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On the magnetic field of the oceans

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The authors of the idea of linking strip magnetic anomalies with the formation of their sources under the influence of the Earth's alternating magnetic field thought it possible to study the movement of lithospheric plates with their help. Most of them quickly abandoned such intentions. Nevertheless, most geophysicists in the world believe this is possible. The material accumulated over the 60 years of the idea's existence contradicts it. The article reviews the currently known facts from the standpoint of plate tectonics and from the point of view of alternative ideas about the formation of the oceans and their crust. The discussion focuses on the spatial distribution and intensity of band anomalies of the oceans' magnetic field and on their sources being restricted to certain types of rocks and layers of sections of the Earth's crust and upper mantle. According to the author, they cannot be explained in any way by the plate tectonics concept. This conclusion is consistent with the long-standing results of many geophysicists. Recognition of this fact is restrained only by the unwillingness to abandon ingrained stereotypes. A variant of the process of oceanization of the continental crust proposed by the author, most of all reminiscent of continental endogenous regimes, reminiscent of rifting, accommodates models for the formation of band anomalies without involving sources with reverse magnetization. In oceanic basins, such sources have not been found at all. They occur in limited areas, but their experimentally determined parameters do not allow for an explanation of the observed magnetic field.

Key words: magnetic field of the oceans, band anomalies, anomaly source models.

Introduction. Until now, insight into the formation of the crust in the spreading zone, including magnetic field anomalies sources of alternating polarity. They arise according to a simple rule and allow the movements of the moving plates, has been widespread so far. However, this picture has long been shown to distort reality. The initial magnetic model of the oceanic crust that had been employed to explain band anomalies [Vine, Matthews, 1963; Morley, Larochelle, 1964] and that had, for a while, been referred to as the Morley-Vine-Matthews model, soon came into conflict with the observed magnetic field. This was supplemented by the concept of dyke intrusion not just directly into the rift trough, but also by the dykes' synchronous normal distribution along Mid-Oceanic Ridge (MOR) slopes [Matthews, Bath, 1967]. Later, the model was further developed by M.B. Leybov and E.I. Mirlin [Leybov, Mirlin, 1978] who added some assumptions. Firstly, intrusion of dykes occurs in discrete moments with a fixed-step-size time algorithm. Secondly, each dyke forms a cover which can be described in terms of the Gaussian quadratic exponent. Lastly, the position of the center of spreading at those same moments is determined as a function of normally distributed random numbers. As a consequence, the results of modeling began to depend not just on the rate of spreading, but also on the quantity of

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dykes, the compactness of their intrusion, the volume of the substance being exported, and the dispersion of the instantaneous jumps of the bottom expansion center. At certain ratios of parameters, a regular sequence of anomalies is not formed at all. Apart from that, intense magnetization of the upper part of the crust and weak magnetization of the lower part were accepted. The effect of the upper layer was thought to dominate in the axial parts of MOR, its magnetization decreasing with time as magnetically active rock minerals oxidize, and the contribution of the lower layer increasing [Cox et al., 1972; Blakely, 1976]. Then it was found that strata with different signs of magnetization are interbedded in the section, and models appeared that take into account the duration of each basalt portion formation and its relationship with the duration of the epoch of one-sign field and the width of the embedding band. In fact, the magmatic history was not studied, but fitted to the desired result [Johnson et al., 1979]. A three-stories model was introduced to explain the differences in the interpretation of anomalies in surface and bottom survey data [MacDonald, Fox, 1983].

To date, the following sequence of dating anomalies has been established.

The length of the period during which a single polarity prevailed (nearly 40 million years in the Mesozoic) differs by two orders of magnitude from the shortest, available at the end of the time scale (Table 1). «The epochs were interrupted by short periods of opposite polarity lasting for just 100,000 years… whereas during the Early Cretaceous and Late Jurassic, magnetic inversions occurred more frequently and some polarity epochs lasted for up to one million years» [Kukal, 1987, p.177]. This author never came across any description of the convection mechanism within the Earth's core (convection is attributed to the role of the generator of the major dipole field) that would explain such changes. None of the eleven dynamo models cited in the [Gubbins, Herrero-Bervera, 2007] answers such a question. Not all magnetic field researchers of the oceans recognize the long Cretaceous and Jurassic periods of direct polarity. The paper [Buallo, 1985] also addresses other points of view on the distribution of oceanic regions without band anomalies: crustal heating after the occurrence of band anomalies, etc. By the way, the intensity of non-band Mesozoic anomalies is much greater than typical band anomalies of the basins. I.e., such extreme field variations are possible without involving objects with reversed magnetization.

