What is the meaning of dropstones in the rock record?

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Dropstones are rocks whose diameter is larger (outsized) than the thickness of the sediment beds within which they are found. Sometimes large 'rocks' within fine-grained, massive sediments are considered dropstones. Dropstones have commonly been interpreted as being dropped into the sediment by icebergs floating in a lake or the ocean. This interpretation is considered one of the three main diagnostic features for ancient ice ages, which occurred hundreds of millions to billions of years ago within the uniformitarian timescale.[1] The ice age interpretation is considered proven, or at least well founded, when boulders are found within thin beds, especially if those beds are couplets of silt and clay or sand and silt, assumed to be varvites, the consolidated equivalent of a varve (figure 1). A varve is a couplet of different sublayers laid down in one year.

Non-glacial occurrences of dropstones

It is also well known that dropstones can occur as a result of non-glacial mechanisms.[2] Dropstones can also end up on the bottom of a lake or ocean due to sea ice rafting, floating kelp, tree stumps, swimming animals with stomach stones, sinking projectiles and even waterspouts that pick up boulders on the beach and carry them over the water.[3] Because of the variety of emplacement mechanisms, dropstones should be equivocal paleoclimatic indicators. They certainly should not be diagnostic of an ancient ice age.

Although the sediments that contain the dropstones are commonly assumed to have settled over many years, sometimes these sediments are actually products of mass flow, and the rocks are actually transported laterally. Many presumed dropstones in fine-grained sediments have been reinterpreted as stones emplaced laterally by turbidity currents, a fast-moving, bottom-hugging flow of sediment. One example is the rocks within thin bands from the famous 2.2 billion-year-old Gowganda Formation, Ontario, Canada (figure 1). This formation was considered a classic dropstone varvite until reinterpreted as rocks within a distal turbidite,[4] which is the far travelled product of a turbidity current. Distal turbidites can mimic varves.

There are other reinterpretations of supposed ice age dropstones as emplaced laterally by mass flow. A Neoproterozoic deposit in Namibia was interpreted as being from an ice age because of the presence of dropstones in varvites. However, the whole deposit has been reinterpreted as a product of mass flow.[5,6] A presumed ice age deposit with dropstones in the Canning Basin, Western Australia, was redefined as the product of subaqueous mass flow.[7] The supposed dropstones were likely deposited laterally in the mass flow.

The meaning of dropstones in 'tropical settings'

There are of course many occurrences of dropstones that provide no or equivocal evidence for the environment of emplacement. Such cases are especially evident when the dropstones are found in presumed tropical settings. There is no choice but to advocate emplacement was by non-glacial means. It also means that the sediment, which appears to have been deposited slowly over a long period, was likely deposited rapidly, probably by a horizontal mass flow mechanism.

A number of these dropstones in fine-grained layers are found in Mesozoic sediments within the uniformitarian geological column. The Mesozoic has been assumed to be a very warm period on Earth in which there were no ice sheets at high latitudes and very few if any mountain ice caps.[8] Such deductions are especially based on warm climate polar flora and fauna. In spite of the fossil evidence, some researchers are positing glaciations in Antarctic during the Mesozoic, maybe to account for

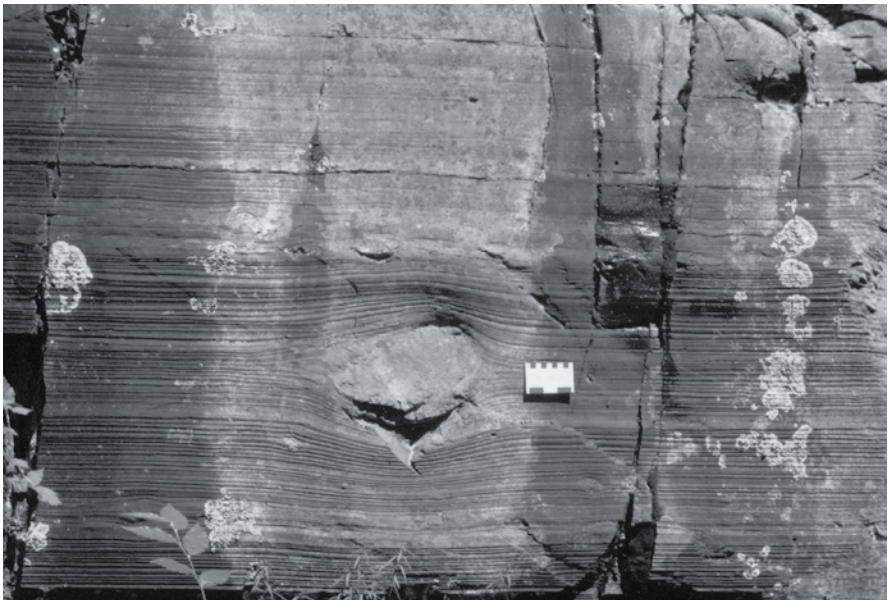

Figure 1. Outsized clast in rhythmites from the Gowganda Formation, Ontario, Canada. Rhythmites are considered to be a distal turbidite (Geological Survey of Canada).

what the researchers believe are real ice rafted dropstones. One recent effort claimed that Antarctica built up an ice sheet, half the size of the current ice sheet, during a 'brief' 200,000-year period in the supergreenhouse Cretaceous period![9,10]

As an example of Mesozoic 'dropstones', the origin of 1-m (B-axis) quartzite boulders found in Cretaceous sandstone in South Australia has been debated for 100 years.[11] Because the boulders are fossiliferous and presumably from the Devonian period, they are believed to have been transported at least 1,000 km toward the west and northwest. A few of the boulders are facetted and striated, an assumed sign of glaciation, but which can be duplicated by mass flow and other processes.[12] Although acknowledging the boulders were last transported by mass flow, the researchers suggest that the boulders were really transported great distances by the 'Permian glaciation' and reworked by mass flows to the location where they are currently found in Cretaceous sedimentary rock.

