

On the role of paleontological fossils in geology and its latest research significance

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Abstract

Paleontological fossils in strata and rock mass carry a large amount of important information, which is of great significance for geological workers to study the biological and environmental conditions in the geological history period, and is the basis of geological research. This paper will discuss the important role of paleontological fossils in geology, explain their specific role in geology research from four aspects, and try to analyze the latest research significance of paleontological fossils in the present era, and explain this from three perspectives for reference.

Keywords

Paleontological fossils; geology; action analysis; research significance.

1. Foreword

Paleontological fossils are ubiquitous in strata and rock bodies, and are the remains of living organisms used in geological history, retaining the remains of biological activities, and other residues. The role of paleontological fossils in geology is very critical, and the study of paleontological fossils is often the basis of geological work. At the same time, in the process of scientific development, with the progress of science and technology, the research of paleontological fossils has also formed a new research significance of The Times, and played the academic value and social value.

2. Analysis of the important role of paleontological fossils in geology

(1) It helps to divide the comparative strata and trace the geological age

Scientific analysis of paleontological fossils will help researchers to divide the comparative strata, which is an important basis for geological research. Generally speaking, in the biostratigraphic research, the most basic method is the standard fossil method, that is, the use of paleontological fossils for biostratigraphic research, from which we can imagine the important role of paleontological fossils in the geological research. Specifically, standard fossils refer to biological fossils unique to a stratigraphic unit, which are almost absent both above and below the formation. Standard fossils have the characteristics of large number, short time limit, fast evolution and wide distribution, so they have the advantages of easy to distinguish, easy to find and compare, and have the nature and function of determining the stratigraphic geological era. Trilobites, penstones, and radiant corals, for example, are all standard fossils, and mark the Cambrian, Ordovician and Silurian periods, and the Devonian Carboniferous periods, respectively. If researchers find a certain type of standard fossil assembly in a formation, they can largely date the formation, for example, if a combination of trilobites, armored fish and penstones is found in a formation, the formation is basically Silurian. It can be seen that the scientific analysis of paleontological fossils will help to divide the comparative strata and trace the geological age of the strata.

(2) It is helpful to study the paleoenvironment, paleogeography and paleoclimate

Through the scientific analysis of the paleontological fossils, it is also of great significance to the scientific research work of the researchers on the paleoenvironment, paleogeography and paleoclimatology. In different geological and historical periods, the climate, environment and geographical conditions will vary, and these external factors will affect the characteristics of the biological communities. Based on this, the biological information carried by paleontological fossils has an important influence on the study of paleoenvironment, paleoclimate and paleogeography. In such geological studies, researchers generally use no longer standard fossils, but reference phase fossils. The fossil, also known as Index fossils, has its function and nature to help researchers deduce the geological age of its strata. In theory, the differences in the environment placed during the deposition process can give them different shapes, but it is possible that these deposits can still contain the same biological fossils. If the species to which the sediment is pointing had only existed in some hundreds of thousands of years, it can be inferred that the target formation contained allofossils that the formation was deposited during that particular period. The shorter the existence time of the phased fossil species, the higher the accuracy of the judgment of the geological age, and then it can determine the climate, environment and geographical characteristics at that time, and even the rotation cycle of the earth corresponding to the historical period, providing a reliable judgment basis for researchers.

(3) It is helpful to study the characteristics of sedimentary rocks and sedimentary minerals

Sedimentary rocks and sedimentary minerals in the process of formation, is often inseparable from the role of living organisms, and some sedimentary rocks and sedimentary minerals are based on the biological formation. Generally speaking, living organisms will leave traces on the surface or inside of the sediment during the activity and growth process, and these traces are biogenic sedimentary structures, which can have a significant impact on the tectonic characteristics of sedimentary rocks and sedimentary minerals. By studying paleontological fossils, geological researchers can form a scientific understanding of the sedimentary structure of sedimentary rocks and deposited minerals, and then form a systematic view of the characteristics of sedimentary rocks and sedimentary minerals. Biogenic sedimentary structures generally include biological relic structure, biological perturbation structure, biological growth structure and plant root trace and so on. Biological disturbance and biological growth structure refers to the process of the activity and growth of sediment surface or internal under the influence of the unique sediment structure, regular layer, homogeneous sediment and laminated structure is the basis for the analysis of sediment characteristics, and trace fossil traces generally stop traces, crawling traces, foraging traces, feeding traces and cave traces, which can judge the characteristics of sedimentary rock and sedimentary minerals, plant roots can assist to identify fresh water and brackish water environment. For example, the fossil fossil can determine the environment and direction of pelvic floor hydrocarbons, crude oil displacement path and channel gap parameters of sediments and deposited minerals.

