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Seafloor topography and structure of the rift zone of the Mid-Atlantic Ridge between 5° and 7°18′ N

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Abstract. Distinctive features of the poorly studied MAR segment between 5° and 7°18′ N are discussed with the use of bathymetric maps (based on surveying with a Simrad EM-12S multibeam echosounder), Bouguer anomaly maps, and slope angles. The comprehensive interpretation of these data made it possible to reveal the complex structures of the rift zone and the active parts of the fracture zones. A system of northwest strike-slip faults was discovered.

Introduction

The Mid-Atlantic Ridge (MAR) between the Equator and 15°N was thoroughly studied during several expeditions. A significant contribution to understanding the inner structure of this Atlantic segment was made by Russian and Russian–Italian expeditions aboard the R/V "Akademik Nkolai Strakhov." At the same time, one of the least studied areas is that between 5° and 7°40′ N. Below, it will be referred to as the Sierra Leone Fracture Zone, after its only seafloor feature with a conventional geographical name.

Information on the seafloor topography of the Sierra Leone Fracture Zone was based on scarce and unsystematic by-pass ship-tracks with the use of a single- beam echosounder [*GEBCO...,* 1997; *General...,* 1982; *Marine...,*] (Figure 1). Analysis of these data indicates that the area is crossed by the boundary between two large trans-Atlantic zones, trending roughly westward [*Mazarovich,* 2000]: one extending from the Fifteen Twenty Facture Zone to 7°10′ N and the other from 7°10′ N to the San Paulu Fracture Zone. The former zone is characterized by short rift valleys, which are displaced for significant distances by numerous transform faults (Arhangel'sky, Vernadsky, Doldrums, and others). The latter has a long rift zone, which is bordered in the east and west by flattened plateaus with thick sedimentary covers. Transform faults in this zone are scarcer, with the Strakhov Fracture Zone (4°N) pronounced most clearly [*Equatorial...,* 1997].

Cruises 6, 9 (8°50′–7°15′ N) [*Stroenie...,* 1991] and 12 (south of 5°N) [*Equatorial...,* 1997] of the R/V "Akademik Nikolai Strakhov" were organized (Figure 2) in the vicinity of the Sierra Leone Fracture Zone. The area was studied by multibeam surveying, magnetometry, dredging, and single-channel seismic profiling, both within testing areas and along a system of north-trending track-lines.

Valuable information on the structure of the area of the Sierra Leone Fracture Zone is provided by satellite altimetry [*Sandwell and Smith,* 1997; *Smith and Sandwell,* 1997]. These data indicate that the area between 5° and 7°18′ N (Figure 3) includes a transform fault at 7°10′ N, a rift zone, and a series of discontinuities. North of this area, a trench at 7°24′–7°30′ N and a ridge at 7°36′ run nearly parallel to these seafloor features (from south to north), with a rift supposedly located between 34°36′ and 34°38′ W and the trough of the Vernadsky Fracture Zone situated at approximately 7°45′ N. In map view, the rift valley is twisty and supposedly has depths from 3400 to 4800 m. South of 5°36′ N, it trends roughly northward up to the Strakhov Fracture Zone. Between 6°10′ and 6°12′ N, the valley sharply bends to the west with an overall displacement for more than 120 km. The inner structure of the rift valley is complicated by two seamounts of isometric shape (at 6°12′ N, 33°27′ W and 5°42′ N, 32°48′ W). Below, we will return to the analysis of the predicted topography.

The area of the Sierra Leone Fracture Zone is characterized by lower seismicity [*CNSS...,* 1997] (Figure 3). Information on the rocks composing this MAR segment was previously obtained from the material dredged in 1968 [*Bonatti et al.,* 1968], which indicates that the ultramafic rocks are strongly tectonized.

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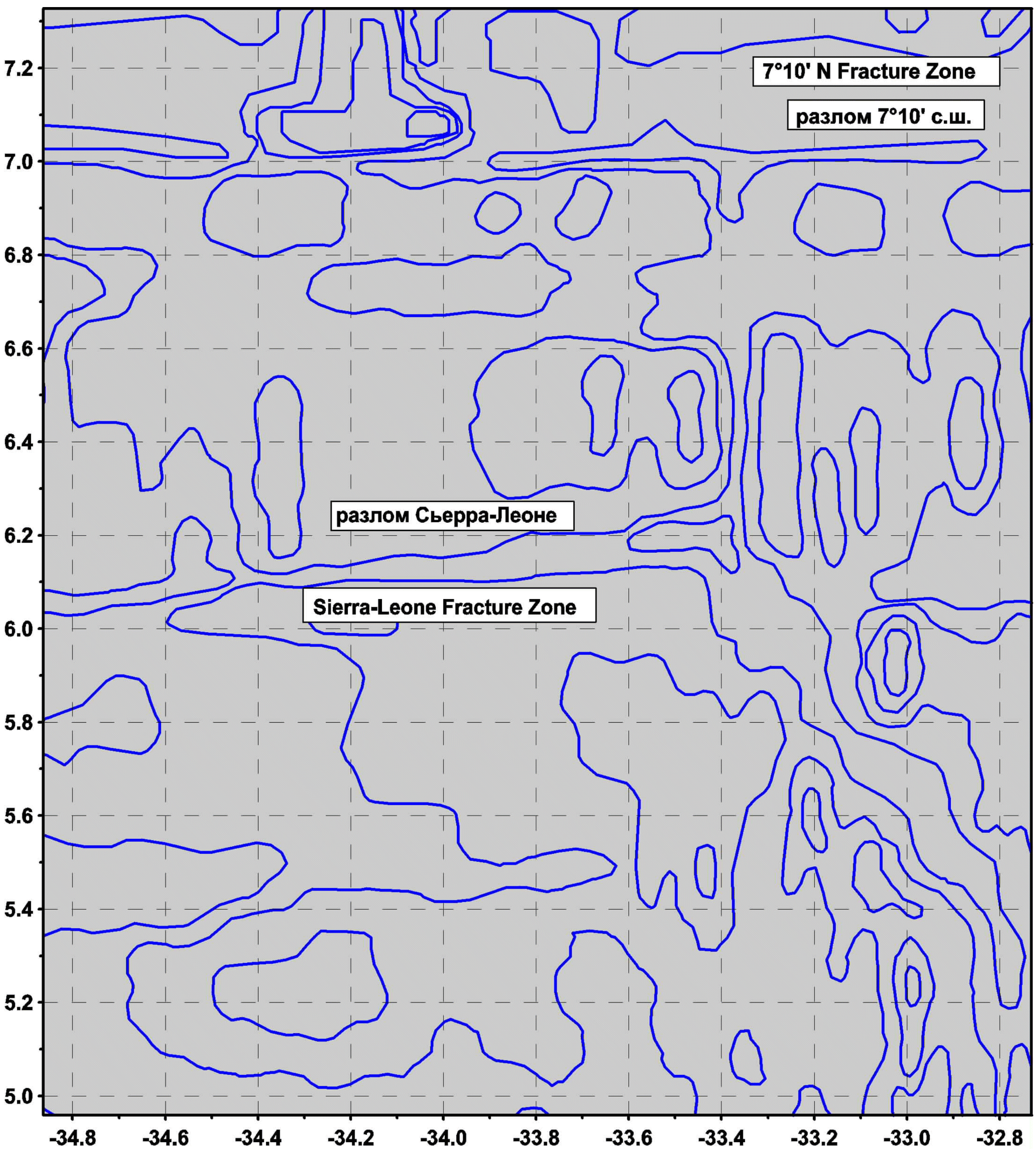

Figure 1. Bathymetric map of the Mid-Atlantic Ridge between 5° and 7°30′ N [*General...,* 1982; *GEBCO...,* 1997]. Here and below, latitude and longitude values are given in degrees and their decimal fractions.

