NATURAL HISTORY IN THE CHRISTIAN WORLDVIEW

Chapter 4. Constraining Geologic Models

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Abstract

Previous chapters have demonstrated the superiority of the Biblical Christian system to the Naturalist-Uniformitarian system in providing metaphysical and epistemological frameworks for earth history research. Following a logical progression towards deriving geologic models, the next step is the use of information from sources other than geology to constrain and direct model formulation. To begin that process, special revelation will be applied as a primary constraint. As the most reliable source of historical information, the Bible provides both general and specific constraints. General constraints include limited time, catastrophic process, an event-oriented perspective, and the possibility of a more complete geologic record than is recognized by uniformitarians. Specific constraints include the outline of historical events presented in the biblical text. Although many constraints from other disciplines (e.g., history, archeology) could be explored, a rigorous examination of these areas is beyond the scope of this paper.

Introduction

This book is presented in a logical progression aimed at the development of geologic models of earth history within the context of biblical Christianity. Understanding that science is not an independent venture, but rather a facet of human intellectual endeavor, the progression began at an axiomatic level instead of an evidentiary one. Chapter 2 demonstrated by formal tests that the Naturalist-Uniformitarian system (NUS) is invalid because of axiomatic contradictions between its basic assumptions and conclusions, and therefore it cannot be the basis for successful geologic models of earth history. Chapter 3 demonstrated, in contrast, that the Biblical Christian system (BCS) passes the same formal tests, and is a system within which successful geologic models of earth history can be developed and tested. Chapter 3 also introduced a method for earth history research. Christianity affirms the ultimate unity of truth in God, and therefore applies the university paradigm to human knowledge, and its derivative mixed question approach. The university paradigm is the belief that all truth is connected, coherent, and consistent, even if human knowledge has not yet progressed to the point of understanding all the connections. The mixed question approach recognizes the connectivity of truth and subsequently accepts the concept of multidisciplinary problems and solutions. In the context of investigating earth history, this type of approach would recognize that facts outside of geology must be evaluated for completeness of any conclusion.

Developing geologic models of earth history is analogous to moving inward through the ever-narrowing concentric circles of a target. Each outer circle adds increasing

constraints to the final geologic model, and only within the inner circle is geologic data considered. In the outer circles, I have shown that the BCS is logically superior to the currently accepted NUS by virtue of its axiomatic consistency. Moving inward, a transition is made into the area of developing positive programs of investigation into earth history, restricted by the outer circle of the logical consistency of the BCS. Since the Christian worldview accepts the mixed question approach, the next circle in the target is the further constraint of potential geologic models with factual information from other disciplines outside of geology.

Each of the previous steps is required because the rock record is not a prepackaged presentation of earth history, since multiple conflicting interpretations are possible. The benefit of the rock record is rather that it offers the basis for comparing competing geologic models. In concentrically narrowing spheres of validity, conclusions from these models are first constrained by the metaphysical and epistemological framework, and then by data from other relevant disciplines. The challenge to scientists operating within the BCS is to develop empirical models, consistent with the entire system, that stand or fall on their ability to interpret field data. If a particular model fails empirical tests only, then the model must be revised, but only within defined limits. If a particular model fails axiomatic tests within its parent system, it must be more drastically revised or abandoned. Geologic models must include criteria by which the model can be judged, revised, and/or rejected with respect to both categories.

Following this logical progression through the target simultaneously restricts the scope of any potential model and increases the level of detail demanded, thus increasing the potential for variety in each model. Every model developed within the BCS will share certain features in common, but will also have the potential for significant variety. This progression will proceed as follows:

(1) all geologic models of earth history should be identically constrained by the metaphysical and epistemological frameworks of the parent (Biblical Christian) system;
(2) all such models will be similarly constrained by data external to the scientific model under the mixed question approach. Differences between models at this level will result from differences in the interpretation of external data (e.g., the inferred geologic significance of a particular historical event recorded in the Bible such as the breakup of the "*fountains of the great deep*" (*Genesis 7:11*));
(3) each geologic model will attempt to explain field data sets. At this level models may vary dramatically, depending on the selection of the data set, and the interpreter.

