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THE FORMATION OF EARTH'S OCEANS AND BEGINNING FORMATION OF ITS ATMOSPHERE

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Abstract:
The earth's oceans were formed during the formation of the earth, over billions of years. The water upon earth accumulated in the process of the earth's formation and subsequently the formation of the earth's crust, in tandem with the formation of the continents and the various layers. In my view, the addition of water through comets and meteors made of ice, if any such did occur, was marginal. In parallel to the formation of the oceans the atmosphere too was formed..

Keywords*: Geology, Tectonics, , Creation of Earth, Formation of Oceans , Formation of Atmosphere*

I. THE FORMATION OF THE EARTH'S OCEANS AND BEGINNING FORMATION OF ITS ATMOSPHERE

The oceans and atmosphere were formed at an advanced stage of the earth's consolidation, after it had taken form as a sphere. In the early stages of formation of the earth's core and mantle, the "dynamo" operation began which created the earth's magnetic envelope. In the parallel process of the sphere's consolidation, and of its rotation around the sun in a spherical (elliptical) manner, the earth's axis of rotation acquired a tilt of 66.6 degrees relative to the plane of the ecliptic, and 23.4 degrees relative to the vertical of the ecliptic. The change in the angle of the earth's axis relative to the sun caused the formation of the north and south poles, where the sun's rays strike with much less force relative to the equator and other regions of the earth. After the stages of the earth's formation, and perhaps already while the earth's crust was being formed, the atmosphere and the oceans began to be formed. The formation of a magnetic envelope around the earth prevented the solar wind from boiling away the atmosphere. In parallel, more atmosphere was created directly through the action of vapors, including water, evaporating directly from the magma, through cracks in the various layers after their formation.

When the earth was still very hot and the atmosphere (consisting of various gases, including water vapor) began to be formed, the vapors of the various gases that formed the atmosphere, which contained water, gave rise to a bidirectional flow.

In one direction, vapors boiled upward; when they reached a certain height and cooled down, droplets of water formed. In turn, the water droplets descended toward the surface of the earth, where the temperature was close to 100

degrees Celsius, turning the water to vapor again, which again rose upward. This up and down movement of water constituted the vertical current in the atmosphere.

Contrarily, due to the tilt of the earth's axis in its rotation around the sun and the formation of the poles, where temperatures were low, glaciers formed at the poles. They had two sources. One source was the horizontal stream of the atmosphere toward the poles with their low temperatures, where water droplets condensed and fell to the earth's surface. The second source was water accumulated from cracks in the various layers, which also froze and added to the formation of the glaciers.

Interestingly, the location of the earth's axis of rotation moves around the earth's surface in circular fashion and has done so consistently since the earth's formation as a sphere (Greitzer July 2020, September 2020). This constant change in location of the earth's axis of rotation also causes a change in location of the north and south poles, in circular fashion and consistently over the earth's surface. Since glaciers accumulated at the poles, due to the constant change in location of the poles, towards where the equator had previously been and temperatures were warmer, the glaciers melted and added water to the formation of the oceans in a consistent and sequential manner (Greitzer September-October 2022). The cooling of the places where the glaciers melted also assisted the cooling process of the earth's surface, especially in the advanced stages of the crust's formation.

II. DISCUSSION

The oceans today cover two thirds of the earth's surface.

The earth is thought to have begun to form 4.4 billion years ago. It may be assumed that the earth's core and mantle formed first, after which large continental blocs formed, floating above the mantle and creating the earth's crust, and in parallel the oceans formed. During the continents' formation, they were constantly moving, joining together and splitting apart several times in a process that eventually gave rise to the continents we know today. What caused the continents' motion across the earth's surface was the centrifugal force of the earth's rotation and the change of location of the earth's axis of rotation across the earth's surface (Greitzer July 2020, September 2020). In the course of this process volcanoes and cracks in the earth's crust formed, and in the large gaps between the continental divisions, the oceans developed.

The oceans' formation was a gradual and sequential process that is thought to have taken a few billion years. Hydrogen is the most common element in the universe, subsequently oxygen became common too. It may be assumed that these two elements, which gave rise to water, were formed in the course of formation of all the other elements constituting the earth's mantle and crust. The first primitive fossils cells, which are termed Prokaryotic, were found in Australia in rocks that are 4 billion years old (Schopf JW, Kudryavtsev AB, Agresti DG, Wdowiak TJ, Czaja AD (March (2002). Schopf, J. W. (1993).