(4) It is helpful to study the causes of plate movement and tectonic movement

The scientific research on paleontological fossils can also help researchers to determine the causes of plate movements and tectonic movements, which is of great significance to the safety and stability of social life and the development of geology. One of the earliest important bases used in the theory of continental drift is paleontological fossils. Mesosaurid fossils found in the Early Permian strata of South America and Africa, as well as non-marine fossils in Africa, Antarctica, and India, provide important evidence for the existence of the Gondwana paleontology in the Jurassic. It can be seen that scientific research on paleontological fossils will help relevant personnel in the field of geology to study plate movement. In addition, tectonic movements can also be explained by using ancient biological fossils. Take specific examples to illustrate. In the 1970s, Chinese geographer and geomorphologist Li Jijun and other geologists

studied the era, the amplitude and the form of the uplift of the Qinghai-Tibet Plateau, and completed the altitude and uplift of the Qinghai-Tibet Plateau in the Pliocene by using the three-toe horse fossil group and the ancient karst. For another example, Chinese geological researchers Yang Qun and Wang Yujing studied the layered silicic rocks in Qinzhou, Guangxi and Changning-Menglian, Yunnan, in 2007, and according to the carboniferous-Permian parasites contained, they verified that the pan-ocean and Gutetis ocean did not differentiate significantly. Studying paleontological fossils also helps geological researchers explain tectonic movements.

3. The analysis of the latest research significance of the paleontological fossils today

(1) Implications for the coordinated evolution of life and the environment

In the traditional geological research, the relationship between life evolution and the environment is generally emphasized in the one-directional relationship, that is, the environmental change of the earth will have a decisive impact on the evolution of life, while the evolution of life has not been paid much attention to the change of the earth's environment. This is just like the contradiction and opposition relationship, the main contradiction will generally be paid attention to by people, and to develop its research, while the secondary contradiction often will not cause people's attention. However, the secondary contradiction of the reaction and its initiative, and under certain conditions both sides can transform each other this objective law means that geological researchers should not only study on life evolution and environmental change, this is one-sided, is not conform to the objective law, the evolution of the world environment should also be its attention, and into the system of inquiry. As geologists' understanding of ancient fossils gradually, many scholars are inclined to life evolution and the earth environment change is a synergistic relationship, namely the coordinated evolution of life and environment, the understanding of the relationship between life and environment and geological history period of life and environment evolution is of great significance, this is the modern significance of ancient fossil research, to the progress of human civilization also has to be reckoned with.

(2) Biological species diversity and the protection of rare species

Biological species diversity refers to the richness of animal, plant, and microbial species, and the higher the degree, the stronger the diversity, and the more diverse the variety of organisms. Species diversity is a simple way to measure biodiversity, and the species examined are generally only delineated within a particular region. Maintaining species diversity in an appropriate range is of great significance for human survival and development, and it has a fundamental role for human civilization. With the development of the industrial society, the human destruction of the natural environment has long since cannot be covered up. Only by recognizing their own mistakes can we make the right choice in the future. More and more rare species are going towards and being declared extinct, which is a blow to the balance of nature and a blow to the continuation of human civilization and the sustainable development of the ecological environment. In recent years, the awareness of ecological protection in the world has been significantly enhanced. Protecting rare species and maintaining species diversity have become the common mission and responsibility of mankind. Study of paleontological fossils, can form a more comprehensive understanding of species diversity in the geological history period, and according to the process of biological evolution and environmental change to analyze the current and future species diversity and biodiversity, and then implement the more effective protection of rare species, it is of great significance for the continuation and development of human civilization.

(3) The origin and extinction of important organisms in the geological historical period

The biological and geological research of the important organisms in the geological history period, exploring the origin and extinction of these organisms, as well as the radiation events encountered, and so on, are of great significance to human civilization, that is to say, it has an impact on people's life in the present era and can not be underestimated. Many geologists, archaeologists and biologists in the study of geological history in the origin of important organisms and extinction paid a lot of hard efforts, on this aspect of the research work has also made a lot of important achievements, played a high academic value and social value, but still many problems to be solved. For example, the problem of discontinuity and difference between the Precambrian Eddicala animal group and the Cambrian animal fauna remains to be solved, and the exact causes of the five mass extinctions since the Phanerozoic period are not clear enough. All of these problems need to be solved, which is of great significance not only to the development of geology, but also to the development of human civilization. The study of paleontological fossils can help geologists and other scholars to solve these important problems, so this is also part of the significance of studying paleontological fossils today.

4. The conclusion

To sum up, it is of great significance to study the paleontological fossils in the geological research, which is also the basis of conducting the geological research. By studying the paleontological fossils, it will be helpful to divide the comparative strata and trace the geological ages, and to study the paleoenvironment, paleogeography and paleoclimate, the characteristics of sedimentary rocks and sedimentary minerals, as well as the causes of plate movements and tectonic movements. In addition, paleontological fossils are of great contemporary research significance in revealing the origin and extinction of organisms in the geological history period, protecting rare species, maintaining biodiversity, and enlightening the coordinated evolution of life and environment.

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