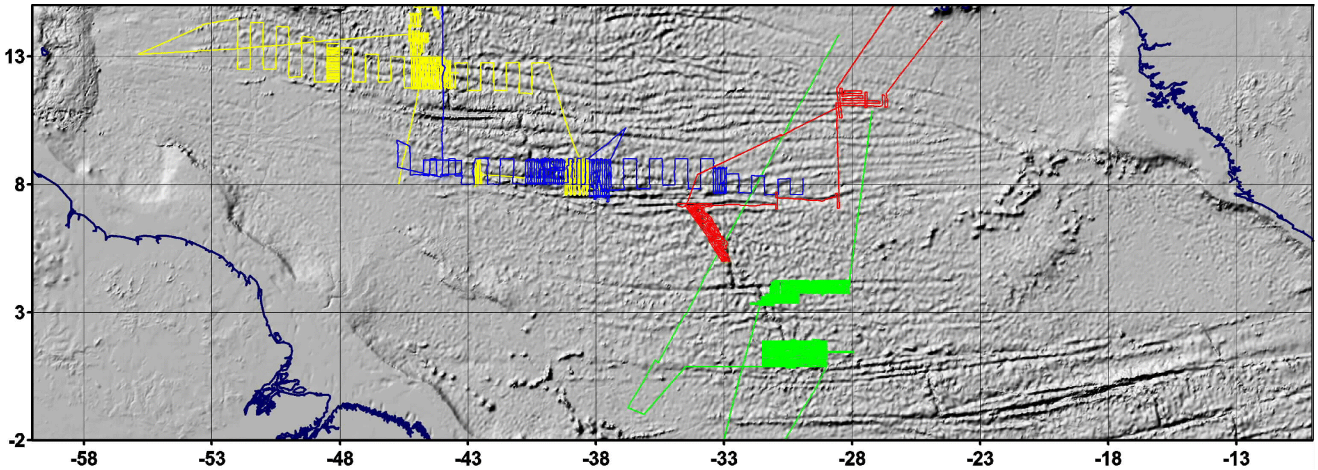

Figure 2. Study areas during Cruises 6 (shown in yellow), 9 (blue), 12 (green), and 22 (red) of the R/V "Akademik Nikolai Strakhov." The cartographic background is predicted topography [*Smith and Sandwell,* 1997].

The MAR segment between 5° and 7°18′ N was studied very poorly. All information on it was based on data obtained with outdated echosounders and navigation systems, three sites of rock sampling and satellite-borne observations.

The considerations and facts presented above led to the organization of Cruise 22 of the R/V "Akademik Nikolai Strakhov" in this segment in June, 2000 (cruise head A. A. Peyve, research supervisor Academician Yu. M. Pushcharovskii). The idea of organization of the works was formulated by A. O. Mazarovich. The seafloor bathymetric surveying was conducted with a Simrad EM12S multibeam echosounder under supervision of N. N. Turko and A. O. Mazarovich. The primary bathymetric data were treated by N. N. Turko, K. O. Dobrolyubova, and S. Yu. Sokolov (Geological Institute, Russian Academy of Sciences). The data and materials were collected with the participation of A. A. Peyve, S. G. Skolotnev, Yu. N. Reznitsyn (Geological Institute, Russian Academy of Sciences), M. Ligi, D. Penitenti, S. Carluccio, V. Ferrante, A. Blasi, and A. Cipriani (Istituto di Geologia Marina). The most valuable contribution to the successful accomplishment of the works was made by Prof. Marco Ligi, who supervised the technical conditions of the echosounder and the GPS navigation system during the Russian part of the cruise and measured the sound velocity in water.

In order to optimally cover the area, the track-lines were oriented in a northwesterly direction (Figure 2), because it was prearranged that the echosounder swaths should have ranged from 5 to 11 km. The overall length of the mapped area (Figure 4) from northwest to southeast exceeded 300 km

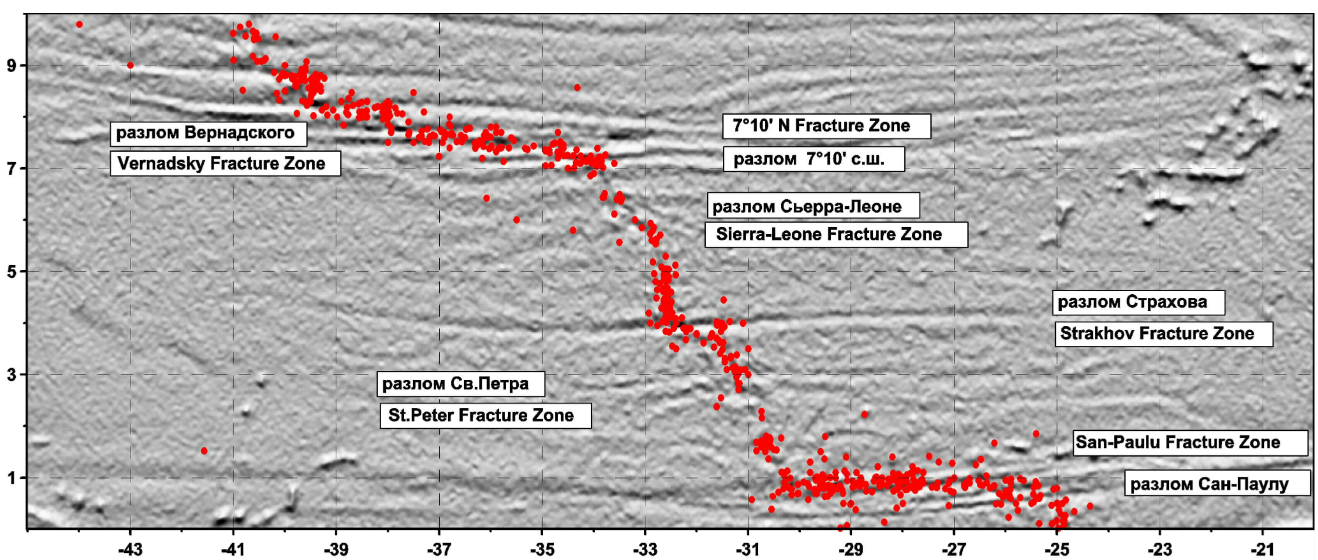

Figure 3. Distribution of earthquake epicenters [*CNSS..,* 1997] in the equatorial segment of the Mid-Atlantic Ridge. The cartographic background is predicted topography [*Smith and Sandwell,* 1997].