The explanation and application of the second step is the subject of this paper. Its scope precludes a comprehensive development of that step, and for that reason, and in keeping with the concept of the dimensional hierarchy in knowledge described in Chapter 3, factual constraints discussed below will be derived only from the Bible.

Biblical Constraints on Earth history Models

Factual constraints on geologic models coming from disciplines other than geology are recognized because of the multidisciplinary (mixed question) approach to historical analysis that emphasizes contributions from areas of knowledge outside of science. The challenge for creationists lies in the paradox that the most reliable (based on God's trustworthiness) information about earth history lacks significant detail. This aspect of biblical revelation simultaneously increases the opportunity for human creative thought and the level of uncertainty in investigations into earth history.

In other words, the Bible broadly defines an outline of earth history, but is insufficient in historical detail for formulating detailed geologic historical models. It does describe certain events in earth history that are geologically significant, but does not say very much about them from the point of view of modern geosciences professions. Previous authors[1] have discussed these events and their geologic significance, but with a large degree of uncertainty at the level of interpretation. Thus the tradeoff for creationists is between the axiomatic inconsistency of uniformitarianism and the interpretational uncertainties of Christian historical analysis to date. When placed in these terms, the superiority of the Christian approach becomes clear, however, most scientists do not choose to think in those terms.

Biblical input can be divided into two areas, general and specific. General information consists of broad principles explicitly presented, or reasonably inferred from clear passages that are of significance to scientific models. Specific information is found in the record of specific events that individually may be of significance to geologic models. There are a number of general principles derived from the biblical historical record that are significant to any geologic model. Four of the most important are presented below, and include:

(1) a relatively limited timeframe;
(2) importance of catastrophic process;
(3) an event-oriented perspective; and
(4) the relative completeness of the rock record.

These principles are interrelated, and these relationships provide additional internal evidence of the consistency of the Biblical record.

Time

Time is the feature most commonly associated with the uniformitarian geologic column, but paradoxically, uniformitarian interpretation is relatively unconstrained temporally, since time necessary for most hypothesized events is presumed to be available. This reservoir of time allows more freedom of interpretation by dismissing limits potentially imposed by adjacent strata. This is done through the use of projected intervals of missing section; i.e., a given sedimentary section can be designated as a deep-marine deposit even if a vertically adjacent section is considered continental fluvial, since intervening deposits predicted by Walther's Law (regarding the lateral and vertical associations of facies)

[1] See Whitcomb, J.C., Jr. and H.M. Morris. 1961. *The Genesis Flood*. Baker Book House, Grand Rapids, MI and Oard, M.J. 1990. *An ice age caused by the Genesis Flood*. Institute for Creation Research, El Cajon, CA.

could have been removed by erosion over millions of years potentially represented by the boundary between the two units. However, the biblical record does not provide an extended time framework. Therefore, historical geologic models in the BCS must accommodate relatively limited time intervals for geologic events, and emphasis is shifted to understanding geologic processes that would generate observed strata in that limited timeframe.

It is ironic that in spite of the more stringent limits placed on interpretation in the BCS; philosophically, time is much less significant for the theist than for the non-theist. This is because time and historical progression assume metaphysical significance for the Naturalist, since time is a major cause of change. Time and history lose this almost mystical significance in the BCS, since time and history are created and directed by God. This results in two important distinctions in the theist system: (1) the assumption of pre-history is not made, since records of all natural history are included in revelation; and (2) the biblical system supports the significance of discontinuous events rather than the mere passage of time in a particular sequence[2] by emphasizing God's interactions with man and nature through time. Since information outside science (appropriate in a mixed question analysis) describes significant discontinuous and novel events (i.e., Creation, Curse, Flood, etc.), a derivative geologic model must also embrace discontinuity. Time, which integrates the observed physical discontinuity in nature into a historical progression, itself had a beginning point, and will likewise have an endpoint. Thus time is not the ultimate integrating factor of physical reality as supposed by the uniformitarian, but instead points to God as the provider of continuity.

