Earthquakes and Archaeology and the raging Uniformitarian – Catastrophic debate

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The idea that an earthquake storm helped usher in the catastrophic collapse of the late bronze age in the eastern med (Nur and Cline, 2000) gave rise to an ongoing raging philosophical debate about Uniformitarianism vs Catastrophism.

Introduction

For many years now we - Nur et al (see references below) - have been exploring the possibility that destructive earthquakes may have been involved in destructions that archaeologists have uncovered – not only at specific sites but also more regional impact. Specifically, we have shown how an earthquake storm could have helped usher in the catastrophic collapse in the eastern Mediterranean at the end of the bronze age. This idea – which we thought is pretty straight forward - has come under a variety of criticisms and even attacks. One of the more intriguing repeated attack aspect was based on the philosophical debate related to uniformitanism vs catastrophism. Specifically, that our ideas re the links between earthquakes and destruction uncovered in archaeology are nothing but the convenient re-emergence of the presumably long discarded concept of catastrophism so we should be dismissed.

Denying Catastrophism (and Neocatastrophism)

Here are some of the scathing opinions by Mark Rose (1999), Nicholas Ambraseys (2006), Klaus G. Hinzen (2018), and Manuel Sintubin (2011):

1. Mark Rose, the editor of 'Archaeology' opined in 1999:

   "Tired of needlessly complicated multi-causal explanations for why this civilization collapsed or that city was destroyed? How about a catastrophe?"

"Gradually, as archaeology became a profession and the pretenders were exposed, catastrophism as an explanation for past events went out of vogue, being left to cranks and fringe authors".

"To say all Neo-catastrophism is cut from the same cloth-of-doom would be incorrect; some tries to be rigorous and serious, some is undoubtedly trendy, and some is a return to Velikovsky. At best it is an acknowledgement that catastrophes happen and that we shouldn't dismiss them out of hand as archaeological explanations. This is basically an attempt to place catastrophes within the uniformitarian system".

2. Nicholas Ambraseys in 2006 pontificated:

"In the early part of the 19th century geology was under the influence of the dogma of catastrophism: the hypothesis that changes in the earth occurred as a result of isolated major catastrophes of relatively short duration, as opposed to the idea implicit in uniformitarianism, that small changes are taking place continuously. Catastrophism passed off the scene, now more or less completely discarded, and uniformitarianism took over. However, the last few decades have seen a gradual re-emergence of neo-catastrophism, this time in the field of archaeo-seismology, particularly for earthquakes before our era in the Eastern Mediterranean, bringing back into prominence the ideas of Velikovski. The reason for the revival of catastrophe hypotheses is perhaps that they are easy to explain. They are too simple, too obvious and too coincidental and chiefly because they have become fashionable in recent years ".

3. Klaus Hinzen et al in 2018 seconds Ambraseys conviction that catastrophism is simply useless:

"As outlined by Ambraseys (2006) in the past few decades there has been a reemergence of neocatastrophism in the field of archeaosesmology, particularly for earthquakes in the eastern Mediterranean. Ambraseys attributes the revival of catastrophe hypothesis to their usefulness as easy explanations".

4. Sintubin et al (2011) even propose that we should actually excise the whole idea at least when it comes to earthquakes

   "It's therefore time to get rid of the catastrophism that has burdened earthquake archaeology for too long"

Re-emergance of Catastrophism

The authors above - as well-meaning as they may be - clearly believe that the philosophical idea of uniformitanism is actually a sort of basic law of nature (a-la-Newton's laws by which Hutton and Lyell were influenced), proven and broadly applicable and generally valid. However, uniformitianism has not in fact been recognized by past as well as modern thinkers and many logical questions have been raised repeatedly about its general validity. In fact, it has been challenged for both logical as well as observational scientific reasons from the early start by Hutton (1795) and Lyell (1832) vs. Whewel (1832), Sedgwiick (1831) and Hopkins (1852), to more recently e.g., by M. King Hubbert (1967), Cannon (1960), Gould (1987), and Baker (1998).

