Hypercanes: rainfall generators during the Flood?

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A class of super-hurricanes provide a hitherto-unexplored mechanism for the 40-day rainfall during the global Flood. These unusual super-storms originate over areas of scalding-hot ocean water, as would be generated by submarine volcanoes during the early stages of the Flood. Whereas ordinary cyclones affect broad but limited georaphic regions, hypercanes deliver moisture well into the stratosphere, ultimately causing global effects. Although a large number of hypercanes would be needed to account for the global rainfall during the Flood, the combined geographic area directly affected by the hot ocean water, and by such hypercanes, would be minimal. Thus the organisms (in and outside the Ark) could have easily survived in the large areas of ocean, free of these life-destroying effects. Recent research on cyclonic storms helps clarify the role of SSTs (sea surface temperatures) and dissipative heating in hypercane genesis.

Where did the water come from that led to the 40-day global rainfall at the start of the Flood (Genesis 7:4,12)? Critics have scoffed at the biblical account on this matter, pointing to the fact that no modern storm system could ever produce that much rain. Following similar thinking, compromising evangelicals have likewise argued that only a local flood could have rainfall associated with it. The obvious reply is that no known normal meteorological process would produce 40 days of continuous rainfall over the Tigris-Euphrates region! Thus, the attempt to reduce the Noachian Deluge to a local event fails miserably once again.

In criticizing the concept of a global 40-day rainfall, both biblioskeptics[1] and compromising evangelicals display a narrow-minded adherence to known meteorological processes as the sole conceivable source of the rainfall. Their attitude only demonstrates a reluctance to consider any alternatives.

But what else is new (cf. Ecclesiastes. 1:9)? In 1795, *before examining the evidence*, the deist James Hutton, 'the father of modern geology', proclaimed: *'the past history of our globe **must be explained** by what can be seen to be happening now. ... No powers are to be employed that are not natural to the globe, **no action to be admitted** except those of which we know the principle'*[2] (emphasis added) — uniformitarianism. This automatically rules out the biblical worldview, i.e. a miraculous six-literal-day Creation about 6,000 years ago, and a globe-covering Flood about 4,500 years ago. But why should Christians follow Hutton's rule instead of interpreting the facts in terms of the biblical framework? It is up to us who believe the Bible to propose and test these alternatives.

At the 4th International Conference on Creationism, in August 1998, I presented a technical paper that introduced hypercanes as a novel mechanism for the Flood rainfall.[3] Here I describe this research for *CEN Tech. J.* readers, and update it with some recent developments in our understanding of powerful cyclonic storms.

Some previous theories for the 40-day global rainfall

This section is not intended to provide a comprehensive account of past theories, but rather to call attention to some of them. Many commentators have supposed that the earth was surrounded by a water vapour canopy that condensed at the start of the Flood. This is an area of ongoing research, and it is possible that a workable canopy will be modeled one day. However, it appears at present, that no naturalistically-functioning canopy, able to provide more than about one metre of rainfall, could have surrounded the earth without making it too hot for life to exist below.[4]

Anyway, a global canopy is not necessary to explain the existence of a much-warmer, pre-Flood world than the world we know today. My research[5] has highlighted alternative conditions that would have sustained a frost-free planet. These include the absence of ice caps at the poles, the absence of tall mountain ranges (whose presence tends to deflect global wind circulation from a more polar direction — according to some models), larger concentrations of atmospheric carbon dioxide (for a greenhouse effect), and the existence of shallow seas over much of the continental-interior areas.

Because water has a high specific heat, these shallow seas would trap heat, and help prevent the interiors of the large continents from falling below freezing temperatures at night. It should be stressed that these antediluvian seas would have covered a much larger percentage of the continents than the conventionally-modeled Cretaceous epeiric seas which are found to freeze over in winter according to some models. Consequently, there would have been ample large areas within the continental interiors with enough thermal inertia to prevent the near-surface temperatures dropping below freezing in winter.

Others have suggested that jets of hot water were being injected from the ocean bottom into the atmosphere as the

Flood began. The hot water subsequently cooled, and fell back as rain. This mechanism needs to be evaluated more fully. To my knowledge, no detailed research has been conducted on its feasibility or otherwise. And, as it turns out, such hot-water jets may be completely unnecessary in view of the probable existence of hypercanes.

