the same positions on the geologic calendar. Instead, they should be treated as objectively operational datum horizons which may be readily recognized in outcrop or well records and used to differentiate the stratigraphic column* [emphasis added]."

Surprisingly, Sloss *et al.*[30] also claimed the variability of the strata within the individual sequences was not defined by specific time intervals:

"Sequences should be considered as rock units, assemblages of formations and groups. They are simply the strata which are included between objective, recognizable horizons, and are without specific time significance since their limits do not coincide with time lines and may include rocks of different ages in various areas."

However, this claim ignores the fundamental and pre-existing links between the strata and the timescale. Strata had already been classified by age, and all implicit correlations were made on that basis, as evidenced by the stability of the conceptual timescale in its basic structure from before the exploration of most of Earth's geology. This is evident in later references to the sequences that use the timescale's ages to define them (figure 2).

Stratigraphic sequences

The six Sloss sequences are defined by their bounding interregional (i.e. transcontinental) unconformities. The initiation of each sequence began with a transgression (sea-level rise) and it ended with a regression (sea-level fall sufficient to expose the craton to erosion). Sloss stated:

"Each sequence represents a major transgression and overlap, beginning at the cratonic margins and in the basins of greatest subsiding tendencies, gradually spreading to the more stable areas of the cratonic interior, and ultimately lapping up on the margins of the Canadian Shield. The transgressive phase, buried and protected by a cover of younger strata, is commonly well preserved. The closing regressive phase of each sequence is typically poorly preserved, since the representative sediments were exposed to erosion at the close of the major depositional cycle of which each sequence is a record. In most cases sufficient testimony is preserved to indicate clearly that each sequence is representative of a major cycle of transgression, commonly complicated by minor reversals in trend and by a host of local effects."[31]

Sloss clearly recognized the limitations of these sequences:

"The cratonic sequences are rock units defined by unconformities and of broad although finite, lateral extent. Therefore, the utility of the six sequences of the present paper in interpreting the geologic history of the North American craton notwithstanding, … they have no necessary applications to the rock stratigraphy and time stratigraphy of extracratonic or extracontinental areas."[32]

However, as modern seismic stratigraphy developed in the early to mid-1970s, Sloss believed his sequence-bounding surfaces could be extrapolated across all cratons "and may be considered global cratonic unconformities".[33] Each of the six Sloss[5,7] sequences presents a high level of stratigraphic variability. More importantly, each sequence is bounded at its base and top by perceived transcontinental unconformities. In reality, these unconformities cannot be physically traced across the continent but are projected by connecting 'correlative conformities'.[34,35] These correlative conformities are aligned on the basis of their age, as dated by the geologic timescale.