Table 1. Numbers of band anomalies and age of the crust according to [Müller et al., 2004]

Pliocene—Cretaceous			
Number	Age, Ma	Number	Age, Ma
5	10	21	48
6	20	25	56
13	30	1	68
18	40	34	83
Cretaceous—Jurassic			
0	120	16	140
4	127	21	148
10	132	25	154

Therefore, after familiarization with such additional factors in formation of band anomalies (many more additions could be listed), we have every justification to reject anomalies as a valid source of information on the age of the Earth's crust. The point is that in the particular situation, as presented, there is no solution to the inverse problem. This is, however, actually not the case. The difficulties listed above are simply ignored and the age of sedimentary rocks overlying basaltic formations is adopted as the age of the crust.

Ocean magnetic anomaly specialists react to the situation in different ways.

«[Individual] scientists and entire associations have shared the belief that drift is a proven fact. They are indifferent to opposite points of view and hardly make an effort to coordinate even their own ideas. And all of them tend to reject or ignore (as small, irrelevant or insignificant) facts which irritate them since they do not play into their own concept» [Meyerhoff, Meyerhoff, 1974, p. 444].

«Comparing the anomalous magnetostratigraphic scale to a «reference ruler», we have to admit that the determination of the magnetic age of the lithosphere is a measurement with a rubber standard with all the ensuing consequences» [Gordin, 2007, p. 76—77].

«There is no factual evidence that linear magnetic field anomalies represent the association of geomagnetic polarity changes and isochrones of seafloor evolution as is currently believed. Instead, a variety of evidence suggests that the marine magnetic linearity arises from a combination of fault-aligned magneto-mineralogical changes giving rise to susceptibility contrasts and induction from the ambient geomagnetic field»[Storetvedt, Longhinos, 2011, p. 8].

The latter approach seems to be preferable supplemented.

There are no band anomalies in the vast expanses of the World Ocean. In the most studied region (the northern part of the Pacific Ocean) they are absent in almost half of the area (outside the marginal seas). They are indistinguishable in the equatorial region, where the field is sharply lowered. Outside the MOR, there are areas where the identification of significant band anomalies is often performed beyond a reliable level.

Initial data. Location of magnetic anomalies in the oceans. According to the concept of plate tectonics (PTC), band anomalies should trace a path from the spreading zone to the subduction zone. The subduction zone is one of the main elements of the deep-process construction in plate tectonics. However, you can get acquainted with the events taking place in it almost exclusively in the Pacific Ocean. In the Atlantic and Indian Oceans, it is represented only by relatively small fragments. Subduction does not occur at the vast majority of contacts between these oceans and continents. However, even in the Pacific Ocean, its «embeddedness» in the PTC process cannot be clearly demonstrated. Such a demonstration would appear to be the presence of opposing credible spreading and subduction zones, between which there are areas of crust of successively increasing age. The latter cannot be done with the help of band magnetic anomalies, contrary to the opinion of supporters of plate tectonics. Primary magnetization of noticeable intensity in layer 2A of the oceanic crust persists only for a geologically short time [Pecherskiy et al., 1979 etc.]. Serpentinised objects in Layer 4, capable of producing significant anomalies, are known to have only direct magnetisation [Gubbins, Herrero-Bervera, 2007]. North of 20° N, the subduction zones of the Pacific Ocean's western margin are not confronted by a spreading zone near the eastern margin. Of course, one cannot take seriously the preposterous claim that spreading is possible under the sedimentary layer (including on the Gorda, Juan de Fuca and Explorer «ridges») or at the edge of the trench off the coast of the California Peninsula in the southern part of the band near the western coast of North America (Fig. 1), from which the counting of band magnetic anomalies starts in the PTC.