Another distinction addresses the issue of the application of science to historical analysis. Since these events are outside of human experience in the sense of repeatable scientific investigation, the scientific method is not directly applicable, and the principle of causality must be employed to indirectly derive modern analogies to historical events by discovering an event-process relationship. Please note that this is another important distinction between the uniformitarian and the biblical method. The uniformitarian approach to interpretation of the rock record is univocal; it demands a direct relationship between observable modern process and unobservable historical geological process (e.g., sedimentation, volcanism, fossilization, etc.). Therefore, field data should be almost identical in all geologic ages and open to interpretation based on observed modern processes (see any uniformitarian discussion of the derivation of facies models). Obvious failures have been explained away superficially without addressing the failure of the methodology and the implied failure of the parent Naturalist system.[3] In contrast, the BCS includes probable differences in past geological processes, although the underlying physical-chemical processes were likely constant.

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[2] Cullmann, Oscar. 1964. *Christ and time: the primitive Christian conception of time and history, third edition.* Translated by Floyd V. Filson. The Westminster Press, Philadelphia, PA. p. 20.

[3] For example, see Ager, D. V. 1993a. *The nature of the stratigraphical record*, *third edition*. John Wiley & Sons. New York and Ager, D.V. 1993b. *The new catastrophism: the importance of the rare event in geological history*. Cambridge University Press, New York.

This clear demarcation between models of the BCS and NUS on the basis of time opens three additional areas in which Biblical models can be clearly distinguished from those of the NUS. These areas include: (1) catastrophism, (2) the extent of missing section in the rock record, and (3) the contrasting significance of discrete events as a paradigm for interpretation, as opposed to that of a continuous chronology.

Catastrophic Process

The Biblical record of time combined with the observed magnitude of the rock record demands catastrophic (i.e., at least greater in rate and magnitude) conditions during certain periods of earth history. An open question for further investigation is the nature of qualitative change in geologic process brought on by a quantitative increase in rate and magnitude. While it is likely that a process-product interpretive approach to field data may demand processes not presently observed, it is also possible that these processes can be modeled by investigations of the underlying quantitative variations in the rate and magnitude of constant physical/chemical processes. This concept is currently being approximated by uniformitarian researchers under the label of "Event Stratigraphy." Additionally, it is being developed and used within the framework of Sequence Stratigraphy.[4]

Although it is not commonly noted as such, the explicit biblical record of catastrophic process in the Genesis Flood demonstrates internal consistency with the biblical record of limited time, which implies catastrophic processes by reference to the massive volume of the existing rock record. Any theological position that incorporates both an old earth (4500 Ma) and the Genesis Flood is not demanded by the rock record, and is thus less consistent because of the principle of parsimony (Occam's Razor). Geologic field data, especially when analyzed on a global scale, also appear to require catastrophism. Individual sections imply processes different from those observed at present, and geologic preservation of large-scale sections (e.g., Cretaceous chalk deposits) is itself extraordinary in modern terms, since preservation depends on the rapid deposition and burial of the constituent strata in episodic, high-energy events.[5]

Accounts in historical texts of past events of geologic significance do not describe geologic processes with the same detail and from the same perspective as would geologic models. Therefore, field evidence is required to best describe in detail the extent and nature of particular geologic events. Sections of the rock record may provide evidence of physical processes similar in nature and scale to those operating at the present, as well as

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[4] For an old earth perspective, see: Sloss, L.L. 1988. Forty Years of Sequence Stratigraphy. *Geological Society of America Bulletin* 100:1661-1665 and Frazier, W. and D. Schwimmer. 1987. *Regional stratigraphy of North America*. Plenum Press. New York. For a young earth perspective, see Froede, C.R., Jr. 1998. Sequence stratigraphy, stratigraphic time and the flood. *CRSQ* 35:100-103 and Froede, C.R., Jr. 1994. Sequence stratigraphy and creation geology. *CRSQ* 31:138-147.