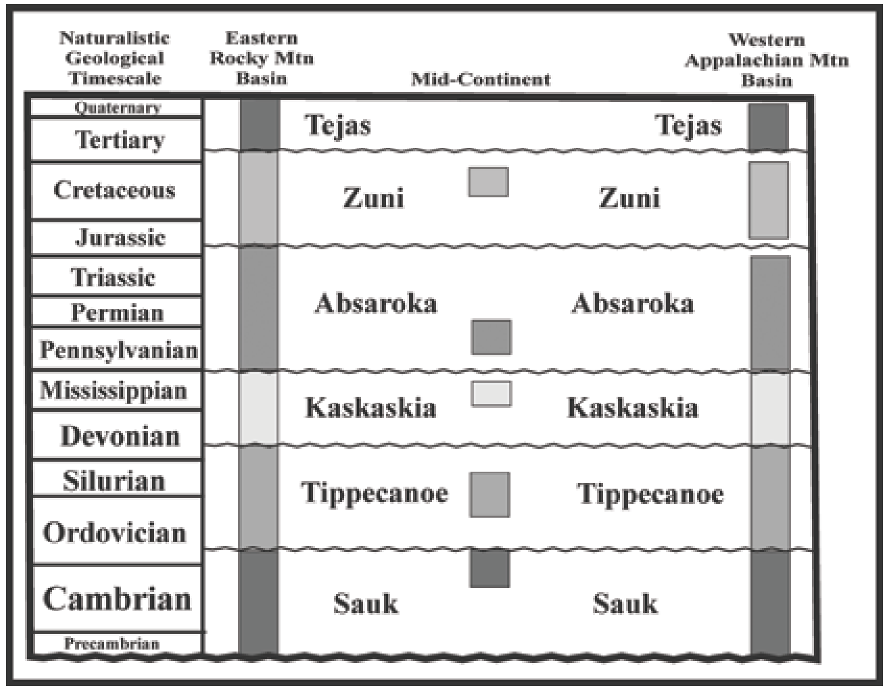

Figure 2. Three stratigraphic columns with the six Sloss sequences extending from the Rocky Mountain Basin to the central continent, to the Appalachian Mountain Basin. Note the thickening and thinning of the sequences (shaded boxes) as a consequence of developing basins, erosion, or non-deposition. This variation in strata and corresponding age is what Sloss *et al.*[5] claim as sequences without time. However, this is misleading because the change between the individual stratigraphic columns is due to the size of the missing strata and corresponding unconformity. The loss of strata in some areas demonstrates that sequences may have more gap than record (i.e. more rocks are missing than present—which is a function of the geologic timescale and not what the actual rocks exhibit—see Ager[86]). Diluvialists must consider the possibility that much of the 'missing time' is illusory. (After Sloss.[87])

Modern sequence stratigraphy

Beginning in the 1970s with the advent of seismic stratigraphy, former students of Sloss modified the application of unconformity boundaries from transcontinental to regional scale. This smaller-scale approach was directed toward the pursuit of petroleum hydrocarbons across sedimentary basins and became the framework for modern sequence stratigraphy.[36] While conceptual similarities exist between Sloss sequences and sequence stratigraphy, differences exist in scale, roles of tectonism, variations in sea-level change, and objectives.[37,38] Possible application of modern sequence stratigraphy to Flood geology has been discussed by several young-earth creationist geoscientists (Appendix II) and is outside the focus of this paper.

Sloss stratigraphic sequences transformed into creationist 'megasequences'

The use of Sloss sequences has been advocated by several young-earth creationists. Austin and Wise[39] invoked the initiation of the Flood in the Grand Canyon with the deposition of the Sixtymile Formation, and correlated it to the Kingston Peak Formation across the Mojave region, westward across southern California. Both formations are viewed as the base of the Sauk Sequence, which they renamed a 'megasequence'.[40] These stratigraphic units onlap the top of the Great Unconformity.

Austin and Wise[41] also identified the erosional base of the overlying Tippecanoe Sequence but did not convey the reasoning for its position in the study area. No other Sloss[7] sequences were identified. To correlate the stratigraphic units across Arizona, Nevada, and California, Austin and

Wise[41] used regional stratigraphic correlation charts to match the formations. However, they defined the base of the Sauk Sequence using five discontinuity criteria.

American geologist Gordon Davison[42] also invoked megasequences but expanded their number and location across the globe. He advocated abandoning the geologic timescale and sought to tie them to "coherent subdivisions of geologic time within a single tectonic domain during the Flood".[43] This approach would discount the stratigraphic correlation of sediment and fossils and emphasize the importance of the depositional tectonic framework corresponding to the flux of geologic energy during the Flood. Unfortunately, this promising work has not been further developed.

In 2009, Australian geologist Andrew Snelling reviewed the Sauk Sequence in the Grand Canyon[44] based on the work of Austin and Wise,[39] and agreed with their conclusion that the Cambrian Tonto Group, specifically the base of the Tapeats Sandstone, is the base of the Sauk Sequence. However, Snelling extended the 'Sauk Megasequence' well beyond the area discussed by Austin and Wise:

> "The vertical sequence consisting of the Great Unconformity, Tapeats Sandstone, Bright Angel Shale, and Muav Limestone has enormous horizontal extent, which can be measured in terms of many hundreds of kilometers. However, the Sauk Megasequence, which consists of these Tonto Group strata in the Grand Canyon region, has been traced right across the North American continent, because strata units similar to those which make up the Tonto Group can be correlated with one another over such an enormous lateral extent. Indeed, it is possible to map the occurrence of all the sandstone strata that correlate with the Tapeats Sandstone, which together are known as the basal sandstone lithosome of the Sauk Megasequence. Distribution of this basal sandstone lithosome appears to form a single sandstone body that blankets a major portion of North America, extending along the Mexico border from southern California to Texas northwards across Montana and much of North Dakota through to Canada, and from southern California and Nevada right across to the Mid-West and the [sic] New England including Maine.[45] As such, this enormous blanket of sandstone right across North America represents a major flooding of the land, the evidence in the Tapeats Sandstone implying that it was a rapid, storm-driven inundation, such as that which occurred at the initiation of the cataclysmic Flood event."[46]