1. M. King Hubbert explains why uniformitanism cannot be sustained (1967):

   "During the last five hundred years the tortuous evolution of the geological science has been charachterized by a progressive emancipation from the constraints and impediments imposed by assumptions of special Creations and interferences by Divine providence in geological (and human) affairs. A major part of this emancipation has been accomplished by the employment of the Principle of Uniformity, but this rests upon insecure grounds due in large part to its having been formulated in ignorance of the later-developed laws of thermodynamics".

   "It may be that the time has arrived when geologists too explicitly declare their lack of necessity for that particular hypothesis – a vaguely formulated Principle of Uniformity".

2. In 1960 Cannon produced a detailed overview of the history of the Uniformitarian-Catastrophist Debate:

"Darwin was deeply indebted to Charles Lyell for the method of accounting for large changes by summing up small changes over immense periods of time, nevertheless he did not accept the general Uniformitarian account of the history of nature. Evolution by means of natural selection involves the acceptance of the idea that some sort of cumulative development is demonstrated by geological and biological evidence- and it is just this idea that Uniformitarianism consistently denied".

3. Victor Baker in 1998 provides a particularly insightful discussion:

"Catastrophism in the Earth sciences is rooted in the view that Earth signifies its causative processes via landforms, structures and rock. Processes of types, rates and magnitudes not presently in evidence may well be signified this way. Uniformitarianism, in contrast, is a regulative stipulation motivated by the presumed necessity that science achieves logical validity in what can be said (hypothesized) about the Earth. Regulative principles, including simplicity, actualism and gradualism, are imposed *a priori* to insure valid inductive reasoning. This distinction lies at the heart of the catastrophist versus uniformitarian debates in the early nineteenth century and it continues to influence portions of the current scientific program. Uniformitarianism, as introduced by Charles Lyell in 1830, is specifically tied to an early nineteenth century view of inductive inference. Catastrophism involves a completely different form of inference in which hypotheses are generated retroductively. This latter form of logical inference remains relevant to modern science, while the outmoded notions of induction that warranted the doctrine of uniformitarianism were long ago shown to be overly restrictive in scientific practice. The latter should be relegated solely to historical interest in the progress of ideas"

4. Stephen Gould points out in 1987 the stifling impact of the uniformity assumption:

"Modern geologists do not apply uniformitarianism in the same way as Lyell. They question if rates of processes were uniform through time and only those values measured during the history of geology are to be accepted.[44] The present may not be a long enough key to penetrate the

deep lock of the past.[45] Geologic processes may have been active at different rates in the past that humans have not observed. "By force of popularity, uniformity of rate has persisted to our present day. For more than a century, Lyell's rhetoric conflating axiom with hypotheses has descended in unmodified form. Many geologists have been stifled by the belief that proper methodology includes an a priori commitment to gradual change, and by a preference for explaining large-scale phenomena as the concatenation of innumerable tiny changes."

Conclusion

So to dismiss earthquakes and what we know today about their geography, magnitude distribution, and ground shaking as a possibly important factor responsible for collapse uncovered by archaeologists by invoking the “rule of uniformitarianism” is frankly nothing but silly. We are not pretenders, cranks, fringe authors, or amateurs. If anything, it is the blind adherence to uniformitarisem that is the actual dogma here, itself based on pseudo objectivity as opposed to suggesting that catastrophic events as opposed to gradualism could cause major or important changes, be it in archaeology, geology or society.

A wonderful set of quotes of totally opposing views by two prominent 20th century historians highlights the obviously relevance of the unsettled debate between Uniformitanism vs catastrophism.

“.. the causes of the breakdowns of civilizations are not acts of God .. neither
are they the vain repetitions of senseless laws of Nature” (Toynbee, *A Study of History IV, 1939)*

“Civilization exists by geological consent, subject to change without notice” (Will Durant, 1885-1981)

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