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Short Communication

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The Influence of Volatile Components On the Evolution of the Biosphere

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Water stands alone in the history of our planet. There is no natural body that can compare with it in terms of its influence on the course of the most grandiose geological processes and the birth of the biosphere.

V. I. Vernadsky in" The History of Natural Waters " wrote that water is the main volatile component contained in magmas, far exceeds the number of other components and significantly affects the changes in the chemical and physical properties of rocks and melts.

In the monograph "Problems and origins and evolution of the Biosphere" [1]. In the section "What is life" on the diagram of the Initial stage of the evolution of life, it was indicated that the primary environment on Earth contained hv minerals, H_2O, CO_2, CO, CH_4, NH_3. Water has always stood out in the first place.

In the book "Fluids in the Earth's Crust", he provides literature data on the water content in various layers of the Earth's crust [2]. In the Earth's crust, the amount of water up to a depth of 20 km is not less than 8%, and the amount of water up to 60 km does not decrease [Vernadsky, 1960].

In more recent studies, the amount of water in the "granite" layer is 0.5-1.5%, in "basalt" - 0.1-0.7%, [E. S. Gavrilenko and V. F. Dorpholz, 1971

The average water content in the rocks of the subcrustal layer of the upper mantle and the lower part of the earth's crust is 0.3-0.5%. This approach allows us to judge only the presence of bound water in the rocks and does not indicate the content of free water [2]. Many works have been devoted to the experimental study of the water content

The figures are given to show the scope of our work.

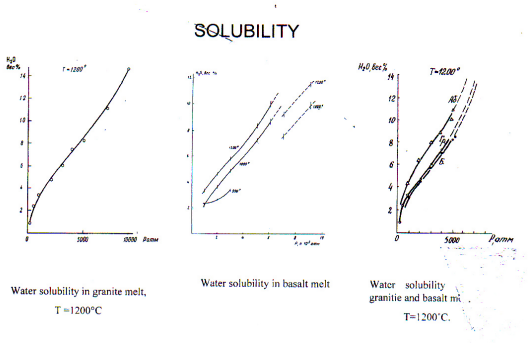

Figure 1: Solubility of water in melts of albite, granite and basalt, at P and T.

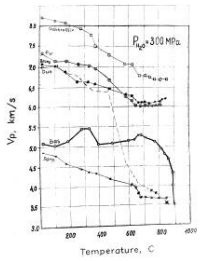

Figure 2: The velocity of elastic waves of rocks under water pressure, at P and T.

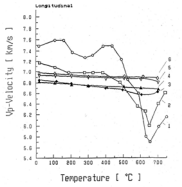

Figure 3: The velocity of elastic waves of amphibolite in dry conditions (straight lines), fractures
(under water pressure)

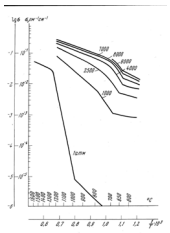

Figure 4: Electrical conductivity of granite under water pressure, at P, etc.

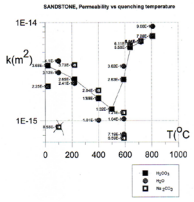

Figure 5: Sandstone, the permeability of the quenched sample by fluids, at P and T.

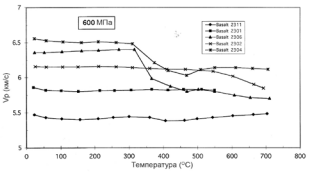

Figure 6: Karer basalts, water release at T=300oC and P = 600 MPa.

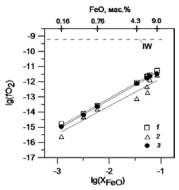

Figure 7: Oxygen volatility during iron deposition lg f O2 = - 15, T=1400oC Study of the formation of the Moon's core.

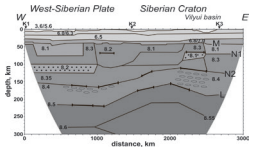

Figure 8: Siberian Craton

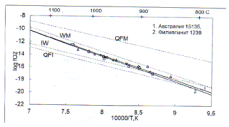

Figure 9: Oxygen volatility during iron deposition lg f O_2 = - 10 -18, T=800-1100oC

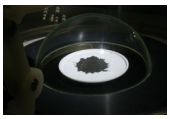

Figure 10: Lunar soil in the GEOHI Museum.

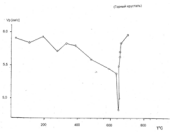

Figure 11: Curve α-β transition in quartz under water pressure

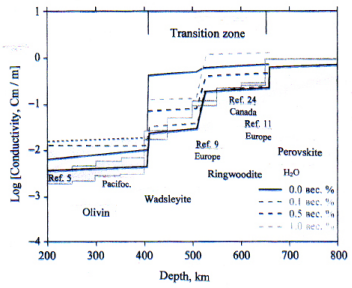

Figure 12: wadsleyite

Conclusion

Experimental studies have shown that water and various solutions strongly affect the physical and chemical properties of melts and rocks as a result of mineral reactions and changes in the structure of magmatic melts and rocks.

Acidic, neutral, and alkaline fluids have a significant and different effect on the physical and chemical properties (seismic, electrical, etc.) of rocks and melts.

The results of the study of the role of volatile components in geochemical and geophysical processes will contribute to the deepening of the petrophysical and geochemical interpretation of geophysical observations, as well as the problems of the evolution of the biosphere [3-20].

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