More recently, Snelling[47] reviewed the six Sloss stratigraphic sequences but only attributed five of them to the Flood. In defining these sequences, he stated:

> "Geologists have discovered that powerful forces eroded the entire North American continent, and then deposited the debris over the whole continent. This was repeated several times. How is this possible? The obvious answer is the Flood."[48]

He omitted the uppermost Tejas Sequence (which is also considered by naturalists to be transcontinental and comparable to the other five Sloss sequences) and did not convey his reasoning in its omission, although he possibly believes it to be post-Flood deposits.[49] Still unresolved is the problem of likely chronological stratigraphic discontinuities in a single conceptual continental-scale transgression and regression 'Flood sequence'. Also, Reed[50] noted that similar stratal packages may represent similar *processes* operating at *different times* during the Flood, since topographic and lateral distances would cause time differences that would be significant in Flood deposition.

Young-earth creationist Clarey reported on the results of his analyses of transcontinental Sloss stratigraphic sequences, which he also defines as 'megasequences':

> "Using data from over 500 stratigraphic columns, I examined megasequences across North America to document the sedimentary evidence for the Flood's catastrophe. At each site, the megasequence boundaries were identified, along with the thicknesses and extent of individual rock types."[51]

A new seventh megasequence was identified by Clarey at the Midcontinent Rift of North America:

> "Preliminary results demonstrate the presence of a seventh megasequence below the six common fossil-bearing megasequences. It lies just below the Sauk Megasequence in what secularists [i.e. naturalists] call the late Precambrian or Proterozoic Era. However, this newly delineated pre-Sauk sequence may be instrumental in documenting the onset of the Flood.
>
> "In part, the pre-Sauk megasequence was created by a tremendous outpouring of basaltic lava that split open central North America and caused the Midcontinent Rift. …Could this be evidence of the breaking up of the 'fountains of the great deep' mentioned in Genesis 7:11?"[51]

It should be noted that Reed previously published an extensive review of the Midcontinent Rift from a young-earth creationist perspective and proposed rift initiation at the onset of the Genesis Flood. However, because it occurred in the *interior* of North America, far from any transgressing ocean, there would have been a period of tectonism/volcanism and rainfall-induced sedimentation (from local flash floods infilling basins) prior to the initial Flood marine transgression, when broader-scale marine transgression as floodwater moved into this area:

> "The MRS [Midcontinent Rift System] can be

explained as an event marking the initiation and early stages of the Genesis Flood in the northern Midcontinent region. Field evidence strongly suggests that structural downwarping, crustal fracturing, erosion, sedimentation, and volcanism began almost concurrently. The language of Genesis 7:11 implies that the initiation of geologic activity associated with the Flood was sudden and intense. The Flood model requires local erosion, limited transport, and rapid deposition of sediment in an environment created by heavy continuous rainfall. A vertical and lateral change to regional erosion, longer transport distance, and regional deposition marks the transition to conditions associated with the advancing transgressive front.

"*The ... loss of ... the geologic column in the northern Midcontinent would undermine uniformitarian models, the current understanding of natural history, and radiometric methods implying the long hiatus* [emphasis added]."[52]

Note that Reed[52] sees a discrepancy between the necessary continuous timing of events at the Midcontinent Rift System in the diluvial framework and the naturalistic proposal of an approximately 500-million-year hiatus between rifting and subsequent Cambrian marine transgression; since the time of this hiatus is equal to the time of the entire overlying rock record, and since the craton should have undergone cycles of transgression and regression on a more frequent basis.[53] Clarey's detailed work remains unpublished, and we look forward to seeing how he handles these problems.

Discussion and conclusions

The use of regional-to-continental scale unconformities to define stratigraphic sequences is an area that may be fruitful for creationists. However, the existing unresolved problem of how the naturalistic geological timescale applies to diluvial geology will probably affect future work, since Sloss sequences have an inherent bias towards the timescale, as well as toward the uniformitarian/evolutionary view of history. For those advocating the incorporation of a compressed chronostratigraphic timescale, the Sloss[7] concept will be used in the same way—simply by ignoring the geochronologic ages, but using the chronostratigraphic timescale in its 'Hadean to Holocene' framework.