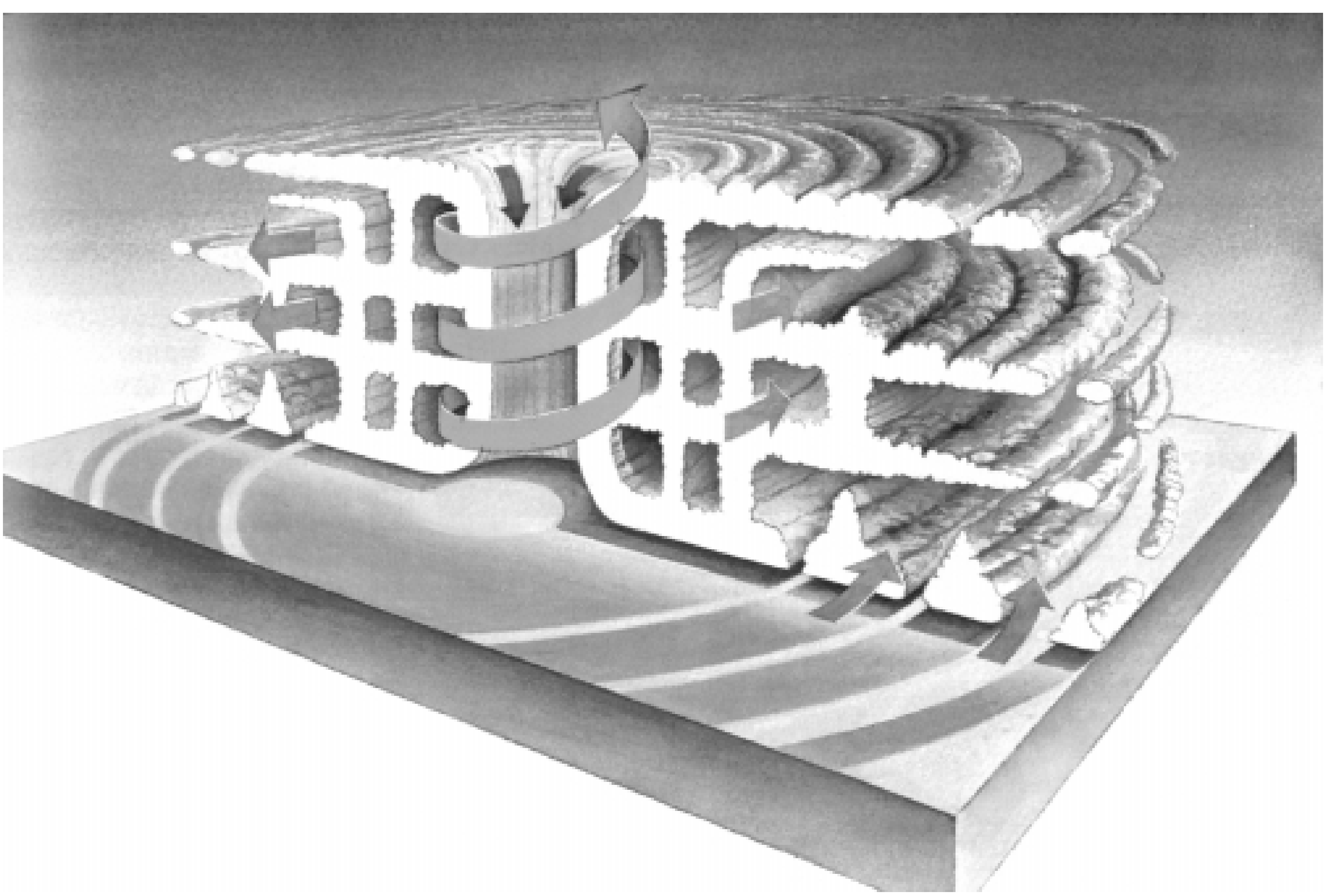
Still others have conjectured that the 40-day rainfall originated from water vapour injected into the air by volcanoes. However, we now realize that most of the water emitted by volcanoes is scavenged in the volcanic plume itself. Very little of it persists in the upper atmosphere. But if a volcanic caldera fills with ocean water, appreciable quantities can be vaporized and lifted by the volcanic plume into the upper atmosphere. However, even then, a volcano is much less effective in lofting water into the stratosphere than a hypercane.[6]

One gains the impression that previously-proposed models for the 40-day rainfall are inadequate. We thus need to consider other mechanisms for the 40-day rainfall, and the hypercane turns out to be a prime candidate. But before we even do that, we need a clear understanding of what the Bible means by '40 days and 40 nights'. A Hebrew scholar should investigate the biblical terminology, as to whether this refers to 40 days and nights of non-stop rainfall, or episodic rainfall. And is this to mean that it rained everywhere on the earth within this period of 40 days and nights? For purposes of this study, I will assume that it rained over most, but not necessarily all, of the earth's surface at any given instant of time within the 40 day and night period, and that the rain was largely but not completely continuous. All of these conditions would have been fulfilled by hypercane-generated rainfall.