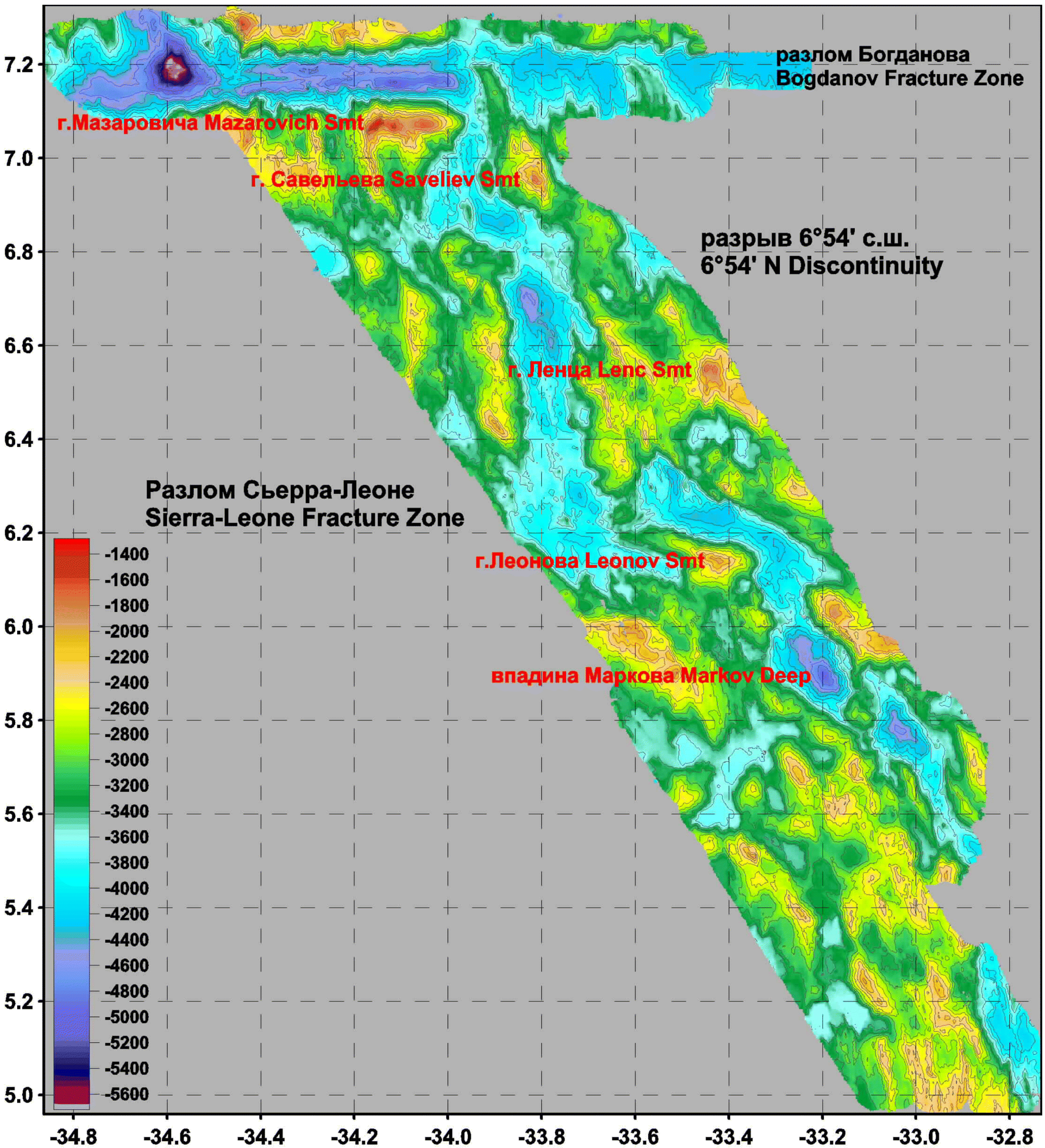

Figure 4. Bathymetric map of the area of the Sierra Leone Fracture Zone. Topographic sections are spaced 200 m apart.

and attained approximately 65 km from east to west.

Before proceeding to the analysis of the structure of the area of the Sierra Leone Fracture Zone, it is necessary to emphasize some points concerning the position of the fracture zone itself and the terminology.

On the map published in the geological–geophysical atlas of the Atlantic Ocean [*Mezhdunarodnyi...,* 1989–1990, pp. 34–35], this name is borne by a trough at 7°20′ N, south of which, at 7°N, a small nameless fault is located. At the same time, on the orographic scheme [ibid., p. 32], the Sierra Leone Fracture Zone is shown at 5°N. On a map sheet of "The General Bathymetric Chart of the Oceans" [*General...,* 1982], which is recognized as the official reference source of the position of seafloor features and their geographic names, the fracture zone runs at 6°10′ N. According to "The Dictionary of Geographical Names of Ocean Bottom Features" [*Agapova et al.,* 1993, p. 125], the Sierra Leone Fracture Zone is located in the quadrangle with coordinates 6°00′ N, 37°00′ W and 7°00′ N, 27°00′ W. Exactly the same coordinates are cited in gazetteers [*Gazetteer of undersea...,* 1997; *Gazetteer of geographical...,* 2001]. Because of this, the term of "the Sierra Leone Fracture Zone" is applied to a small-displacement feature located at approximately 6°00′ N. Below, we will return to the position of this transform feature.

We propose to name the fault at 7°10′ N for Aleksei Alekseevich Bogdanov, a prominent Soviet tectonist (see http://atlantic.tv-sign.ru/names/russian/names_r.html for details). This proposal, along with others below, were submitted to the GEBCO Subcommittee for Names and Nomenclature for approval.

Here we discuss the areas referred to in the literature in English as "ridge–transform intersection" (see, for example, [*Karson and Dick,* 1983]) and "discontinuity." However, the rift usually does not intersect a transform fault, and in the Russian literature the area is known as "the junction zone between the transform and the rift valley" [*Stroenie...,* 1991], "junctions between transform faults and rifts" [*Kaz'min and Borisova,* 1992], and "junction between rift and transform depressions" [*Agapova,* 1993]. We believe that the phrase "junction between the rift and the active portion of the transform fault" can most adequately convey the meaning. For brevity, below we will use the term "junction."

In describing a variety of anomalous zones within the axial portion of the ridge, the term "discontinuity" is used [*MacDonald et al.,* 1987]. In essence, these are areas of changes or breaks in the strikes of the rift mountains or rift valleys, i.e., their "discontinuity," and, hence, this term will be used below.

Seafloor Topography in the Rift Segment Between 5° and 7°10′ N

Multibeam mapping with 100% area coverage confirmed predicted topography evidence that a clearly pronounced rift valley lies between 5° and 7°10′ N (Figure 4) and is characterized by numerous changes in its strike, a transform fault is situated at 7°10′ N, and the segment includes a number of discontinuities.

The active portion of the Bogdanov Fracture Zone (7°10′ N, Figure 5) trends for approximately 60 km (between 34°38′ W and 33°56′ W) and is expressed as a trench 7–7.5 km wide, whose floor has depths of more than 4000 m. No sediments are present in the active part of the fracture zone. Its axis roughly coincides with a narrow "en echelon" median ridge with elevations from 150 to 200 m. In the north, the trough is bounded by a narrow ridge, whose southern slopes have angles from 20° to 45° and sometimes more (Figure 6). An isometric nodal basin in the western part of the fracture zone is characterized by a maximum depth of 5512 m. The eastern nodal basin is a roughly west-trending depression 35–40 km long, 4–10 km wide, and with a maximum depth of 5002 m. It is bounded by a steep (15° and more) slopes.

The axial MAR segment between the Bogdanov and Strakhov fracture zones (Figure 4) is subdivided into the following segments (from north to south): 6°54′–7°10′ N, 6°12′–6°54′ N, 6°12′–5°42′ N, and 5°42′–5°00′ N, which differ in topography and the strikes of their principal morphological features.

Mar Segment Between the Bogdanov Fracture Zone (7°10′ N) and the Discontinutty at 6°54′ N

The junction between the active portion of the Bogdanov Fracture Zone and the rift valley is a seafloor area (Figure 5) with pronounced high inside and outside corners, a nodal basin, a rift valley, and a fault trough.

The rift valley immediately south of the fracture zone is 3.2 km wide and extends along 33°54′ W. West of it, a high outside corner is located (Figure 4); we propose to name it Mazarovich Seamount, after the founder of the Geological Department of Moscow State University (see http://atlantic.tv-sign.ru/names/russian/names_r.html for details). The high outside corner consists of two parts: eastern, oriented roughly eastward and extending for approximately 20 km, and western, trending roughly from north to south.