We advocate returning to the field data and rebuilding a stratigraphic understanding from that data, within the framework of biblical history. The point of disagreement is *not* whether to accept geologic observations; it is how to recognize and address naturalistic presuppositions that are embedded in modern stratigraphy—down to its foundations. For example, naturalistic geologists see *time* as the conceptual foundation for global stratigraphic correlation. This follows from their uniformitarian, deep-time perspective, which views the rock record as a series of snapshots (of similar processes) that can be assembled into a coherent story of Earth's evolution. However, if the bulk of geologic activity occurred in a single year, is that perspective valid? If not, how does it affect our understanding of the timescale?[54]

The heart of the issue of using Sloss-based megasequences is their dependence on the geological timescale. One creationist school of thought is rejecting absolute dates—the geochronological timescale—from the chronostratigraphic timescale, the relative arrangement of strata by their chronology (i.e. Hadean to Holocene). This seems attractive because it follows the division noted by secular geologists. These creationists think that rocks can be identified and correlated by reference to the chronostratigraphic scale, and then connected to biblical history. However, we disagree. If we are right, it undermines the use of megasequences because they are correlated also by reference to the chronostratigraphic timescale.

A related problem comes from the nature of unconformities. They are seen by naturalistic geologists as evidence for long periods of erosion or non-deposition. Diluvialists cannot accept this conclusion. What if we view these unconformities—even regional ones—as evidence of rapid hydrodynamic action?[55] We know that, on observable scales today, factors as simple as changes in current velocity, depth, or sediment supply can create local unconformities. Might not some larger-scale unconformities reflect similar, but Flood-scale, processes? If so, how might that affect our understanding of 'megasequences'? These factors all need careful consideration.[56]

The presence of these (largely unaddressed) assumptions is the reason we urge caution in the application of 'megasequences' in Flood geology. All such sequences are ultimately constructed from the naturalistic geological timescale. Physical correlation, independent of the timescale, spanning entire continents remains to be demonstrated, although the presence of widespread, lithologically similar strata certainly suggests possibilities of large-scale interpretation.[55,57] Stratigraphic, tectonic, and hydrodynamic considerations must all play a role in defining the actual rock record.[58] Naturalistic methods and assumptions will be of less utility. For that reason, the use of naturalistic, regional-scale stratigraphic correlation charts in defining creationist megasequences should proceed with extreme caution. The idea that strata across the North American continent were deposited 'simultaneously'[59] in layer-cake form is violated empirically[60,61] as well as conceptually.[38,62,63] The North American continent contains areas of uplift adjacent to developing basins. Each area/region will need to be examined from basement to surface to reconstruct its biblical geologic history. Questions to be answered include criteria for assigning parts of the crust and overlying rocks, sediments, and fossils to the Creation Week, the Flood, Ice Age, and subsequent millennia (figure 3). Then, we must interpret those parts of the rock record according to events commensurate with each episode, not with the outworn actualism of naturalistic geology. Time may have much less to do with stratigraphic sequences than do tectonic or hydrodynamic energy.[64]

Unconformity boundaries and strata should be correlated as broadly as possible, but we should be sure that the empirical correlation criteria are observed, and that correlation is not extrapolated based on uniformitarian time. We must also remember that similar Flood processes, occurring at different times, could result in very similar strata. The approach of Austin and Wise[39] for defining the pre-Flood erosional surface at the top of the Great Unconformity is consistent with biblical Flood-related expectations, but a case can also be made in other areas for the Flood onset at the top of the basement contact.[65]