All the more so because the plates «formed» here «move» not to the trench, stretching south of Alaska and the Aleut, but along them. West of the central Aleutian arc, the plates turn(?) southwards, a maneuver unthinkable for plate tectonics. To the west, up to Kamchatka and the Kurils, there are no

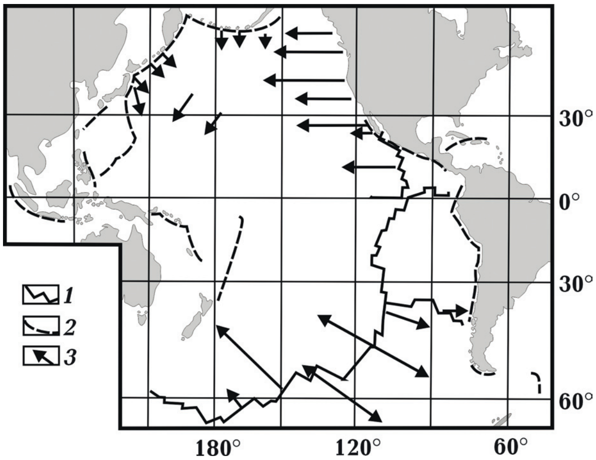

Fig. 1. Spreading and subduction (deep-sea trenches) zones of the Pacific Ocean and the direction of plate movement according to the magnetic field band anomalies strike data. The length of the vectors corresponds to the size of the distribution area of band anomalies [Krasnyy et al., 1981; Udintsev, 2003; Müller et al., 2004; Vasiliev, 2005; Frolov, Frolova, 2011; Lomtev, 2008, 2011 etc.]: *1* — spreading, *2* — subduction, *3* — direction of plate movement.

band anomalies. The crust composition of this part of the Pacific Northwest Plate differs from the typical oceanic crust [Krasnyy et al., 1981; Lomtev, 2008 etc.]. What kind of plates sink under these island arcs is unclear. A field of Mesozoic band anomalies unrelated to the Cenozoic extends from the southern Kurils to the end of the Izu-Bonin arc. The anomaly numbers indicate that the plates are «moving» from the trenches (Kuril, Japan, Izu-Bonin) towards the center of the ocean or along the trenches. The situation with the immersion of the slab into the trench is not recorded anywhere. And according to the Hawaiian magmatism data, the plate from the central Pacific Ocean is moving towards the Obruchev Rise (at the junction of the Kamchatka and Aleutian trenches), completely confusing the situation, just like the Mesozoic magnetic anomalies on the inner slope of the Japan Trench.

South of this latitude, information on band anomalies becomes sporadic. According to data known to the author, either band magnetic anomalies do not indicate subsidence of plates or there is no combination of spreading zones, plates, and subduction corresponding to the PTC near all of the remaining trenches of the Pacific Ocean, the Sumatra-Javan Trench of the Indian Ocean, and the trenches of the Antillean and Scotia of the Atlantic Ocean. The exception is the trench at the Nazca Plate. Thus, the correct combination is present in about 5 % of the trenches' length, and the incorrect combination is present in 35 %. In the remaining cases, the data is insufficient to draw a definite conclusion. Of course, words about the correct combination of elements of the movement scheme in plate tectonics should not be taken as an indication of the correctness of the scheme in nature. The age of the trenches [Lomtev, 2011 etc.] is about 0.5—1 Ma, which rules out the submersion of a noticeable amount of crustal material into the subduction zone.

Despite such a bleak picture, mapping plate ages based on band anomaly data is quite successful, in full accordance with the PTC canon [Müller et al., 2004]. Even the errors in determining ages (including in areas without band anomalies) have been calculated. They range from 1—10 million years.

The plate tectonic mechanism in the back-arc seas of the Pacific looks even stranger. In the space between the island arcs and the Java-Sumatran, Philippine, and Izu-Bonin-Marian trenches, there is neither a mid-ocean ridge nor plate movements marked by band magnetic field anomalies. So where does the material submerging near the Philippine Trench come from? It turns out it is a product of «diffuse spreading». That is, to «explain» this event, a verbal construction is created, which differs sharply from plate tectonics proper. The extreme case of the formation of two parallel trenches without a spreading zone between them is the branching of the Kamchatka Trench. The double trench can be traced from the Obruchev Rise to the Kronotsky Cape [Lomtev, 2011]. The «partition», tens of kilometers wide, rises more than 500 m above the bottoms of the troughs.

One can also mention many more absurdities associated with the implementation of the plate tectonics mechanism in the Pacific Ocean [Gordienko, 2017, 2018, Gordienko, Gordienko, 2018 etc.]. In this article, we will focus on just one — the submergence of the oceanic crust in the transition zone from the continent to the ocean. Proponents of plate tectonics give subduction a very high importance [Peslier et al., 2017 etc.] or do not mention it at all [Cox et al., 1989 etc.].

In the latter case, we are talking about the submersion of the lithospheric plate without dividing it into crustal and mantle parts.