The nature of hypercanes

In some parts of the world, hurricanes are referred to as typhoons or simply cyclones.[7] Hyper-hurricanes, or hypercanes for short, are exceptionally-powerful hurricanes which are now believed to originate under extreme water-surface temperatures. They were discovered while computer modeling the effects of normal hurricanes, albeit with very extreme SSTs (sea surface temperatures). As we shall see, hypercanes hold the key to transferring large volumes of ocean water into the upper atmosphere.

To understand hypercanes, we must first discuss how hurricanes work. Conventional hurricanes form in warm, stagnant, subtropical oceans. If the air-currents aloft are favourably positioned, the rising moisture-bearing air will



Anatomy of a hurricane (after Oard).[16] Hurricanes form in warm, stagnant, subtropical oceans when the rising moisture-bearing air starts to circulate. Heat from the warm ocean surface converts to kinetic energy, intensifying the circulation. The inrush and updraft of moisture-bearing winds is balanced by the lateral circulation of the winds around the 'eye' caused by the Coriolis effect of the earth's rotation.

be driven into a pattern that starts to circulate. As wind circulation begins, heat from the warm ocean surface converts to kinetic energy. This intensifies the circulation in a type of vicious circle, eventually transforming the system into a full-blown hurricane. The inrush and updraft of moisture-bearing winds is balanced by the lateral circulation of the winds caused by the Coriolis effect of the earth's rotation. That is why there is an 'eye' in the hurricane.

The hurricane produces a great deal of rainfall, but only in and near the regions it affects directly. It is not powerful enough to raise the water from the ocean into the upper atmosphere where winds would carry it a considerable distance beyond the storm itself. This is not an easy task for a storm to accomplish, because a 4th-power law operates. For example, to double the height to which a storm will rise in the atmosphere requires roughly a sixteenfold increase in power.

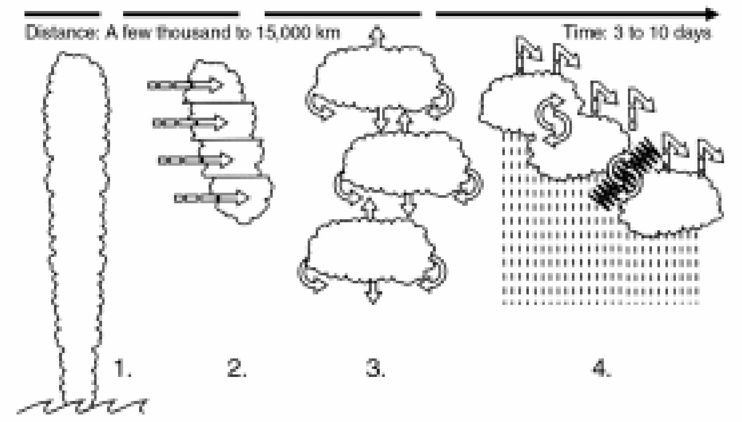
Computer simulations have revealed what would happen as hurricanes become more and more powerful. This would occur, for example, if the surface water were not only warm (25–30 ºC, as in a tropical ocean), but scalding hot (near 50 ºC, or about 120 ºF). The rising, moisture-bearing air would set up a much more intense circulation than in a typical hurricane.

With the increased intensity of circulation, two significant effects would take place. Both the barometric pressure of the storm and the size of the 'eye' would shrink drastically. The latter would occur because the powerful winds would equilibrate with the Coriolis 'force' much closer to the centre of the storm than for a conventional hurricane. Also, the storm column would rise to twice the altitude.

Instead of raining locally, the moisture (in the form of ice crystals) would be lofted into the upper atmosphere (stratosphere), where it could travel for many thousands of kilometres before melting and falling as rain. The small ice crystals, elevated to stratospheric altitudes, would remain aloft for several days at least, before eventually raining on the earth. And, as discussed in my ICC paper, the crystals would probably undergo several cycles of sublimation and recrystallization before doing so. Meanwhile, sufficient time would have elapsed for the upper-level winds to transport the cirriform ice-crystal clouds over the continents.

Unlike conventional hurricanes, hypercanes would tend to remain stationary. It is suggested that, if a hypercane were blown off the 'bubble' of hot water by atmospheric winds, it would die down without hot water to 'feed' from. But a new hypercane would probably form over the original 'bubble' of hot water.