The eastern part of the high outside corner is a massive seamount, whose northern face is complicated by two scarps and has a minimum depth of 1635 m. The overall topographic magnitude relative to the seafloor attains almost 3700 m. Judging from the linear configuration of the southern boundary of the high outside corner, it is of fault nature. The rest of the high outside corner is a continuous ridge trending in a general south–north direction; its orientation near the fracture zone is 45°, south of it the ridge turns 5°, still farther to the south its trend is 347°, and, finally, 325°. The minimum depth is 1307 m. The width of the ridge varies from 2500 to 3800 m. To the east of it, another spur (about 6 km wide) branches off the massive portion of the high outside corner and trends nearly parallel to the former ridge, roughly along 34°07′ W.

The isometric seamount between the ridges (at 6°57.7′ N, 34°06.8′ W) has a basement diameter of approximately

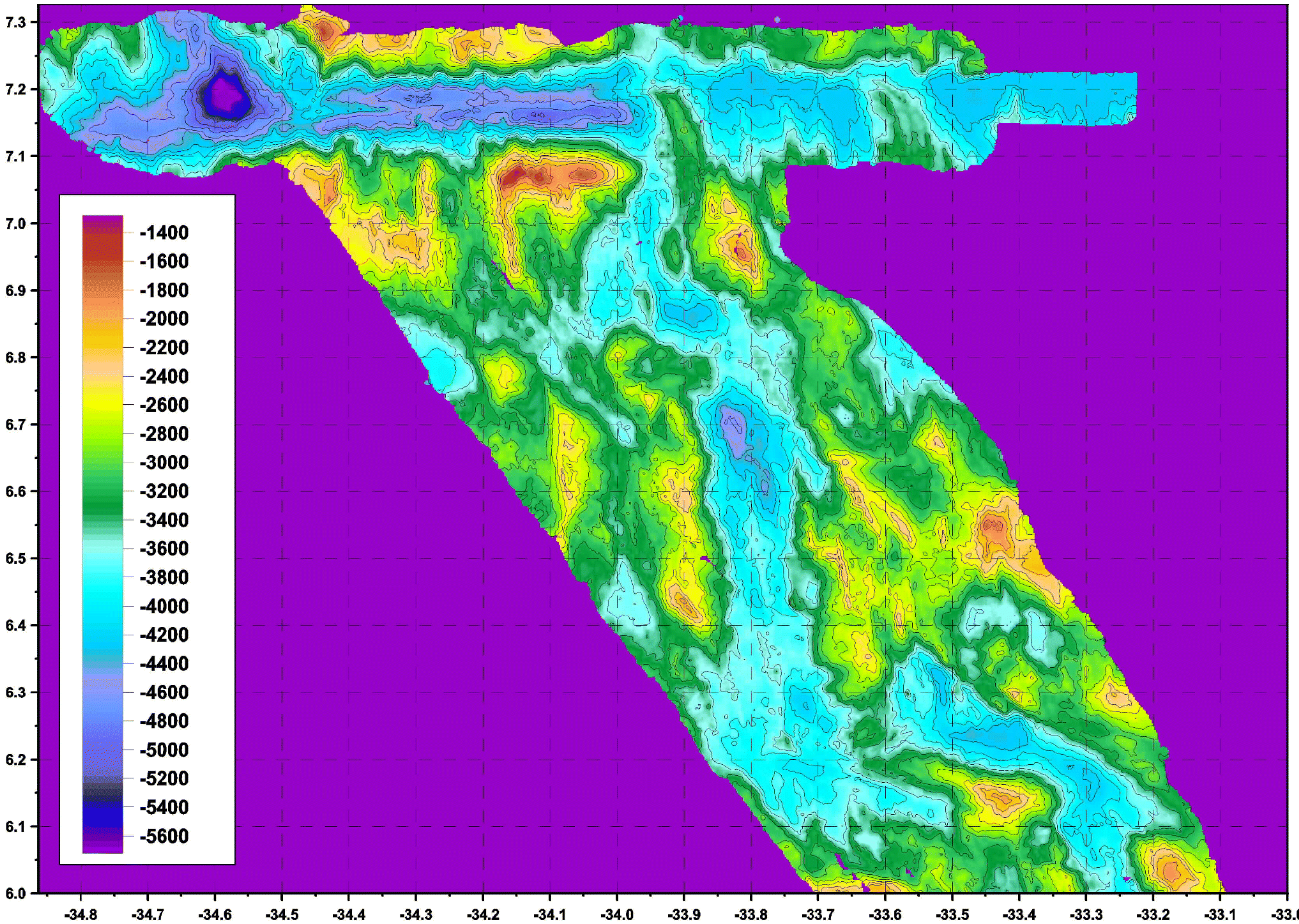

Figure 5. Bathymetric map of the northern part of the Sierra Leone Fracture Zone. Topographic sections are spaced 200 m apart.

1900 m, its top is located at a depth of 3055 m, and the depths of the basement are 3269 m in the north and 3393 m in the south. Hence, the maximum elevation of the seamount, which can be interpreted as a central volcano, is 338 m. The southern face of the high outside corner bears other edifices of the same type, a fact demonstrating the possibility of active volcanic processes outside the rift zone.

A ridge of complicated morphology runs west of the high outside corner. It is composed of a series of south–north-trending smaller ridges with minimum depths of 1793, 2074, 2179, and 2074 m, which are separated from the high outside corner by a valley about 5 km wide. The area is characterized by the presence of numerous narrow (1–2 km) ridges (Figure 7) up to 20 km long and up to 200 m high. In map view, they are oriented at different angles and have a nonlinear morphology. Conceivably, their genesis was related to intrusive processes. The ridges follow the orientation of chains of positive Bouguer anomalies (Figure 8), which intersect the rift zone from north to south and merge with an anomaly at 6°48′ N, 34°18′ W.

The sharp terminations of the ridges, their bends, and the position of individual ridges and elongated depressions make it possible to distinguish a series of northwest-trending zones, which are most probably of tectonic nature. Some of these zones are also marked by Bouguer gravity anomalies (Figure 8). Since eight of the ten transform faults [*Sokolov,* 1999] are practically not pronounced in the form of Bouguer anomalies compared to free-air gravity anomalies (a fact testifying that most of the faults are crustal structures), the correspondence of northwest-trending faults to Bouguer anomalies indicates that their depths probably exceed the crustal thickness.

The rift valley includes interrift depressions (the deepest portions of the rift) of complicated configuration and seafloor areas with numerous volcanic edifices of the central type (Figure 9). The latter are round (in map view) mounts up to 1200 m in diameter at the basement and a few dozen meters high. In places, the rift-valley floor was determined to host chains of volcanoes or long ridges, probably of extrusive genesis. The rift is separated from the nodal basins by a series of steep scarps of northeastern trends, which seem to have fault-related geneses.