Modeling. The nature of anomaly sources. For the Pacific Ocean, igneous rocks of the Volkano, Izu-Bonninsky and Kuril-Kamchatsky trenches, the Zenkevich Swell, the Ogasawara Plateau, the Shatsky and Hess Uplands, the Imperial Trough and the Magellanic Mountains were studied. Studies have led to the conclusion that highly altered magmatic rocks due to their magnetic properties can be sources of an anomalous alternating magnetic field of high intensity. The natural remanent magnetization of most of the studied samples is secondary in nature and was formed when the rocks were heated to a temperature of approximately 300° C. M.I. Raykevich was the first to establish that the reversal of the polarity of natural residual magnetization occurs under the influence of high-temperature hydrotherms within a single monolith [Raykevich, 1990]. This also happens during rifting on dry land, in the rocks of the «granitic» layer. An example is band anomalies along the Mid-Continent Rift on the Canadian Shield [Olsen, 1995 etc.] (Fig. 2).

The generalized data show that the magnitude of the band anomalies is above or below the average regional background by about 2 % [Cox, Hart, 1989]. Experimental studies of samples of basalts from the Pacific and Indian Oceans, diabases of the Southern Urals, and volcanic rocks of Kamchatka showed that irreversible changes in the remanent magnetization J under the influence of uniaxial compression of 1200 kg/cm^2 in the hardened parts of the samples amount to a few percent, and outside the hardening crust they reach 20 % [Goryainov, Smekalov, 1991]. The magnetic susceptibility *K* under the same conditions gives change values of 10.5 and 15.5 %, respectively [Permanent …, 1981 p. 95]. The reason for the differences in the magnetic characteristics of the quenched and crystallized parts of the samples lies in the sizes of the grains that compose them. Pressure, causes changes in the internal structure, phase composition, and magnetic characteristics of the minerals that make up the rock. Thus, it has a stronger effect on mineral ensembles represented by relatively large individuals. For Bohemian basalts, there are equations to calculate the reversible changes in *J* and *K* depending on the one-sided pressure. For example, for pressures of 100 and 500 kg/cm^2, the equations give, respectively, relative decreases in *J* to 2.1 and 12.6 % and *K* to 8.2 and 49.0 % [Permanent … 1981, p. 12]. Relative changes in *J* and *K* in andesites and andesite-basalts under unilateral compression or tension range from 1.5 to 12 % (700 kg/cm^2). When the rocks are compressed, *J* and *K* decrease; when stretched, increase [Permanent …, 1981, p. 113]. There are no measurements of real stresses in the rocks of the ocean floor; however, some idea can be gleaned from baro-minometric work in the ore land areas. There is a sharp heterogeneity of the field of primary rock pressure when horizontal stresses often exceed vertical ones, and both of them can differ significantly from the theoretical ones calculated from the mass of rocks.

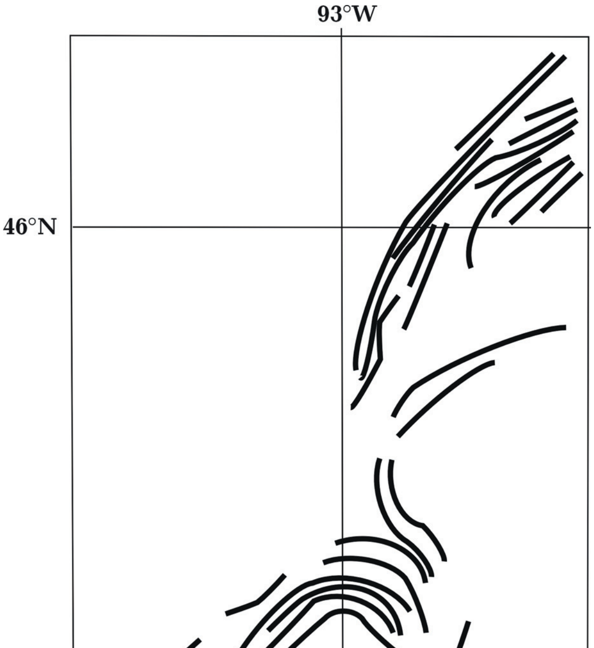

Fig. 2. Band magnetic anomalies of the Mid-Continent Rift.

Incidentally, the intensity of the mosaic Mesozoic anomalies is much greater than the typical band anomalies of the basins. That is, even such field drops are feasible without involving objects with reverse magnetization.

