VOLUME AND PECULIARITIES OF SPACE DISTRIBUTION OF THE MID-OCEANIC RIDGE VOLCANISM.

O.V. Kuvikas

Kamchatka State University, 683032, Petropavlovsk-Kamchatsky, Pogranichnaya street, 4

In 1983 Gushenko carried out the analysis of volcanism product dependence from the location in geographical latitude. The information about submarine volcanic activity of rift zones has not examined in this article. It is interesting, that, according Dr. Avdeiko data (1979), the submarine rift volcanism four times exceeds the other types of volcanic activity.

In order to perform this work I have made calculation of the volume of emitted volcanic material separately for each ridge for the last 10 million years. I used the map of Magnetic lineation of the world's ocean basins by Cande and others and the International geological and geophysical Atlas of the Pacific Ocean. The volume of magmatic material for every mid-oceanic ridge for the last 10 millions years was calculated according the latitudinal intervals along the 10^{th} degree from 70^0 northern latitude (N.L.) to 70^0 southern latitude (S.L.). Thickness of the second layer of the oceanic crust was considered to be as 1.5-2 km. The relation of emitted material volume (km^3) to the length of Mid-oceanic Ridge arc (MOR) (km) in one million years was used as subsidiary estimating unit.

The rate of spreading for every mid-oceanic ridge was calculated. Also we compared the rates of plates diverging according to different scientists as Galushkin, Ushakov (1978) and others. The received results, in common, do not contradict those universally recognized. In some cases they complete existing data (Huan de Fuka Ridge, South-Pacific Rase, East-Pacific Rase). General volume of erupted material is 4.67-6.23 km3 (cubic kilometers) per year attached to thickness of the second layer oceanic crust – 1.5-2 km.

It occurred that, maximum speed of separation of the oceanic floor is in the south-eastern part of the Pacific Ocean near Easter Island. Every year the new oceanic floor about 18 cm grows and material is emitted about then 1,5 km3 per year. The calculations were carried out with the thickness of the second layer of the oceanic crust about 1.5-2 km.

Less intensive is the effusion of lava flows in South-Pacific raise – 0.51-0.68 km3 per year. The extension is 4518 km and average speed – 7.49 cm in year.

The effusion of lava flows plus parallel dikes for West-Indian ridge is –0.84-1.13 km3 per year. The extension is 4396 km and average speed – 1.17 cm per year.

The effusion of lava flow for Central-Indian ridge – 0.51-0.68 km3 per year. The extension is 8215 km and average speed – 1.13 cm per year.

The effusion of lava flow for Carlsberg ridge – 0.2-0.4 km3 per year. The extension is 1632 km and average speed – 3.7 cm per year.

For Mid-Atlantic ridge the volume of magma material (lava flows plus parallel dikes) is 0.71-0.94 km3 per year. The thickness of the oceanic crust second layer is calculated – 1.5-2 km.   The magnetic lineation are not displayed since 15 N.l. to 5 S.l., nevertheless information is used, because there is the distinct regularity of in volume increasing from the south to the north. As Mid-Atlantic ridge has the meridian location, so, the distribution of magma material depends on rotation poles of the lithospheres plates. The data were calculated every other $5^{0\ \text{from}}$ $70^{0\ \text{N.l}}$. to 55^{0} S.l. As the absolutely increase of magma volume material is showm on 25-30 S.L., I think, there is the Eiler equator or the equator of lithospheres plates.

The effusion of lava flows occurs slowly in ridges; Huan de Fuka, Galapagos and Chilean rise. The thickness of the second layer of the oceanic crust it was calculated as 1.5-2 km .The general volume of magma material is 0.5 sm per year.

So, on the total graph of magma material emission you can see that the East – Pacific raise delivers magma material more 1.7 km3 per year. It may be explained by two active subductional plates – the Naska and the Pacific Plate. The East – Pacific raise is located in the equator of lithospheres plates. On the second place is the Central-Indian ridge. The effusion by lava flow occurs about 0.51-0.68 km3 per year. The largest extension is 8215 km.

This is the final map of location and volume of MOR. So, the analysis of received data revealed several approximate regularities of space distribution of the MOR volcanism in latitudinal intervals. Maximum of the general volume of magma material is located in 25-30 S.l. Diminution of magma volume is northward and southward from this latitude. However on the 60-70 s.l. is 137.22 km3 per 1 million years.

According to Eiler's theorem, the motion of lithospheres plates over the surface of the sphere can be represented as axial rotation through the center of the sphere. The transform breaks give the direction of the Eiler latitudes. The analysis of the received material shows that submarine volcanic activity depends not only on poles of rotation of lithospheric plates, but also on the Earth poles of rotation.

The evidences are:

The submeridian location of MOR (East-Pacific raise, Mid-Atlantic ridge, Carlsberg and Huan de Fuke ridges) and, accordingly, sublatitudinal location of transformed breaks.

1. With the west-northern stretch of Chile ridge, the rift zones of this ridge are divided by transformed breaks and have sublongitude stretching.
2. Near the Earth’s poles of rotation MOR have latitudinal stretch (East-Pacific raise, West-Indian and Central-Indian Ridges in the southern hemisphere, Gakkel Ridge in the northern hemisphere) it is more likely connected with smaller line speed of the Earth as compared to the equatorial part.
3. The maximum volume of the magma material is located in the equatorial part.

Resume.

The general volume of magma material delivered by all ridges (MORs) makes up 4.67 at 1.5 km thickness of the oceanic crust second layer and 6.23 km3 per year at 2 km thickness of the oceanic crust second layer. Whereas according to the Gushenko data surface volcanism delivers about 1 km3 per year. For each MOR the volumes of magma material for one year and 1 million years were calculated. The rates of spreading were determined. The diagrams of dependence of distributions of a volcanic material are constructed. The analysis of the received material shows that submarine volcanic activity depends not only on poles of rotation of lithospheric plates, but also on poles of rotation of the Earth.