[5] See Ref 3, Einsele, G., W. Ricken, and A. Seilacher. 1991. *Cycles and events in stratigraphy - basic concepts and terms*. Springer Verlag, NY, Seilacher, A., 1984. Storm beds: their significance in event stratigraphy. In Seibold, E. and J.D. Meulenkamp (editors). *Stratigraphy Quo Vadis?* Studies in Geology 16. American Association of Petroleum Geologists. Tulsa, OK, and Dott, R.H., Jr. 1983. 1982 SEPM Presidential address: episodic sediment - how normal is average? How rare is rare? Does it matter? *Journal of Sedimentary Petrology* 53:5-23.

those unexplainable by modern example. An advantage of any biblical model is that it can accommodate either conclusion prior to the examination of the field data, since in addition to recorded catastrophic processes, the majority of recorded time in the biblical historical record does not demand a catastrophic interpretation of a given stratigraphic unit (i.e., the Flood was a worldwide event of tremendous geologic import, but was also short-lived).

Event vs. Continuum

The length of historical time is important for estimating the rate and associated energy levels of past processes, but as mentioned above, there is another aspect of time that generates significant distinctions between biblical and naturalist models. That aspect is the issue of continuity versus discontinuity in history and in nature.[6] The NUS must embrace physical continuity to maintain a rational approach to nature because there is no transcendent reality (i.e., God) to provide rational connection and meaning to observed discontinuity. Blurring of this philosophical distinction has caused confusion in past attempts to correlate biblical events with the uniformitarian timescale (see Figure 1, Chapter 1).

But there can be no symmetry between Christian models and those of the NUS, because the uniformitarian geologic column is biased towards history as a continuum, expressed by its dependence on evolution. Evolution operates as a continuum, producing products that would clearly show continuity if all the data were available. Thus, for the evolutionist, the ability to classify modern and ancient biota is the result of observational gaps, not actual ones. Uniformitarianism shares this assumption by presenting a continuum into the past of all geologic processes. Frequent modern revision to uniformitarian interpretation is a result of the disagreement of observed data with the concept, and uniformitarianism has not embraced the philosophical rejection of continuity.

The utilization of the continuum paradigm has not survived empirical observation in either evolutionary biology or uniformitarian geology. The ability to separate and classify taxa in biology is mirrored by a twofold similarity in geology: (1) the ability to separate and classify the fossil contents of strata, and (2) the ability to separate and classify the strata themselves. Recognition of observed discontinuity in nature has led to revisions that attempt to accommodate both sides; however resolution on a metaphysical level is not likely within the Naturalist system, since its proponents deny metaphysical reality. For example, punctuationist constructs of evolutionary progress are only superficially different from gradualist constructs, since quantitative discontinuities in rate do not fundamentally alter the underlying continuity of process and product.

A similar tension between observation and paradigm has been present in the earth sciences for a number of years. Interpretation of the rock record has historically existed in a tension between a chronological and an environmental focus. Chronological interpretation is exemplified in the traditional practice of biostratigraphy, and

[6] Adler, M.J. 1967. *The difference of man and the difference it makes*. Holt, Rinehart and Winston. NY.

environmental interpretation has received increasing emphasis recently in studies of depositional environments by use of the facies concept,[7] and more recently by sequence stratigraphy.[8] This shift in research emphasis may be the result of a belief among professional geologists that the chronological task of stratigraphy is almost complete, and that the remaining interpretive challenges involve environmental reconstruction. However, it could also be that field data from a variety of global settings drives event-oriented interpretation rather than chronological interpretation.