Farther to the east, a high outside corner is located (Figures 4, 5). We propose to name it "Saveliev Seamount," after a geologist of the Geological Institute, Russian Academy of Sciences (see *http://atlantic.tv-sign.ru/names/russian/*

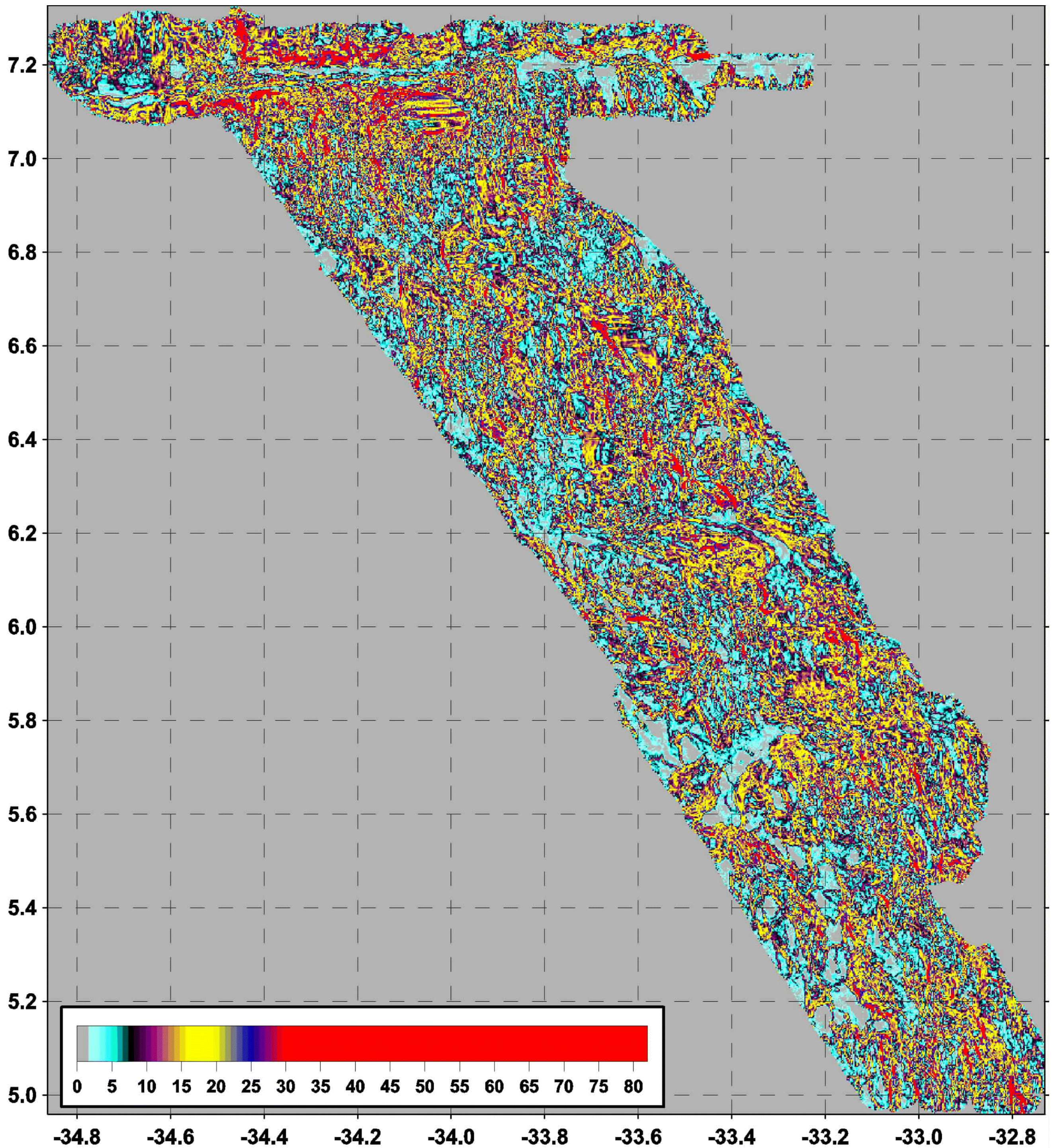

Figure 6. Map of slope angles.

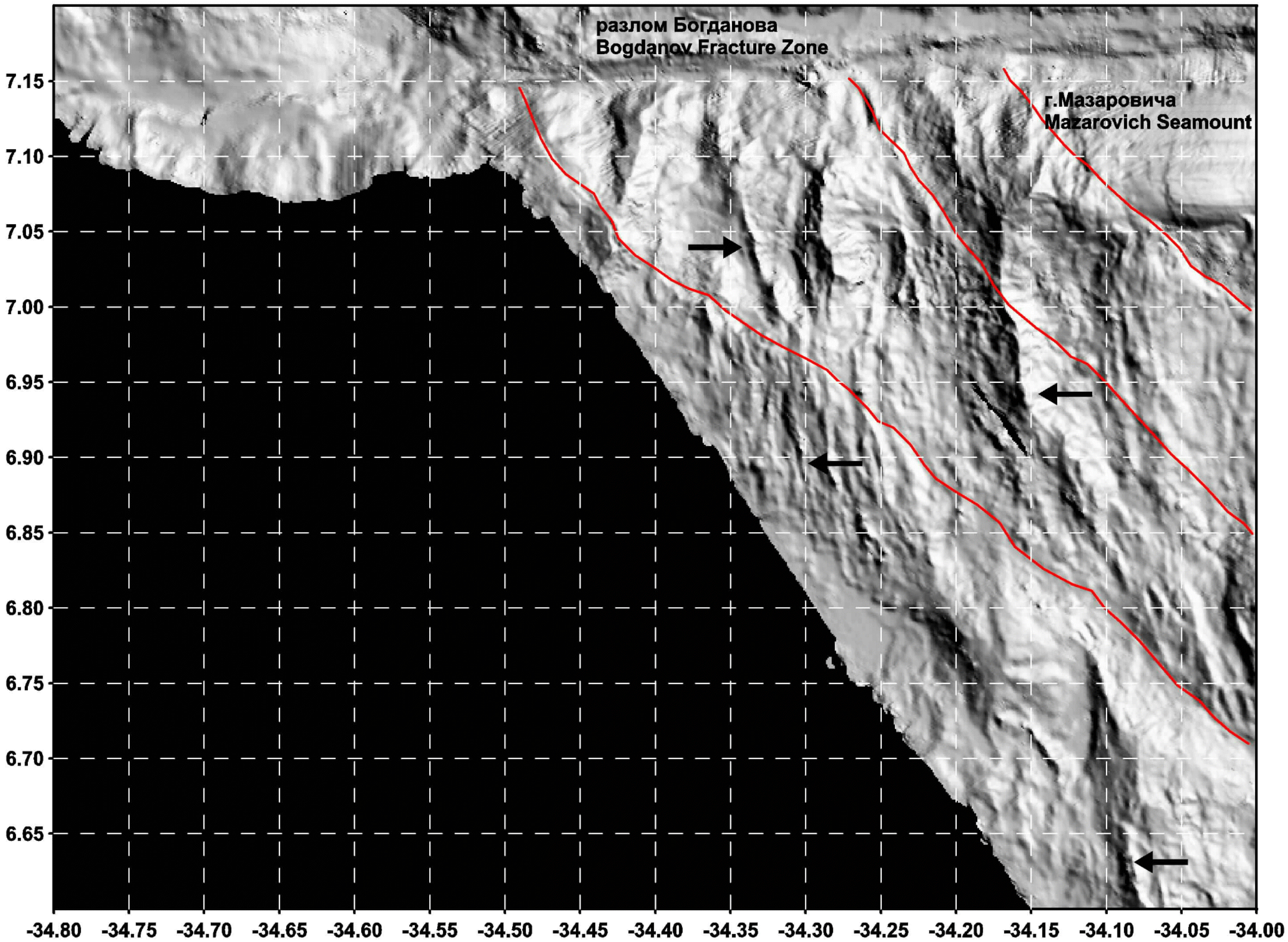

Figure 7. "Dikes" (indicated by arrows) and faults (red lines).

names_r.html for details). The mount is elongated in a general south–north direction. Its western slope is complicated with a narrow (300–800 m) valley, which branches off the main rift.

A ridge running farther to the north is 20 km long and intersects the trough of the Bogdanov Fracture Zone at 33°55′ W (Figure 9). This seafloor feature coincides with a zone of elevated seismicity (Figure 9) and Bouguer anomalies (Figure 8). The ridge comprises several central volcanoes a few dozen meters high, and its crest zone has a wall crowned with three volcanoes (perhaps, an extrusive zone). East of this area (Figure 5), there is a number of structurally similar ridges, which also turn to the west. Judging from their morphology, they are of similar genesis.