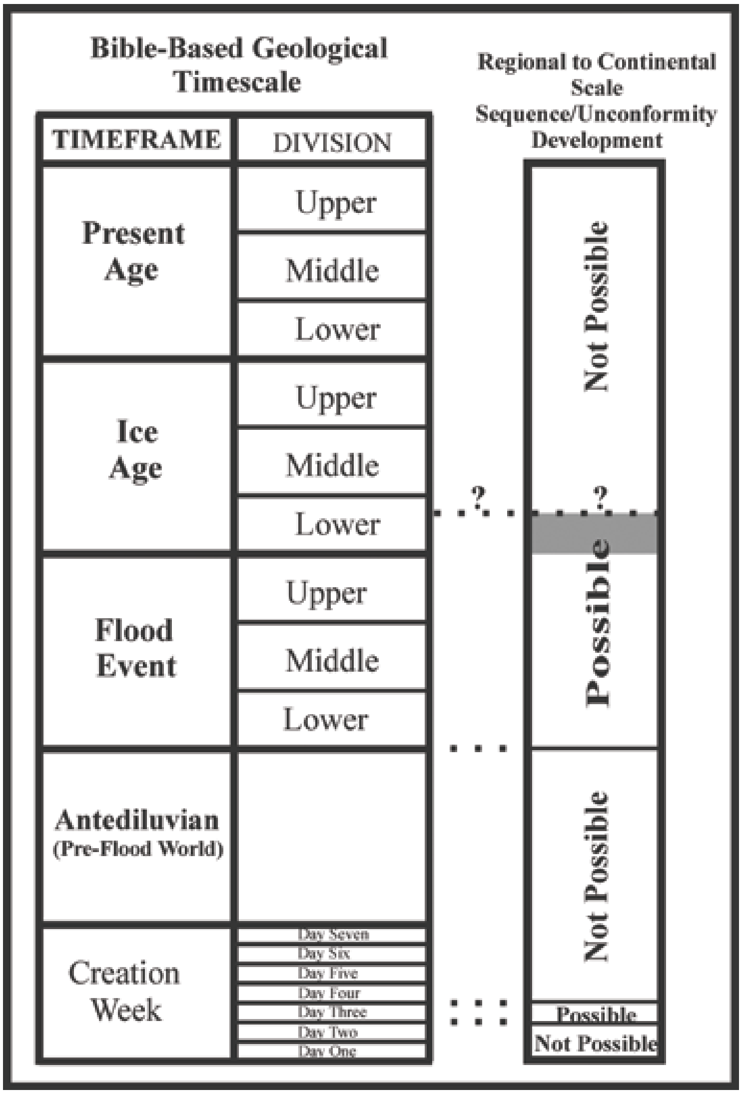

Figure 3. A Biblical Geologic Timescale with potential time intervals where transcontinental sequences and their bounding unconformity boundaries could develop. The grey shaded area may represent a time when local/regional unconformities were created, based on three possibilities: 1) floodwater withdrawal was occurring at different rates across the continents,[88] 2) large-scale vertical tectonic movement may have displaced/advanced floodwater across areas at the close of the Flood Event timeframe, and 3) glacial waxing/waning during the singular Ice Age timeframe may correspond to sediment deposition/erosion due to glacial eustacy. Further study in all three cases is warranted. We do not define/correlate any sequences within this framework because that work has not been conducted. A serious problem remains in explaining the multiple transcontinental transgression–regression cycles of floodwater movement required to match the six Sloss sequences. It should be apparent that the naturalistic geologic timescale (figure 1) and this biblically aligned timescale do not allow direct correlation.[56]

The six Sloss sequences[7] may have application to biblical history, but their usefulness can only be determined independently, and not simply transferred into Flood geology without examination of all naturalistic assumptions. Conceptually, the onset of the Sauk Sequence with the transgression of the ocean across a continent is consistent with the expectations of the Flood. But it also raises questions regarding the pre-Flood Earth surface—was it all basement rocks? Additionally, the repeated cycles of transcontinental transgression and regression creating regional unconformities between Sloss sequences appears to be inconsistent with the biblical record, which records one global transgression–regression cycle, not six (Genesis 7:17–20). Work remains to be conducted and it will likely require independent thought and unique solutions inconsistent with the philosophy of Naturalism.

We contend that biblical geologic history cannot be defined on an internally consistent basis using the naturalistic geologic timescale. For that reason alone, there is a heavy burden of proof on those who wish to simply apply Sloss sequences to Flood geology. The basic methodology may work well, but *only* when *all* uniformitarian baggage is eliminated. It is unlikely that Sloss sequences can be imported into Flood geology without careful analysis of stratigraphic implications. As currently defined, proponents of young-earth–creationist use of Sloss sequences have not yet met that standard. We hope that researchers will address all of these issues and define better ways for interpreting the rock record in the context of the history conveyed in the Bible[64–67] (figure 3).

Appendix I

Sloss's concept of continental-scale 'layer-cake stratigraphy'[24] has gained broad acceptance in North American stratigraphy.[5,7,22,23,68] This idea holds that strata (with matching sediments and fossils) were deposited across vast regions and can be correlated by reference to a specific period of time (see figure 1). However, this is *only* possible through application of the uniformitarian geologic timescale. While geologists divide that timescale into chronostratigraphic and geochronologic parts, the rejection of biblical history is built into both.[69–71] The attempt to divorce 'time' from the timescale and use the 'stratigraphic data' (though they are themselves correlated by the chronostratigraphic timescale) as an empirical global geologic column ignores inherent anti-biblical assumptions and methods.[72,73]