Therefore, there has arisen a philosophical internal tension in the NUS between the underlying philosophical concept of history as a continuum and empirical observations that do not support this view. This philosophical tension is being addressed on a scientific level by the advent of neo-catastrophism; however, it must also be resolved on a philosophical level. Philosophic resolution can be accomplished within the BCS, but it is difficult to see how such resolution can occur within the NUS.

The BCS resolves that tension because it allows a catastrophic and discontinuous event-driven approach within geology by removing the philosophical issue from geology to philosophy and theology. Geologic units are distinct because they represent discrete historical events with physical processes that may not have any 'modern' observable analog. Similarity in geologic units (e.g., worldwide red-beds, chalk deposits, etc.) is based on the more fundamental consistency of physical/chemical processes through time.[9] This distinction is important, and must be seen in contrast to the traditional uniformitarian concept of modern processes operating in repeatable patterns throughout history. In the former case, the geologic challenge is to infer unobserved processes based on physical-chemical laws, while in the latter it is to recognize the ancient effects of familiar geologic processes within the context of an extremely sparse data set. Thus, the underlying continuity in catastrophism is one step removed from uniformitarianism, being based on adherence to physical-chemical laws that govern all physical processes.

A biblical model might predict geologic processes different from any modern examples, but linked by analogy to modern physical/chemical process, which are assumed to be constant. The continuity of physical principles of flow dynamics, sedimentation, chemical reactions, etc. is granted based on the presupposition of an orderly cosmos, justified by the theological understanding of divine providence. However, there is no limit placed on the combination and magnitude of these processes by the parent philosophical framework (as is done by the NUS). Continuity of physical-chemical processes does not ensure the same rigid continuity of geologic processes. It only provides the basis for geologic interpretation via analogy.

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[7] Blatt, H., G. Middleton, and R. Murray. 1980. *Origin of Sedimentary Rocks, second edition*. Prentice Hall, Englewood Cliffs, NJ.

[8] Wilgus, C.K., B.S. Hastings, C.G.St.C. Kendall, H.W. Posamentier, C.A. Ross, and J.C. Van Wagoner (editors). 1988. *Sea-level Changes: an integrated approach*. Special Publication 42. Society of Economic Paleontologists and Mineralogists, Tulsa, OK.

[9] Ref. 3.

Missing Section

Another clear distinction between uniformitarian and biblical models resides in the issue of missing section in the rock record. The uniformitarian approach demands present physical processes acting over long periods of time. Since non-preservational (erosion, non-deposition) processes dominate preservational processes in most observed settings, the assumption that large portions of the rock record have been destroyed by erosion is forced by the uniformitarian system.[10] This assumption is ubiquitous to all uniformitarian geologic models, and is believed to be supported by the fossil evidence of large gaps, based on the assumption of organic evolution.[11]

However, the biblical system requires a history of discontinuous catastrophic events. On a global scale, regional depositional processes during these events would probably have exceeded non-preservational processes, and regional depocenters would then contain a relatively complete record of strata deposited during the event interval (event intervals would also contain a record of synchronous erosion and non-deposition, but these could only be delineated based on the assumption that most of the strata deposited were preserved). Thus a Christian geologic model could predict that much of the originally preserved rock record emplaced during the Flood event remains relatively intact. It is likely that the transition from the global event environment of the Flood to a more localized event environment represented by present geologic processes would reflect a decrease in the preservational potential of the geologic record. A major test of any biblical geologic model would be its ability to supply a reasonable interpretation of discrete geologic events that follow the historical outline supplied by the Bible without major interpretational discontinuity in field data. These same strata may or may not have been determined to contain major gaps within the uniformitarian framework.

Specific Constraints in the Historical Outline of Events

In addition to general constraints on Biblical geologic models, the nature of the scriptural record as a collection of historical narratives provides specific constraints to interpretation by providing the answer prior to the exercise of more indirect scientific or forensic methods. The key to constraining geologic models by the specific narrative of biblical texts lies in the ability to impute geologic significance to a historical record that does not provide geologic detail. For example, the narrative of Abraham's journey to Canaan has intense social, cultural, religious, and theological significance, but cannot be considered a geologically significant event. In contrast, the account of the creation of the earth is tremendously significant to geologists, and strongly constrains historical interpretation.