The primitive fossilized cells found in Australia had to have formed in an aqueous environment, therefore the accumulation of water must have begun even before 4 billion years ago. At that point in the earth's formation, the water temperature must have been very high. That accumulated water was in effect the beginning of the oceans' formation. It may be assumed that the water formed at the beginning was in various states of matter, and constituted a significant element in the materials that make up the earth. It therefore appears there were very large quantities of water which in later stages gave rise to the oceans. Some of the water remained trapped in crevices at high temperature and high pressure within and between the layers, because any possibility of moving toward the surface of the earth was blocked. Ultimately some of these water sources served as one of the sources of the oceans' water, which formed in processes to be described below.

According to various studies, water at very high pressure is able to melt into the alloy of lava, and some of it is in a gaseous state. When the pressure drops, the expansion of gas within the magma causes it to rise upward toward the earth's crust, erupting violently when it reaches the surface – one form of which is volcanoes. Likewise, several laboratory attempts by numerous researchers have found that by melting under high pressure conditions, the magma found in the deeper layers contains very large amounts of water in solution.

When the magma is at great depth, it is subject to lithostatic pressure (of the layers and rocks above it), and bubbles of volcanic gases and water vapor are formed in it. When the magma rises closer to the surface, the lithostatic pressure drops and the volume of magma that contains the bubbles increases. When the magma arrives near the vent, the

highest section of the feeding tube nearest the surface – typically a volcanic cone – the lithostatic pressure ceases to have an effect, enabling the release of the gas bubbles and water vapor. Gases and water vapor that were trapped within the magma are released, and vast amounts of steam and volatile materials are spewed into the atmosphere, including methane, nitrogen, hydrochloric acid, hydrofluoric acid, hydrogen sulfide, carbon dioxide, sulfur dioxide, and more.

In the course of the earth's formation, when the earth's crust formed and its various layers cooled and became solid, some of the accumulated water remained trapped within the layers of rocks. The layers were of varied composition, such as basic or acidic magmatic rocks as well as basalts layered out from the volcanoes. In each of these types of layers, cracks could have formed in which water had accumulated since being formed or had been trapped in pockets within the layers. Some water accumulated secondarily in the course of rising upward and was trapped within the earth's mantle and crust, its flow blocked.

In some regions, the basaltic flows created horizons with clay layers between them, the product of erosion of basaltic layers, which are relatively impervious to the passage of water. Or there may have been horizons of volcanic ash, in which the diameter of the particles is small, and which under pressure may give rise to horizons or layers impervious to the passage of water. In such cases, water accumulated in the cracks of the layers beneath the impervious layers, creating trapped aquifers. The waters of these aquifers may reach very high temperatures, hundreds of degrees Celsius or more, in keeping with the temperatures of the layers in which they formed. They have sustained in liquid form under very high pressure for very long periods. If no opening should form, enabling water to move and flow outside, they can sustain in a combined liquid and gaseous state for hundreds of millions, perhaps billions of years.

Some scholars have discussed the finds of rocks that were transported and deposited by glaciers in the oceans in the Neoproterozoic Era, which were found in tropical regions near the equator. Their conclusion was that in that period the entire earth was covered in glaciers, including the equatorial regions (Harland, W. B. and Rudwick. M. J. S., 1964). Sediments of glaciers that were generally deposited in the poles were found in the area of the equator in various periods, which led to theories of a Snowball earth (Kirschvink, Joseph (1992), Greitzer, Y., Sep.-Oct.,2022). This was not Snowball this is probably because the axis of the earth's rotation, following its rotation on the mantle, was located at the equator at those times. The changed location of the equator resulted from the centrifugal force of the rotational movement of the earth following the change in location of its axis, which was the main force causing the movement of the continents and especially the direction they moved in, as well as the upper part of the magma in the mantle.

III. CONCLUSION

The oceans and the atmosphere formed at a very early stage of the earth's consolidation. The formation of the earth's oceans was gradual and continuous, and it is thought to have taken a few billion years. Hydrogen is the most common element in the universe, subsequently oxygen became common too. It may be assumed that these two elements, which gave rise to water, were formed in the course of formation of all the other elements constituting the earth's mantle and crust.

Water and gases under high pressure due to lithostatic pressure can melt into the alloy of lava. When the pressure dropped, the expansion of the gas within the magma caused it to rise towards the earth's crust, resulting in volcanic eruptions that expelled gases, including water. Likewise, water at high temperatures accumulated in various layers under pressure, in trapped aquifers, and was released through faults and the movement of continents, thus rising to the surface and into the forming oceans.

Due to the tilt of the earth's axis in its rotation around the sun and the formation of the poles, glaciers formed at the poles. The change of location of the earth's axis of rotation around the earth's surface in circular fashion and consistently since the earth's formation as a sphere also causes a change in location of the north and south poles, in circular fashion and consistently over the earth's surface. Since glaciers accumulated at the poles, due to the constant change in location of the poles, towards what had been the equator and places where temperatures were higher, the glaciers melted, adding water to the oceans' formation in fixed and consistent fashion.

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