In contrast to the hurricane, the hypercane does not need favourable upper-level winds to form. Once the ocean surface is hot enough, simulations suggest that the hypercane would be self-triggering. Both conventional hurricanes and hypercanes are giant heat engines that depend upon the temperature gradient between the warm surface-water and the cold upper atmosphere to generate their power. Since the temperature gradient is greater for the hypercane than for the conventional hurricane, the hypercane is much more powerful.



Progress of seawater lofted into the stratosphere by a hypercane (after Woodmorappe).[17] 1. Hypercane injects water into the stratosphere which freezes to crystals, 2. The thick ice cloud bank is split by wind shear, 3. Eddy diffusion (vertical arrows) enlarges the clouds and large ice crystals either fallout or evaporate enlarging the cloud decks downward (curved arrows). Most eventually join synoptic systems and rain out, 4. Precipitation of the remaining ice clouds is triggered by either by convection from solar heating (broken arrows) or wind shear induced convection (curved arrows), including cloud collisions and mergers.

But what would make the ocean surface hot enough to trigger, and then support, a hypercane? Obviously, no conventional meteorological conditions would ever raise ocean temperatures anywhere near 50 ºC. But an underwater volcano would — if it were large enough. We are really talking catastrophism now! Hot magma from the volcano, mixing with ocean water, would create a hot water plume. Being less dense than the surrounding cool water, the plume would rise and create a 'bubble' of hot water at the surface. Provided this bubble (or 'patch' in two dimensions) of scalding water is large enough — say 50 km in diameter — theory predicts that a hypercane will form. And it will not die out until either the heat source is dissipated, or lateral winds snuff out the hypercane.

Hypercanes in a global Flood context

If indeed hypercanes were active during the Noachian Deluge, how would they have operated? At the onset of the Flood, the 'fountains of the great deep' broke up, instantly spawning thousands of underwater volcanoes. Within hours, hot plumes of scalding water generated thousands of hypercanes all over the world's oceans. Unimaginably large volumes of water were thus lofted into the upper atmosphere. Shortly thereafter, the cold, upper atmosphere was saturated with water, mostly in the form of ice clouds. With time, the ice crystals coagulated, and fell back to the earth. Upon reaching the denser middle atmosphere, they either melted or evaporated. The moisture became available to the conventional weather systems, and generated intense global rainfall.

Finally, the tectonic processes during the Flood caused large waves to develop. These snuffed out the hypercanes. Thus we had only 40 days of rainfall, instead of rainfall throughout the year-long Flood. Most of the water which flooded the continents came from the oceans as they increased in depth, and not from the hypercane-induced precipitation.

Survival of life though the Flood

My research on hypercanes has inadvertently clarified some issues that have been the subject of bogus anti-creationist arguments. Some bibliosceptics have claimed that large numbers of simultaneous volcanic eruptions would cause an intolerably intense global acidic rainfall and caused extreme and long-term cooling of the land surface after the Flood.

To begin with, the turbulence of floodwaters would rapidly mix any acidic rainfall, thus greatly minimizing its effects on living things. More important, the anti-creationist arguments tacitly suppose that a linear relationship exists between volcanic emissions and consequent atmospheric aerosol loading (e.g. a thousand volcanoes will emplace roughly a thousand times the aerosol mass of a single volcano). To the contrary, we now know that volcanoes are self-limiting in terms of the amounts of either dust or chemical compounds that the upper atmosphere can hold.[8]

In other words, the holding capacity of the stratosphere is limited, preventing excessive accumulation of acid-causing, or sunlight-blocking, chemical species at any one time. As a result, we would *not* expect excessive acid rain during the Flood. Nor is there likely to have been excessive surface cooling after the Flood.

Another anti-creationist argument would have us believe that ocean water would become so hot during the Flood that nothing could have survived. This, of course, rests on two dubious premises:

1. That enough heat would be produced to raise the temperature of the oceans to intolerable levels;
2. That the heat would be distributed evenly through the oceans, to every layer in every geographic area. This argument is similar to the claim that there is sufficient poison gas in the world's arsenals to kill the world's human population several times over. This would be true only if each of the six billion inhabitants of earth lined up and individually received the minimum fatal dose.