A detailed discussion of all of the events recorded in the biblical texts that are potentially of geologic significance is beyond the scope of this paper, and such discussion is common throughout creationist literature. From the geological perspective, the two most important recorded historical events are Creation and the Genesis Flood. A variety of distinct processes can be inferred from both of these narratives, and applied to geologic

[10] See Ager, 1993a pp. 43-54 in ref. 3; and Dott, 1983, in ref. 5.

[11] For a young earth perspective on the rock record, see Woodmorappe, J. 1999a. *Studies in Flood geology*, *second edition*. Institute for Creation Research, El Cajon, CA.

interpretation. For example, geologic processes associated with the Flood event have been described by numerous authors, and include: tectonic events at the onset of the Flood; catastrophic marine transgression; physical and chemical phenomena associated with maximum Flood levels; major tectonic readjustment in the late Flood stages and the resulting global regression; decreasing energy levels in deposition; post-Flood re-equilibration; and the resumption of lower energy geologic processes.

Because the purpose of the biblical record is not to supply geologic models, it is recognized that geologically significant events have occurred which are reflected by their products in the rock record absent of any explicit biblical (or other) historical reference. These include widespread glaciation (an ice age),[12] meteorite impacts,[13] volcanic eruptions, etc. Extrascientific factual constraints (such as historical narrative from the Bible) are unidirectional, but are limited. They are unidirectional in the sense that they constrain interpretation of the rock record, but they themselves are not changed by the rock record. They are limited because the complete interpretation of the rock record will not be contained in those constraints.

Assessing the Uniformitarian Geologic Column

In addition to the positive factual input from revelation, history, philosophy, etc., biblical geologic models can be constrained by the results of an assessment of uniformitarian geology. The university concept presupposes a mixture of truth and error in a wide range of knowledge, and the resulting potential for additive truth being developed through the efforts of many people. Aristotle[14] recognized this fundamental potential of human intellect:

> The investigation of the truth is in one way hard, in another easy. An indication of this is found in the fact that no one is able to attain the truth adequately, while, on the other hand, we do not collectively fail, but everyone says something true about the nature of things...

Thus, any attempt to reformulate geologic models in the Christian framework will be significantly enhanced by an investigative, rather than a polemic approach to the uniformitarian geologic column.

Formal tests demonstrate that the NUS is invalid on a metaphysical level (see Chapter 2). However, many years of heavily funded research by legions of intelligent and highly trained workers have contributed vast quantities of geologic data interpreted within the framework of uniformitarianism. It is worthwhile to assess the success and failure of those efforts to facilitate the development of models within alternative systems, and creationists should be willing to utilize factual truth and proven methodology that is present in current geologic literature.

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[12] Oard, M.J. 1986. An ice age within the biblical time frame. In Walsh, R. E., C.L. Brooks, and R.S. Crowell (editors). *Proceedings of the First International Conference on Creationism*. Volume II. Pittsburgh, PA. pp.157-166.

[13] Froede, C.R., Jr. and D.B. DeYoung. 1996. Impact events within the flood model. *CRSQ* 33:23-33.

[14] McKeon, R. (editor). 1941. *The basic works of Aristotle*. Random House Publishers, NY. p. 712; 993a30.

Any assessment of the Naturalist-uniformitarian contribution must recognize both positive and negative features. Positive features include:

- skills in organizing and directing research;
- quantity and quality of data;
- field and laboratory research experience;
- highly-developed and sophisticated methods for research, and the ability to apply new technologies to existing problems.