Naturalistic geologists have constructed innumerable stratigraphic correlation charts (e.g. American Association of Petroleum Geologists, Correlation of Stratigraphic Units of North America) that identify vertical stratigraphic profiles for a particular area or region. These charts are especially useful in correlating strata across distant locations. But the framework remains the conceptual template of the naturalistic timescale. We fail to see the benefit to diluvial geology in following a compressed chronostratigraphic timescale,[74] which was built on the philosophical foundations of men determined to suppress biblical history. As such, in as far as megasequences are identified on the basis of correlation with the chronostratigraphic timescale, their utility in the biblical framework is questionable. Those who wish to adapt megasequence analysis to the biblical framework must demonstrate that the basis for correlation to identify megasequences is independent of the chronostratigraphic timescale, or that another basis for correlation exists.

Appendix II

Modern sequence stratigraphy has been discussed at length by several young-earth creationists and will not be repeated here. It is important to note that two opposing philosophies exist,[56] with one following a compressed chronostratigraphic timescale, while the other approach advocates the development of stratigraphy consistent with a new biblical geologic timescale.[66,67,75] For information regarding the first approach, review Bartlett[76] and Hunter,[77] and for the second, consult Froede,[78,79] Davison,[42] Reed,[80,81] and Klevberg.[82–84] We encourage more discussion of sequence stratigraphy and its applicability to diluvial geology as it continues to develop within biblical history.

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54. There has long been discussion among young-earth creationists regarding application of the naturalistic geologic timescale to diluvial geology. Unfortunately, it has focused on which 'parts' of the timescale are applicable. Conceptually, the naturalistic timescale can be divided into three parts, 1) matching similar sediments (identified as lithostratigraphy), 2) matching similar fossils (i.e. biostratigraphy), and 3) matching similar age-dates, based on radiometric dating (i.e. chronostratigraphy). For those who advocate using a time-compressed naturalistic geologic column, the current idea is to work primarily in the lithostratigraphic framework claiming that the other two corresponding conceptualizations are of less utility (see Snelling *et al.*, ref. 74). While well-intended, the geologic timescale cannot be deconstructed separately because it is a progression of evolutionary and radiometric-derived time assumptions requiring a 'Precambrian-to-Holocene' progression, which is unnecessary and, in some cases, counterintuitive to diluvial interpretation. We have proposed a new geologic framework consistent with a scriptural understanding of Earth's geologic history (see refs. 61, 62, and 68). These two conceptually similar young-earth creationist geologic timescales are incompatible with the naturalistic geologic timescale (see Froede and Akridge, ref. 56).
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59. The ambiguity of how to relate the strict global simultaneity of uniformitarian categories is part of the issue. Perhaps each layer is tied to a single tsunami pulse, such that each megasequence was laid down in the time that it took the tsunami pulse to cross the craton. However, this would have resulted in deposition over wide areas in a matter of hours to tens of hours. However, tsunami-like waves could not have traversed North America for the simple reason that topography and distance would have attenuated them after some discrete distance. Even if this were possible, then things like lithology, fossil content, etc. would be functions of hydrodynamic action, not 'depositional environment' over time. This represents another giant disconnect between biblical and secular geology. Creationists cannot pick and choose which parts of secular geology are applicable until we rethink it from the ground up.
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Carl R. Froede Jr *has been active in creation geology since 1988. He has a Bachelor of Science in geology from the University of South Alabama and his geological career has encompassed a wide range of activities. These include oil and gas exploration, public health related soil analysis, groundwater aquifer characterization, waste management and groundwater modelling. At present he is employed as a professional geologist with the US Government Environmental Protection Agency dealing with geological aspects of hazardous waste disposal.*

A. Jerry Akridge *teaches creation science to churches, homeschool groups, and Christian schools. He leads field trips to geologically interesting sites for groups to see and study the effects of the Flood. Jerry has written and coauthored several articles for creationist publications and newspapers. Jerry works as a field engineer, specializing in systems and electronics instrumentation used in defense, space, marine, geoscientific and medical applications. He founded New Creation Ministries and serves as its director. He is a life member of the Creation Research Society.*

John K. Reed *earned B.S., M.S., and Ph.D. degrees in geology. He worked for several decades as a professional geologist in industry and academia. In 1998, John became the geology editor of the Creation Research Society Quarterly, and was subsequently elected to the CRS Board of Directors. He has written and edited numerous books and articles about Creation and natural history.*