Based on experimental data, it was suggested that the high magnetization of the oceanic crust layer composed of serpentinized peridotites is mainly due to the inductive magnetization of iron. Iron is released in these rocks under intense shear action of geodynamic stresses in the presence of elevated quasi-all-sided lithostatic pressures. Calculations show that iron presence leads to a lowering of the lower boundary of the oceanic crust's magnetically active layer by ~2 km. The layer is bounded from below by the Curie isosurface of iron [Absalyamov, 2004].

In most cases, the rocks of layers 2a and 4 (actually, the mantle) are suitable for creating anomalies of the observed intensity. Moreover, in the basalt sequence, strong magnetization with a high Koenigsberger coefficient is typical only for pillow lavas, the thinnest basaltic lava flows, and the apical parts of thick ones. Often, even after cleaning with an alternating magnetic field, the stable (presumably primary) direction of magnetization is found only in 50—60 % of the samples [Pecherskiy et al., 1979]. This can completely erase the inversion effect. However, the opinion that the magnetization of gabbro is comparable to that of basalts and serpentinites remains reasonable, as the range is 0—8 A/m [Pariso, Johnson, 1993 etc.].

Taking into account the low Curie temperature of titanomagnetites, one can expect magnetization of the inner parts of thick flows with a changed polarity. This may explain the interbedding of basalts with magnetizations of different directions. Over time, the transition to coarser-grained magnetites eliminates both features of pillow lavas and thin flow rocks, and they lose not only the ability to create especially intense anomalies but also reverse magnetization. There is also increased viscous magnetization characteristic of the massive part of the basalt layer noticeable against the background of the residual one. As a result, its influence brings the magnetization of most of the rock closer to a straight line.

In layer 4, «... magnetite grains can be large and concentrated along serpentine veins... In this case, large grains contribute to low NRM (remanent magnetization — *author's*), Köenigsberger coefficient and strong magnetization (in the modern field — *author's*). Magnetite is also found as small single-domain grains with higher NRM and Königsberger coefficient in a serpentinized peridotite matrix. Serpentinites with such magnetic mineralogy can be an important factor in the occurrence of magnetic anomalies. The reverse magnetization of serpentinized peridotites has not yet been established» [Gubbins, Herrero-Bervera, 2007, p. 598]. If this has not happened over decades of studying the ocean floor rocks, then it is either absent or represented in an insignificant part of serpentinites. Thus, there are no real objects with reversed magnetization suitable for the creation of negative anomalies outside the paraxial zone of the MOR.

We also note that Cretaceous (mostly directly magnetized at the time of formation) basalts are recorded according to deep-sea drilling data almost everywhere accessible for sampling under the sediment strata, including the central parts of the MOR [Makarenko, 1997; Silantiev et al., 2000 etc.].

For most of the oceans (MOR slopes and basins), the magnetization is lower and less variable. According to [Pecherskiy et al., 1979], titanium-magnetite dissemination is replaced by magnetite dissemination by 30—50 % in the first million years after the formation of basalt and by almost 100 % after 200 million years. This leads to the disappearance of the magnetic memory and the reduction of the total magnetization value. That is, sources of negative anomalies noticeable in the observed field exist only for a geologically short time.

Information on the magnetization of oce-

Table 2. Magnetization (mean values in A/m) of oceanic crustal rocks

Lavas (2A)	Dykes (2B)	Gabbro (3A и 3B)	Serpentinites (4, mantle)	Source
5	0.1	1	—	Kent et al., 1978
3	0.1	0.5	1	Dunlop,Prévot, 1982
3.5	1	0.4	3	Gordin,Zolotov, 1989
—	—	—	2.5	Popov,Shcherbakov, 1994
3.7	—	—	—	Lowrie, 1977

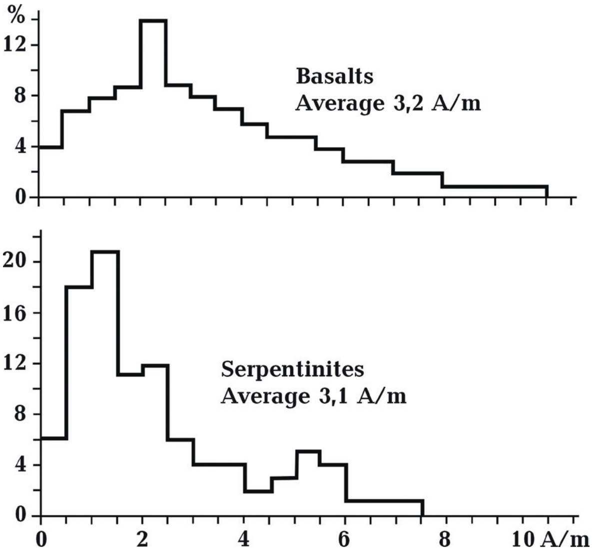

Fig. 3. Histograms of magnetization distributions for two groups of ocean floor rocks.

anic crustal rocks is available in many publications. Some data are presented in Table 2.