Negative features include:

- the over-emphasis on chronology as the basis for historical analysis resulting in a potential under-investigation of field data as phenomena are pigeonholed to fit models;
- dependence on the process of organic evolution to provide the pivots around which the column is fashioned;
- paleoenvironmental reconstruction predicated upon observable geologic processes acting over long periods of time, even when field data do not appear to support that premise.

The positive features can be summarized under the umbrella of professionalism by most geologists. Large quantities of high-quality geologic data are available today. These data include large areas of the surface and subsurface of the earth that have been mapped based on field observations, well logs, seismic profiles, paleontologic (including micropaleontologic and palynologic) studies, petrographic studies, and numerous other types of information, integrated within the NUS. Recent application of plate tectonic and depositional sequence concepts have not yet fundamentally altered the basic structure and methodology of classical uniformitarianism. Frequently geologic work is performed under the pressure to achieve economic success in the oil or mining industry; and thus, concepts are tested by additional data acquisition (although this work often remains confidential for a period of time).

The quality and quantity of existing interpretations and their supporting data are such that no creationist should dismiss them out of hand. Any attempt to minimize the contribution of earth scientists is shortsighted and counterproductive. There is a narrow path for any worker desiring to revamp geologic interpretations. On one side is the danger of arrogance and ignorance in a cheap dismissal of the vast work of the geologic profession over the last century and a half. On the other side is the inability to distinguish adequately between data and interpretation, follow constraints imposed by a consistent metaphysical and epistemological framework, and therefore integrate that data into models fully consistent with the BCS. Only by understanding the necessary links between theology, philosophy, history, and science (as presented in Chapters 2 and 3) can the latter danger be avoided.

Although existing work should be respected, a major pitfall is the inseparability of the global uniformitarian timescale and evolution, and the resulting emphasis in interpretation based on chronology, rather than physical process and significant events. The intricate arrangement of stratigraphic units is based firmly on the flora and fauna contained in it at a type locale. This biostratigraphic dependence of the rock record is

illustrated by the rigidity of the model prior to absolute radiometric dating applications with a relatively limited dataset. Correlation with the type section is based on its chronological compatibility in reference to the geologic column, since lithologic changes (due to facies changes) and superposition ambiguity (due to limited preservation) render more traditional methods inapplicable on a regional or global scale. Questionable correlations are supported by stratigraphically adjacent formations with unambiguous ages derived from their evolutionary position. However, application of the uniformitarian timescale is commonly sophisticated, with a variety of stratigraphic methods integrated into the interpretation of a given group of strata, based on many physical properties of a given unit (lithology, fossil contents, petrography, geometry, relative position to adjacent strata, etc.)

Close examination of all definable parameters of a given rock unit is necessary for interpretation, especially in a biblical model. Uniformitarian emphasis on chronological relationships provides a measure of built-in interpretation even when the details of a given rock unit are ambiguous, or difficult to observe. However, the biblical emphasis on events/process-product relationships demands more careful interpretation of all units, and should force researchers to suspend judgment and interpretation until sufficient data are available to support such conclusions in their own right.

The collection of large amounts of detailed geologic information, the development of sophisticated research methods, and the integration of large datasets are applauded as aspects of the uniformitarian system which should be emulated by catastrophists. The accompanying metaphysical framework is not acceptable and must not be used. Great care is needed in distinguishing between the data and the interpretations, since that distinction is not always clearly made.

Fashioning a Creationist Geologic Column

Since biblical geologic models will differ from the uniformitarian geologic column in respects other than just the length of time involved, we propose that a condensed time version of the standard timescale is not adequate as a basis for future creationist field studies (Figure 1, Chapter 1). We propose that young earth creationists construct and apply distinct models.[15] Each of these models must be constrained methodologically and factually for reasons presented in the first part of this paper. Although the tenets of uniformitarianism are rejected, the excellent datasets compiled by geologists over many years should not be ignored. Valuable information resides in geologic literature regardless of the model applied, and it should be used by creationists as appropriate.

