Alfred Wegner's Hypothesis On The Continental Drift Theory

The statement “After all Alfred Wegner was not wrong in his hypothesis” is valid. Alfred Wegner, a German meteorologist, geologist, and astronomer was born in Berlin on the first of November 1880 and is known mainly for the continental drift theory. In 1912, he hypothesized that, the continents were slowly moving apart after arguing that the continents were once joined together(Pangea) in a single landmass, this was 200 million years ago. However, his hypothesis was denied or rejected by geologists because he could not explain how the continents moved.

He first assumed that, the earth consisted of concentric layers in which density increased with depth when he had noted that the differences between the present and past climates could be explained using the idea that, the continents had shifted north-south by large distances. The continental drift theory explains how the continents shifts position or separate on the earth surface into three parts that is, Laurasia, Gondwanaland consisting of India, Australia, Africa, South America Antarctica and the intervening oceans and Congo craton. His theory explains why there are look-alike animals, plant fossils and similar rock formations on different continents. Alfred Wegner noticed that, the different landmasses of the earth almost fitted together like a jigsaw puzzle and supposed that centrifugal force might be the mechanism for the drift theory. His theory was mainly based on the apparent fit between South America and Africa.

He also submitted a lot of observational evidence in support of the continental drift theory. Some of the evidence are; the similarities of rock types found across the continent, rocks in the Appalachians of North America and the caledonides of Britain are very similar both in age, time and type of existence. The distribution of plants and animal fossils of mesosaurus a freshwater reptile is found in Brazil and South Africa.

Climate clues is also one of the evidence that support the idea that the continents were once joined together. Alfred Wegner found the distribution of perm carboniferous glacial sediments in tropical areas. Glacial deposits and scratched rock surfaces can be found in South America, Africa, Madagascar, India, Australia, Arabia and Antarctica.

His theory also led to the emergence of plate tectonics. Where plate tectonics describes the largescale movement of seven large plates on the earth surface. The lithosphere which comprises of the earth crust and the upper part of the mantle can support and transmit nonhydrostatic stresses of a few thousand atmospheres. Also due to convection currents in the asthenosphere, the plates tend to be in relative motion constantly. Plate boundaries come in three types. These are the convergent boundary, divergent boundary and transform boundary. Divergent boundary occurs when plates move away from each other above the rising limbs of adjacent convection cells whilst convergent boundaries happens when plates move towards each other. Although he had enough evidence to prove what he was hypothesizing that the continents were drifting apart, he was not able to prove how they moved or the medium through which they moved.

During the 1950s, a lot of scientists led by Maurice Ewing provided a lot of proofs and evidence to Alfred Wegener's hypothesis. Harry Hess a professor of geology and one of the scientists confirmed the hypothesis by introducing and providing evidence on seafloor spreading. According to Harry Hess, seafloor spreading was the process by which molten rocks comes up through the mid-ocean ridges, cooling and creating a new seafloor that moves away from the ridge and later sinks into a deep ocean trench. However, it did not provide enough evidence on how it affected the movements of the continents. His theory was later supported by Vine Matthews's explanation of magnetic stripping of the seafloor. The scientists saw that the magnetic field switched from north to south and back again. Vine Matthews's hypothesis on conveyor belts was best used in the explanation. Also data on the ocean floors and nature of the oceanic crust such as magnetic properties gave evidence of seafloor spreading along the mid oceanic ridges and magnetic field reversals. The improvement in seismic data also confirmed that, oceanic crust sinked into trenches making or proving Harry Hess theory and providing strong evidence on Alfred Wegner's hypothesis.

Palaeomagnetism which is the study of the earth's magnetic field in the past and focus on the magnetic measurements on rocks and ocean sediments provided strong support for the continental drift theory and its transformation into plate tectonics. Minerals such as Iron titanium oxide in basalt and other igneous rocks preserve the direction of the earth's magnetic field when the rocks cool through the curie temperatures of magnetite. The earth magnetic field although is not accurately recorded in the basalts of the ocean crust, the polar wandering data has been of great help in the continental drift theory. In addition, Marie Tharp confirmed the continental drift theory by applying her skills in cartography and using seismographic data.

In conclusion, Alfred Wegner's hypothesis on the continental drift theory was true and valid although he could not provide solid evidence to support his argument.

References

1. Chander, R. (1999). ”Wegner and his Theory of Continental Drift”. pp.25 to 35.
2. Alfred Wegner. The continental drift theory. https://en.m.wikipedia.org.