The histograms of magnetization distribution collected by the author (without any claim to the completeness of the material coverage, mainly to present the variations) are shown in Fig. 3.

Average layer thicknesses are 2A, 0.3 km; 2B, 1.7 km; 3A, 1.8 km; 3B, 2.8 km.

The wide variability of the presented data is obvious. In the case of basalts, the maximum values are confined to the central parts of the MOR (judging by the amplitudes of anomalies and direct determinations of magnetization, they are three times higher than those related to basins), but there are few of them in the overall sample.

The information allows us to carry out modeling of the band anomalies of the ocean magnetic field assuming no inversion.

«According to the frequency composition, anomalies over deep-sea basins are divided into short-wave ones with autocorrelation radii of 20—25 km and medium-wave ones with correlation radii of the order of 40—60 km. The former are probably due to intraplate volcanism and secondary differentiation of the magnetic properties of plateau basalts that form the foundation of the basins; the second — subbasaltic sources: either bodies of serpentinized gabbro-hyperbasic rocks, or relics of the continental lithosphere» [Gordin, 2007, p. 80].

According to the provisions ofthe theory developed by the author [Gordienko, 2017], the divisibility of the crust under the action of heat and mass transfer in the mantle should be represented primarily by blocks with a size that is a multiple of 60 km. Under the action of intracrustal advection, bodies with the size of ore fields are formed (about 10 km). I.e., the preliminary impression is that the calculated anomalies may correspond to the observed ones.

The deep process of oceanization is generally close to rifting. It can be argued that the zones of magma intrusions, fault formation, metasomatism, and pressure variations that create conditions for magnetized crustal blocks are located similarly. This is probably especially noticeable in the regions of «failed oceans» (as V.V. Belousov puts it) [Belousov, 1982]). One example is rifting on the East European Platform in the Riphean (Fig. 4).

Fig. 5 shows the distances from the axes of the Riphean and Hercynian rifts of the EEP to the magmatites accompanying the rifting. Naturally, most of these formations are not found in the modern erosional section, and many intrusions are not detected by drilling. Nevertheless, the results show that the pre-

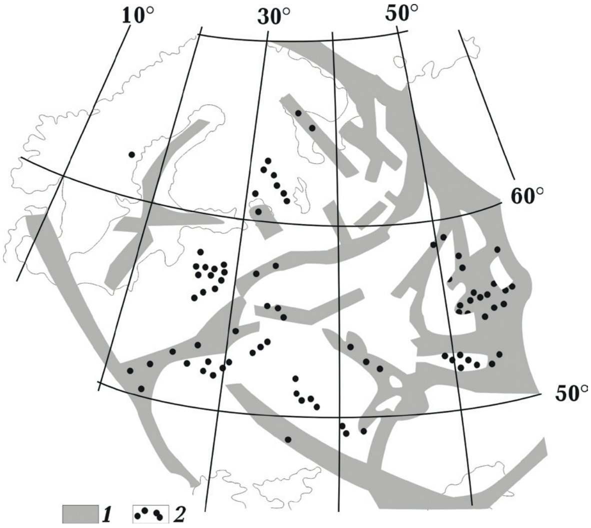

Fig. 4. Manifestations of rifting on the East European Platform (EEP): *1* — uplifts, *2* — magmatism.