The east–west-trending depression located south of all of the aforementioned seafloor features was traced on both the eastern and western sides of the rift and serves as the boundary of this MAR segment. The depression is characterized by a complicated topography (Figures 4, 5), has walls with scarps at angles of a few degrees (Figure 6), and is mostly separated from the rift valley by north-trending elevations.

Near the intersection with the discontinuity, the rift valley changes its trend to northwestern and widens (Figure 10). Its elongation coincides with the aforementioned lineaments, which were identified southwest of the high outside corner.

Mar Segment Between 6°54′ and 6°12′ N

This part of the rift valley (Figure 10) is separated from its northern portion by a steep en-echelon slope (swell) of northwestern strike, 7–8 km wide, approximately 6.5 km long, and up to 800 m high.

The segment includes a depression 40 km long, 8–12 km wide, and up to 4800 m deep. Its deepest portion is located in the north, in the close vicinity to the swell. The depression (striking 351°) is intersected by a ridge (striking 356°) in the central and southern portions. The ridge has an average width of 1100–1800 m and elevations of 200–300 m. At 6°32′ N, the ridge widens, and a narrow spur (trending 326°) diverges from it. East of them, the deepest portion of the rift valley is located, which is expressed as a narrow trough, doubly displaced in the southeastern direction.

The eastern wall of the depression is a cliff 300–400 m high. The ridge running east of it is characterized by min-

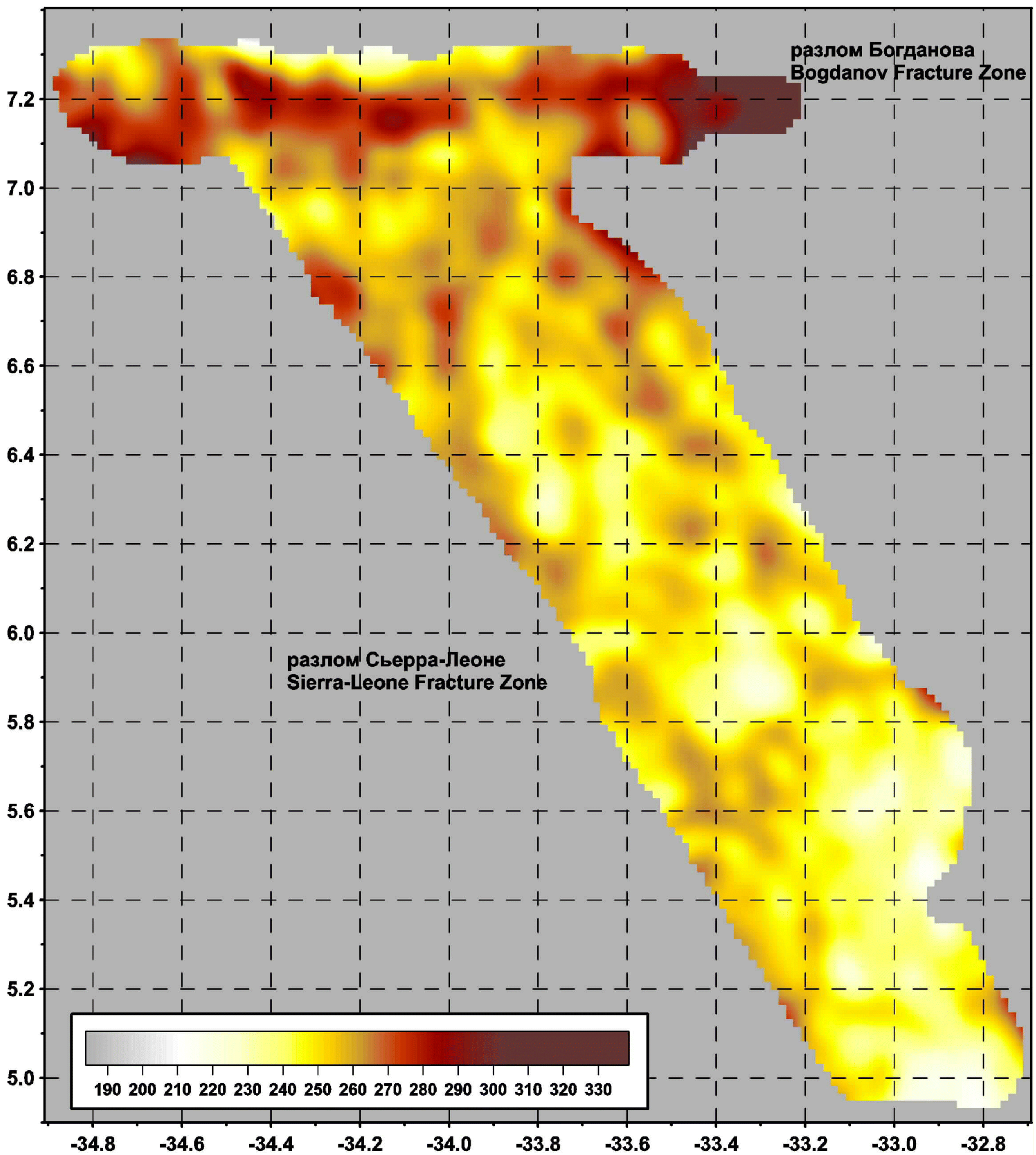

Figure 8. Gravity field (Bouguer anomaly) in the area of the Sierra Leone Fracture Zone.