Another example comes from the Jurassic and Cretaceous of northeast Siberia.[13] Dispersed rocks within fine-grained marine sediments with rare warm-temperate plant fossils are attributed to mass movement.

A recent report from the middle Mesozoic of Spain assumed a tropical lacustrine setting, but disclosed that dropstones occur in fine-grained limestone.[14] Because of the presumed tropical setting and the lack of presumed glacial features on the rocks, the researchers eliminated iceberg rafting from an ice sheet. They also discounted mass flow because of the fine-grained limestone. So, they are left with a hydrodynamic paradox:

> 'The occurrence of outsized stones within featureless micrite [fine-grained limestone] indicative of low-energy conditions involves a hydrodynamic paradox which can only be resolved by their vertical or oblique emplacement in the host sediment as dropstones.'[15]

To solve the paradox, the researchers opted for rafting in the roots of trees. But they did admit that ice rafting is not a sound glacial criterion:

> 'If wood rafting is a possible depositional mechanism, the rafted occurrence of dropstones is consequently not a sound criterion for inferring the existence of glacial conditions in lacustrine environments.'[15]

Figure 2. Rocks in tree roots, Black Hills, South Dakota.

Dropstone varvites are also reported in tropical Jamaica from the Eocene and Pliocene within the uniformitarian geological column.[16] Isolated boulders up to 1.5 m in diameter were found within thinly bedded turbidites within the Eocene formation. Two large siltstone boulders were discovered in Pliocene marlstone, a muddy limestone. Iceberg and sea ice rafting are eliminated. They dismissed tree rafting because of the lack of fossil wood (in a Flood model such a deduction would not hold). So, they concluded that the fine-grained or fine-bedded deposit containing the boulders was deposited by mass flow.

The meaning of dropstones within the Flood

Uniformitarian scientists are sometimes faced with a hydrodynamic paradox because of the large rocks within what they believe are slowly deposited sediments. But creationists have more options with rapid sedimentation during the Flood.

We would expect many more true dropstones from the holdfasts of floating kelp, tree roots (figure 2) ripped up by the Flood, and other 'high energy' mechanisms. Many dropstones would fall from any floating log mat on the floodwater.

Numerous mass flows would have occurred during the Flood, and they should commonly incorporate 'dropstones' emplaced laterally. Sedimentation was extensive during the Flood and currents would also have been strong at times. We would also expect to find evidence of large-scale submarine sliding of freshly-deposited sediments. So, during the Flood, mass flows would likely have been many hundreds of metres thick, covered tens of thousands of square kilometres, and moved at rapid velocities for such volumes of sediment. Rocks entrained within such mass flows can be carried long distances. They can settle within fine-grained sediments, but because the flow is so thick, the rocks could be deposited before they

sank to the bottom of the flow. Such rocks would end up 'floating' in fine-grained sediments or finely-bedded sedimentary rocks. They would have the appearance of dropstones and may not have the appearance of a mass flow product. This is probably the case for the Spanish example above, since the rocks were found dispersed within 8,000 m of sedimentary rock![17]

The gastroliths found in fine-grained sediments from the 'Lower Cretaceous' Cloverly Formation have been interpreted as material carried 200 to 400 km in a mass flow.[18,19] This could well be another example of material deposited in the Flood. Billions of nautiloids (similar to 'floating rocks') were deposited in a 2-m-thick bed at the bottom of the Redwall Formation in the Grand Canyon and vicinity.[20]

Dropstones do not seem to be a problem for the Flood paradigm, but are sometimes a conundrum within the uniformitarian model.

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Nucleic acid bases in Murchison meteorite? Have they proved that life came from outer space?

Jonathan Sarfati

Have evolutionists proved that life came from outer space?

Evolutionary papers are buzzing with the reports that nucleobases were found in a meteorite. In some minds, this is tantamount to discovering life itself. But does the discovery justify the hype?

Introduction

In 28 September 1969, fragments of a meteorite landed 2 km south of the small village of Murchison, Victoria, Australia. Local residents collected about 100 kg of material, and the largest fragment was about 7 kg.

The Murchison fragments came from a class of meteorite called carbonaceous chondrites, because they contain small nodules called chondrules. Since this class is rich in carbon and water, right from the beginning the Murchison meteorite has been analysed for organic molecules. Chemical evolutionists, who have faith that life evolved from non-living chemicals,[1] were hoping to find evidence to support their faith. They had hoped that this meteorite would provide evidence that such processes were widespread in the universe, even if some of them were pessimistic that life could arise on earth.[2]

One of the first discoveries was amino acids, the components of proteins.[3] Later, there were dubious claims that some of the amino acids had a slight excess of the 'handedness' (chirality[4]) required for life.[5] Still later, there were claims that sugars and sugar-related compounds were discovered, which excited many