Many Christians have wrestled with the correlation of the global uniformitarian geologic timescale within the framework of a young earth model. Many ideas have been proposed in an effort to unite the two scales.[16] However, none have proved satisfactory for broad-

[15] See, for example, Austin, S.A. 1994. *Grand Canyon, Monument to Catastrophe*. Institute for Creation Research. Santee, CA; Froede, C.R., Jr. 1998b. *Field studies in catastrophic geology*. CRS Books. St. Joseph, MO; and Froede, C.R., Jr. 1995. A proposal for a creationist geological timescale. *CRSQ* 32: 90-94.

[16] For example, Whitcomb, J.C., Jr. and H.M. Morris. 1961. *The Genesis Flood*. Baker Book House. Grand Rapids, MI. p. 276.

based use, possibly because of confusion between the process of formulating models and defining the system within which the models would be formulated. General timescales[17] are commended as a basis for future work.

Conclusions

1. Geologic models of Earth history can be constructed within the BCS. These models are first constrained by the metaphysical and epistemological conclusions drawn from that system. Such models are also constrained by the introduction of complementary factual data from extrascientific sources. Although the Bible is the most reliable source of information, it was not intended to supply detailed geological information for this type of research. Therefore, it limits, but does not fully define geological models of earth history.
2. Biblical limits are imposed by general information regarding time, catastrophic deposition, discontinuity in historical process, and the inferred extent of missing section in the rock record. Specific information in the form of historical narrative that may contain information of geological significance is another source of limits to any models defined.
3. An investigative, rather than polemic approach to the work of uniformitarian geologists benefits any worker desiring to construct historical models. Benefits are derived from the vast quantity and superior quality of datasets, the professional approach to research problems by many uniformitarian researchers, and their utilization of a variety of field and laboratory methods to solve problems.

Hedtke, R. 1971. A geo-ecological explanation of the fossil record based upon divine creation. *CRSQ* 7:214-221.

Woodmorappe, J. 1980. The essential nonexistence of the evolutionary-uniformitarian geologic column: a quantitative assessment. *CRSQ* 18:46-71.

Coffin, H.G. and R.H. Brown. 1983. *Origin by design*. Review and Herald Publishing. Washington, DC. p. 74.

Rugg, S.H. 1990. Detachment faults in the southwestern United States - evidence for a short and catastrophic Tertiary Period. In Walsh, R.E. and C.L. Brooks (editors). *Proceedings of the Second International Conference on Creationism*. Volume II. Pittsburgh, PA. pp. 217-229.

Scheven, J. 1990. The flood/post-flood boundary in the fossil record. In Walsh, R. E. and C.L. Brooks (editors). *Proceedings of the Second International Conference on Creationism*. Volume II. Pittsburgh, PA. pp. 247-266.

Northrup, B.E. 1986. A walk through time: a study in harmonization. In Walsh, R. E., C.L. Brooks, and R.S. Crowell (editors). *Proceedings of the First International Conference on Creationism*. Volume II. Pittsburgh, PA. pp. 147-156.

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___. 1990b. Identifying the Noahic Flood in historical geology: part two. In Walsh, R.E. and C.L. Brooks (editors). *Proceedings of the Second International Conference on Creationism*. Volume I. Pittsburgh, PA. pp. 181-188.

[17] Walker, T. 1994. A biblical geologic model. In Walsh, R.E. (editor). *Technical Symposium Sessions. Proceedings of the Third International Conference on Creationism*. Creation Science Fellowship. Pittsburgh, PA. pp. 581-592; Froede, C.R. Jr. 1995. A proposal for a creationist geological timescale. *CRSQ* 32: 90-94.

Author's Postscript

1. Earth history is used synonymously in this paper with natural history – the emphasis was placed upon geological aspects of natural history. It would have provided more consistency between the chapters to use the term, "natural history" throughout the series.
2. The issue of continuity in history being found in nature is raised again in this paper as one of the philosophical objections to the geologic column.