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# **TERRESTRIAL HEAT FLOW, VOLCANISM AND EARTH'S GEODYNAMICS**

Within the triad of Earth's heat, geotectonic and volcanism, volcanism plays the role of the main agent of heat transfer. Radiometric dating shows that everywhere volcanic events are short. Usually their duration corresponds with dating accuracy. Independent study of volcanic events shows their global synchronicity without any dependence on the composition of the volcanic rocks. It equally belongs to epochs of kimberlite volcanism, the great outpouring of basaltic lavas and outbursts of silicic pyroclastics.

Massive volcanic manifestations become possible due to the magma's ability for the accumulation of volatiles and heat under impenetrable shields. Depending on the character of the shields and the depth of their location, accumulation occurred at two levels – in the mantle where great masses of basaltic melts have accumulated and whose eruption resulted in trapp volcanism and at the upper crust level where great amounts of silicic magmas enriched in silica and fragmental material are stored. Eruptions of the latter resulted in the formation of covers of silicic pyroclastic material like ignimbrites and pumices.

The nature of volcanic belts of island arcs, and similarly geotectonic systems, can be decoded due to their ability to continue along the strike zone in great deep-seated fault zones like the Alpine Fault of New Zealand, the Median Line of Japan and the main fault of Kamchatka. They are long-living faults and movements along them are of a pulsating character. On the Median Line it has been shown that they divide "coupled" metamorphic belts. One such example of such pairs is represented by high-temperature facies of the rocks, while another is a zone of dynamo metamorphism under relatively low-temperature conditions.

The mechanism and character of magmatic differentiation within volcanic processes compared to an intrusive one is sharply changed. In contrast to the usual prevalence of crystallization differentiation in basaltoid magmas within non-silicate magmas a significant role is played by liquation in the course of which the separation of ore melts take place. This transition from closed systems of intrusives toward a volcanic process plays a major role as a triggering mechanism providing for the ability of new portions of volcanic gases to come from great depths to the surface. As a result liquidation plays a significant role in the course of which the separation of ore melts takes place.

Massive manifestations of volcanic processes are always located within extension structures. Forms of structures vary but general character of geodynamic condition remains the same. Generally speaking attempts to find direct connection of volcanism with specific types of structures show themselves not productive. But association with geodynamic condition in the period of volcanism is always confirmed, reflecting extension vary from grabens-synclines in the rear parts of thrusts, great amount of basaltic dykes serving as feeding channels for basaltic cinder cones and small lava volcanoes, or general density decreasing within regions of recent geothermal activity. The basis of the most popular "plate tectonics" theory today lies in the comparison of complementary data of two geotectonic systems: mid-ocean ridges and island arcs. In order to make this system workable it would be necessary to acknowledge their coupled location. The problem is that such a coupled location did not exist.

The model successfully explained many contradictions and a lot of geologists accepted it. With time there were accumulated facts contradicting this model.

The main obstacle occurred because it doesn't consider the complex of important factual data.

Three groups of such omitted facts have to be listed:

1. Pangea disintegration into two major blocks – Gondwana and Laurasia, their consequent division into a series of blocks coinciding with now existing continents and their creation within them of different types of vortex structures;

2. Data on geodynamics of the most widespread geotectonic systems – stable plates (platforms and median massifs) considered as simply passive structural elements;

3. The results of super-deep drilling of the Kola - super-deep drill-hole showed absence of correlation between composition of granitic layer recognized by geophysical data.