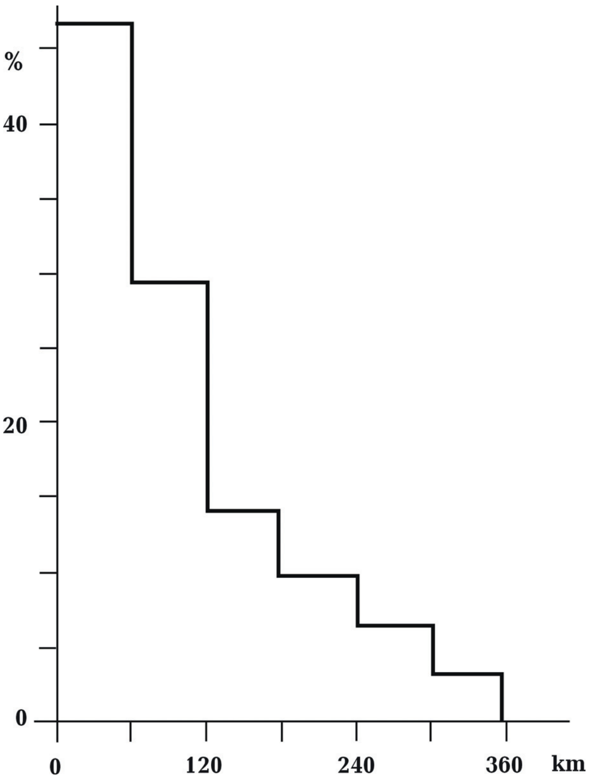

Fig. 5. Histogram of distances distribution of magmatism manifestations from the axes of the Riphean and Hercynian EEP rifts.

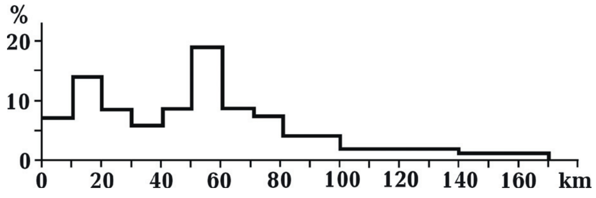

Fig. 6. Histogram of the width of longitudinal blocks in the Hercynian and Alpine rifts of Eurasia and North America [Olsen, 1995 etc.]

dominant part of the platform was covered by a deep process, accompanied by crustal reworking.

It is quite possible to assume that with continued oceanization, the platform territory would have been covered with structures that would create conditions for the source formation of magnetic anomaly elongated parallel to the rift axes. The frequency composition of anomalies can be judged from the sizes of blocks in rift structures, usually separated by faults (Fig. 6).

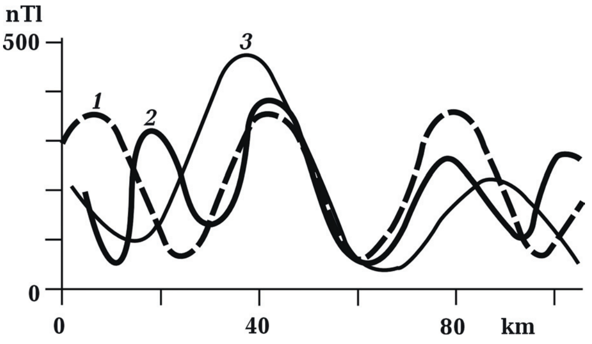

Fig. 7. Comparison of the calculated (*1*) and observed (*2*, *3*) band anomalies of the magnetic field of the basins.

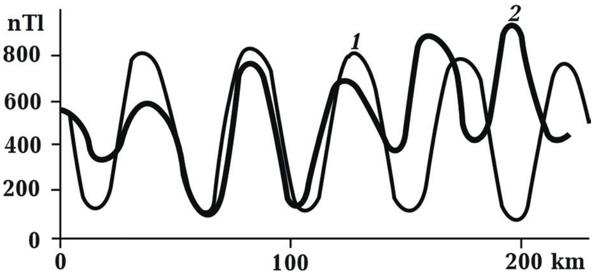

Fig. 8. Comparison of calculated (*1*) and observed (*2*) band anomalies of the MOR magnetic field.

The data in Fig. 6 correspond to both experimental results and theoretical predictions. They can be used for calculating magnetic anomalies (Figs. 7 and 8).

The information on the magnetization of rocks in the upper part of the crust and mantle of the oceans was used in the calculations. In both cases (basins and MOR), the depths of the Curie isotherm of magnetite, limiting the models from below, are taken into account.

It is obvious that slight changes in the model parameters along the calculated profile allow us to achieve full agreement with the real disturbances of the oceans' magnetic field. Experimental descriptions of the field also contain frequency variations. In support of Storetvedt's ideas of the relationship between anomalies and torsional stress waves in the crust, the distances between them were found to increase with approaching the equator [Goryainov, Smekalov, 1991].

Discussion and conclusions. The work represents a synthesis and addition of information previously used by the author in one form or another; some data on specific details of the models have not been mentioned before. In general, there is no doubt that noticeable effects of sources with reverse magnetization are absent in the basins; they are represented in vanishingly small quantities in the MOR, but can arise for reasons unrelated to the reversal of the Earth's field in various regions. The existence of band anomalies can be explained quite well within the framework of the oceanization process without resorting to the plate tectonic concept. Moreover, objective magnetic field examination of the oceans in many cases gives results contradicting this hypothesis.