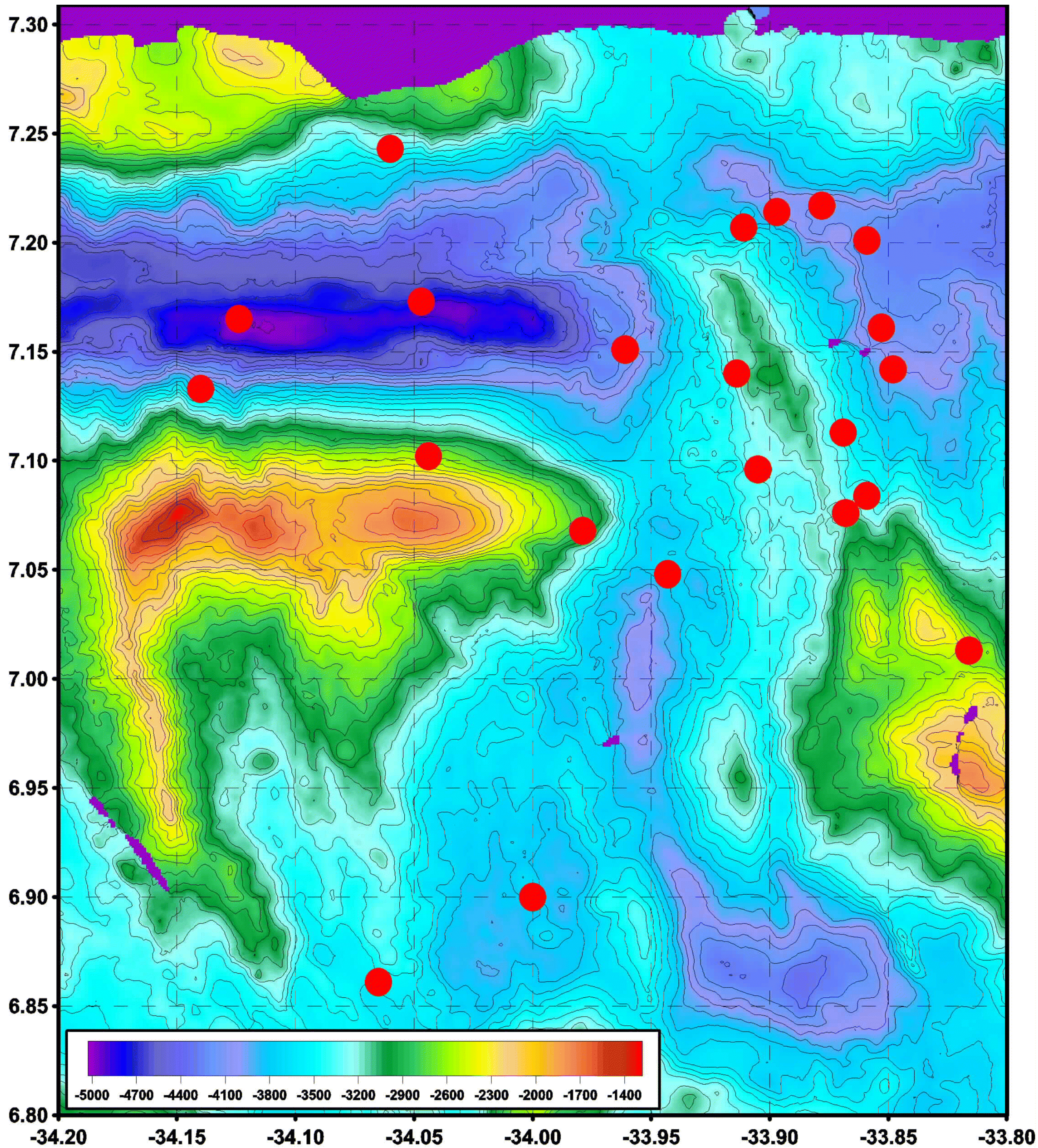

Figure 9. Bathymetric map of the junction zone between the rift valley and Bogdanov Fracture Zone. Topographic sections are spaced 50 m apart. Red dots show earthquake epicenters [*CNSS...,* 1997].

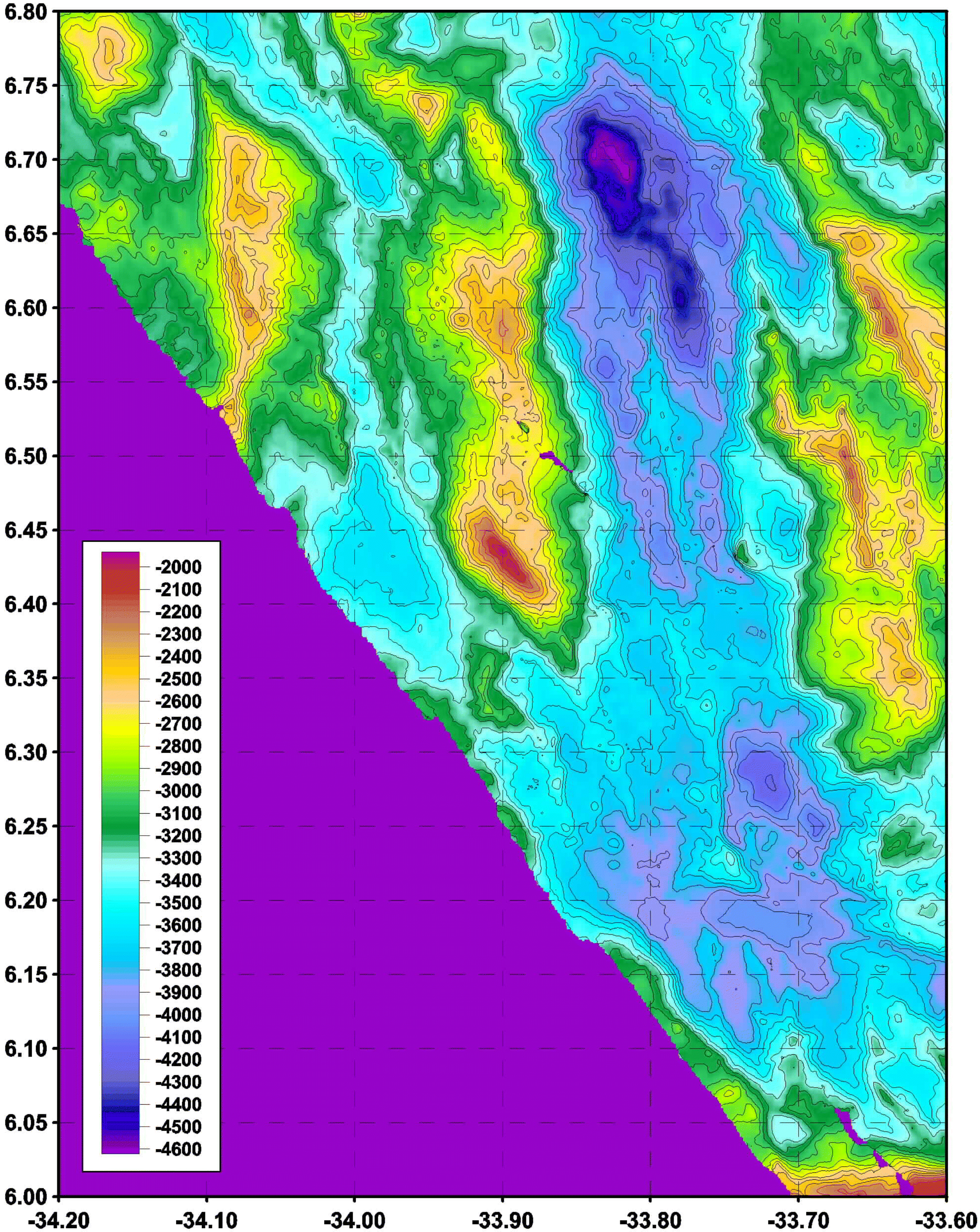

Figure 10. Bathymetric map of the central part of the Sierra Leone Fracture Zone. Topographic sections are spaced 20 m apart.