Let us deconstruct the 'everything-gets-boiled' argument. It must be realized that, perhaps counter-intuitively, large patches of hot water will *not* readily mix with the neighbouring cooler water, except perhaps at the Equator. This is because the Coriolis effect, like an invisible fence, confines the scalding water to a relatively small geographic area.[9]

Moreover, hypercanes, and the 'bubbles' of hot water that gave rise to them, would have been limited in geographic extent. For example, they may have been confined to the 'ring of fire' around the earth, narrow bands along the mid-ocean ridges, and the belts of present-day volcanoes. Alternatively, if the 'ring of fire' was of late-Flood origin, the hot 'bubbles' may have been confined to essentially point-source undersea volcanoes, many of which have since become known as seamounts. Thus the Coriolis-'fence' and the geographic separation of the undersea volcanoes, limited the hot water 'bubbles' to relatively small areas of the ocean until the hypercanes dissipated most of their heat.

Marine life inside the hot water 'bubbles' would have been almost completely obliterated, but outside it would have been largely unaffected. To use the poison-gas analogy, one individual was killed by a 1000-times fatal dose, while 999 other individuals were completely unaffected.

Of course, since hypercanes were limited to relatively small geographic areas of the flooded planet, Noah's Ark and its passengers could traverse large stretches of the ocean without any danger of encountering a hypercane. Thus, not only do hypercanes explain the 40-day Flood rainfall, but they also help us understand how the Ark, and the various life-forms outside the Ark, could have survived the Flood.

Recent research on cyclonic storms

We do not yet know the theoretical limits of the size or power of hypercanes.[10] However, at some point, the internal friction of moving air must prevent the hypercane from exceeding a certain size. More research is needed to understand this limit, and how it relates to the actual quantities of rainwater that could have been lifted by hypercanes during the Noachian Deluge. No more modeling has been performed on hypercanes in recent years, but there have been advances in our knowledge of cyclonic storms. This in turn helps our understanding of hypercanes.

We had known for some time that most cyclonic storms are not as powerful as one might predict solely from SSTs. But some are. So why do some cyclonic storms reach their 'potential', while others don't? We now suspect that cyclonic storms use the full amount of the power available to them only when they are in constant contact with the warm surface water. By contrast, those storms which, as a result of their progress across the ocean, mix the warm surface water with colder subsurface water, tend to be self-inhibiting.[11] In effect, these storms suffocate themselves.

The implication of this for hypercanes is rather obvious.

If hypercanes are to work, then the negative feedback effects of surface-water mixing must be avoided. In other words, the 'bubble' of hot water on the ocean surface must be deep enough to prevent the hypercane mixing the thick layer of hot water with the subsurface cool water. I have heard a depth of 150 metres quoted as the minimum thickness for a 'bubble' of hot water. It is precisely the global-catastrophic Flood that would provide the conditions necessary to create 'bubbles' to generate hypercanes. Not only would these Flood 'bubbles' have the necessary temperature and diameter, but they would also have sufficient thickness.

Recent research has also advanced our understanding of the dissipative heating process in cyclones. We now realize that most heating occurs in the boundary layer of the eyewall region (where the maximum wind speed occurs).[12] Frictional heating of the boundary layer takes place, with resulting dissipation of kinetic energy at the molecular level.[13] In some ways, this process resembles the loss of kinetic energy in a machine due to friction as the moving parts rub against each other. Some kinetic energy is lost as heat, and thus the real-world machine can never be as efficient as a theoretical frictionless one. It is also for this reason that perpetual motion machines are impossible.

But here the analogy ends. It turns out that, counter-intuitively, the dissipative heating can actually ***increase*** the force of cyclonic storm. When dissipative heating is included in the simulations, the projected maximum wind speeds can be greater, and the barometric pressure within the storm lower, than when dissipative heating is neglected.[14] How can this be? Recall that the cyclonic storm is a heat engine. It turns out that some of the heat rejected from the cyclone is returned to the 'front' end of the heat engine (i.e. where the heat source is), thus intensifying the storm. While this applies for conventional cyclonic storms, it is unclear at present to what extent this would take place in the much more powerful hypercane. Since hypercanes rise to much higher altitudes than conventional hurricanes, the effects of dissipative heating are not straightforward. In addition, a significant source of uncertainty is the amount of dissipative heating which occurs in the ocean instead of the atmosphere.[15]

Conclusions

Hypercanes may well turn out to be the 'missing link' between oceanic waters and global rainfall during the global Flood. Creationists with a background in the atmospheric sciences need to conduct further research on hypercanes. If such research validates the hypercane concept, and answers the lingering questions about dissipative heating, we will be much closer to understanding how the 40 days and 40 nights of rainfall took place during the early stages of the biblical Flood (Genesis 7:4,12).

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