As noted in one of the first publications on band anomalies [Vine, Matthews, 1963], the reliability of the accepted idea of the anomaly's nature is associated with the reality of the model of the Earth's crust and its thermal regime. Models «…express the basic tenet of the Vine and Matthews idea that the steep magnetic gradients so obvious from any detailed magnetic survey over the oceans might delineate the boundaries between essentially normally and essentially reversely magnetized crust, thus reproducing the observed gradients without recourse to improbable structures or lateral changes in petrology. If this basic principle is accepted, there is no difficulty in explaining the anomalies but only in deciding on the distribution of magnetization within the various layers of the oceanic crust. As ever in the interpretation of magnetic anomalies, there is no unique solution, and the various parameters are so «flexible» that, having assumed normal and reverse strips, the model can be fitted to any existing concept of the structure of oceanic ridges» [Vine, Wilson, 1965, p. 487].

The results of the flexibility are now obvious. In the article [Vine, Wilson, 1965], a very clear picture of band anomalies on the Juan de Fuca Plate was explained by sources in the depth interval of 8 km (from 3 to 11 km) with a magnetization of 10 A/m (20 A/m for the central anomaly), and a plate velocity of 1—2 cm/year. Today, sources with an intensity of 3 A/m are located in the 0.3 km crustal layer (see Table 2), and the plate velocity is 14 cm/year.

The formally postulated consideration of the process' thermal situation is limited to general reasoning within the framework of the stationary model. «The vertical extent of the magnetic crust is defined by the depth to the curie-point isotherm. In the models this has been assumed to be at 20 km below seas-level over the deep ocean but at a depth of 11 km beneath the center of the ridges where the heat flow and presumably the thermal gradient are higher» [Vine, Matthews, 1963, p. 949]. According to the PTC, crustal layers in the spreading zone are formed from mantle melts almost synchronously, and the age of the upper layer is attributed to the entire crust. Calculation shows that at cooling from above of a partially molten layer its parts end up with a temperature below Curie under conditions of at least threefold changing polarity. Such an object does not cause an anomaly. «Saving the situation» is the insignificant magnetic susceptibility of the rocks in most of the crust, except the upper one.

However, even more serious is the complete neglect of interpreters of magnetic field anomalies (and other fields) by geological realities. In the Juan de Fuca region, a fragment of a sloping abyssal plain with a sedimentary cover 1±0.5 km thick is declared a spreading zone and an area without a deep-sea trench and focal zone is declared a subduction zone. I.e., the proponents of plate tectonics first postulate a deep process, ignoring the criteria for its identification within the framework of the professed concept, and then build models of physical properties, fitting them to the observed fields. This has nothing to do with science.

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Про магнітне поле океанів

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Автори ідеї зв'язку смугових аномалій магнітного поля, що займають значну частину океанів, з утворенням їх джерел при спредингу в умовах знакозмінного магнітного поля Землі, вважали за можливе вивчати з їх допомогою рух літосферних плит.

Частина дослідників відмовилися від таких намірів. Проте більшість геофізиків у світі вважають таку можливість реальною. Нагромаджений за 60 років існування ідеї фактичний матеріал суперечить їй. У статті наведено розгляд відомих на сьогодні фактів як з позицій прихильників тектоніки плит, так і з точки зору альтернативних уявлень про утворення океанів та їх земної кори. Перелічено властивості смугових аномалій магнітного поля океанів (просторовий розподіл, інтенсивність) і характеристики їх джерел (приуроченість до певних типів порід і шарів розрізів земної кори та верхньої мантії). На думку автора, їх не можна пояснити з огляду на гіпотезу тектоніки плит. З таким висновком узгоджуються давно отримані результати багатьох геофізиків, котрі займалися цією проблемою. Визнання цього факту стримується лише небажанням відмовитися від стереотипів, що укорінилися. Пропонований автором варіант процесу океанізації континентальної кори, що найбільше з континентальних ендогенних режимів нагадує рифтогенез, дає можливість побудувати моделі утворення смугових аномалій без залучення джерел зі зворотною намагніченістю. На переважній частині океанів (в океанічних улоговинах) такі джерела взагалі не виявлені. На обмежених ділянках вони трапляються, але за їх експериментально встановленими параметрами не можна пояснити існування магнітного поля, що спостерігається.

Ключові слова: магнітне поле океанів, смугові аномалії, моделі джерела аномалій.