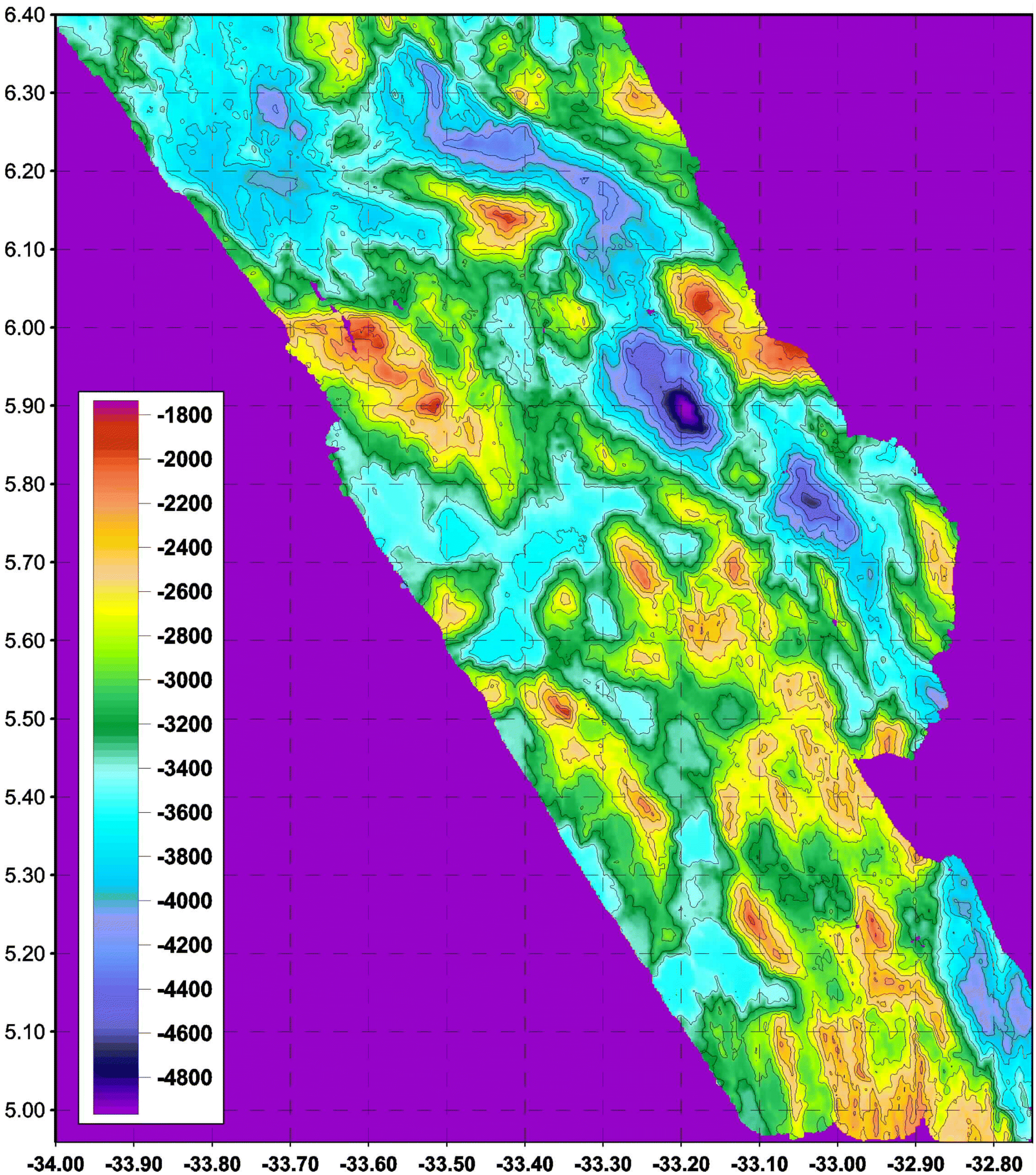

Figure 11. Bathymetric map of the southern part of the Sierra Leone Fracture Zone. Topographic sections are spaced 20 m apart.

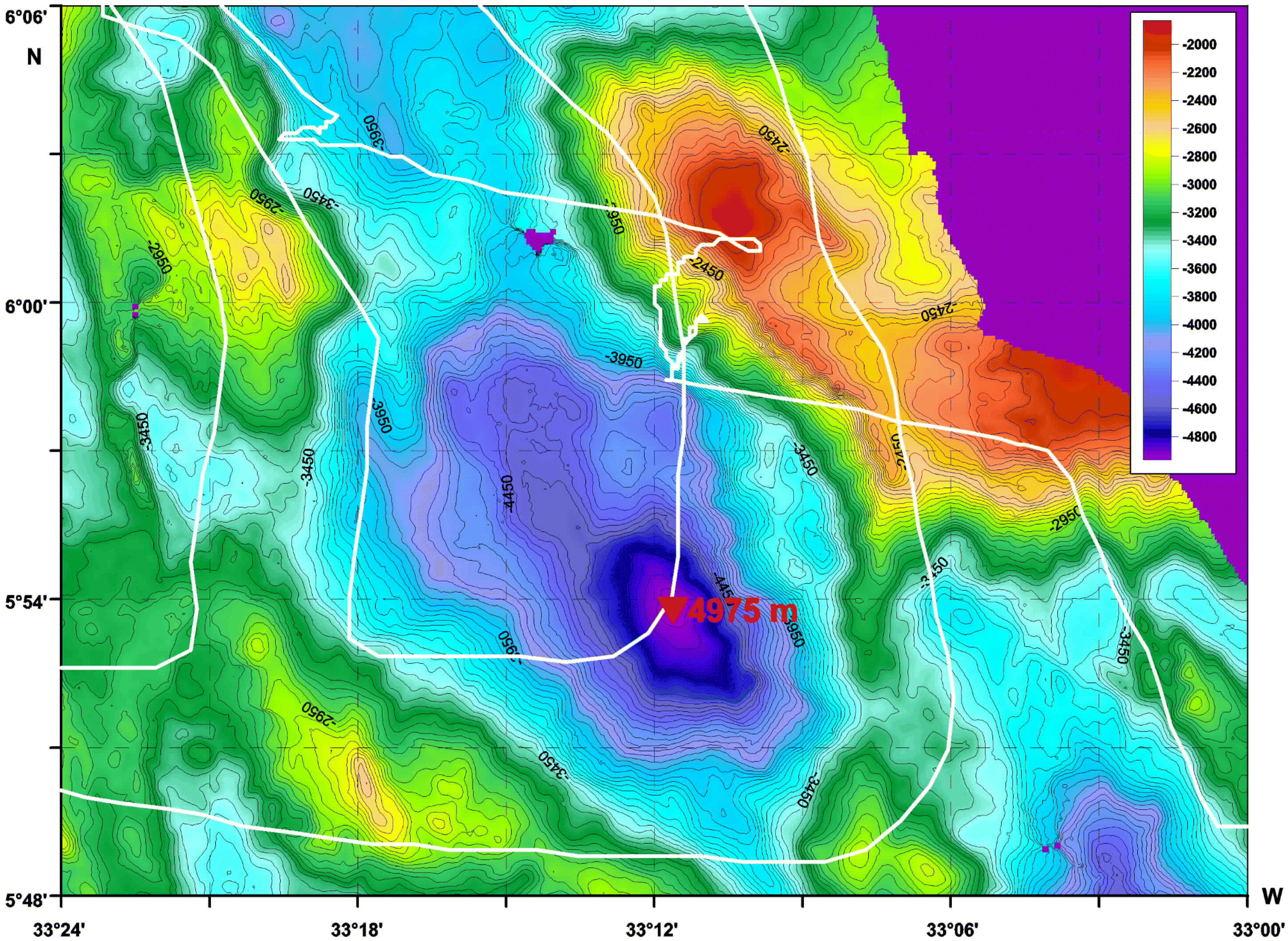

Figure 12. Bathymetric map of the Markov Deep area. Topographic sections are spaced 20 m apart.

imum depths of 2144–2300 m; at 6°32′ N it is sharply displaced for 4600 m. This suggests the existence of a fault at this latitude, which seems to have a sinistral nature, extends further eastward, and is identified based on the bends of two narrow ridges with minimum depths of 2151 and 2267 m. Farther eastward, narrow ridges (trending 350°) occur, which have steep western slopes and southern portions curved to the southwest. This structural situation is typical of dextral displacements. No faults were detected in the western wall of the rift valley.

A ridge running along 33°55′ W trends for 54 km and has a width of 9 km. Its steep eastern slope, which faces the rift valley, has a height of approximately 1200 m.

Mar Segment Between 6°12′ and 5°42′ N

This MAR segment (Figure 11) has the most complicated inner structure and coincides with the Sierra Leone Fracture Zone. The rift valley described above widens, and its trend changes from southern to southeastern. The southern portion of the valley has three branches, trending 337°, 322°, and 328°.

To the east of this area, an elevation (1500 m across and approximately 160–170 m high) and an interrift seamount (with a minimum depth of 1902 m) are situated. The local topographic magnitude attains 2448 m. The seamount is proposed to be named "Leonov Seamount," after Georgii Pavlovich Leonov, a professor of the Geological Department of Moscow State University (see http://atlantic.tv-sign.ru/names/russian/names_r.html for details).

Northeast of Leonov Seamount, a depression was mapped, which trends for 15 km and has a width of 1700–6300 m. It is characterized by steep northern and eastern walls up to 600–650 m high.

Mar Segment Between 5°42′ and 5°00′ N

South of the rift segment described above (Figure 11), an elevation 7.5 km long and 4700 m wide was identified within the rift valley. Behind it, the rift bottom rapidly deepens. The depression (Figure 12) is elongated in an

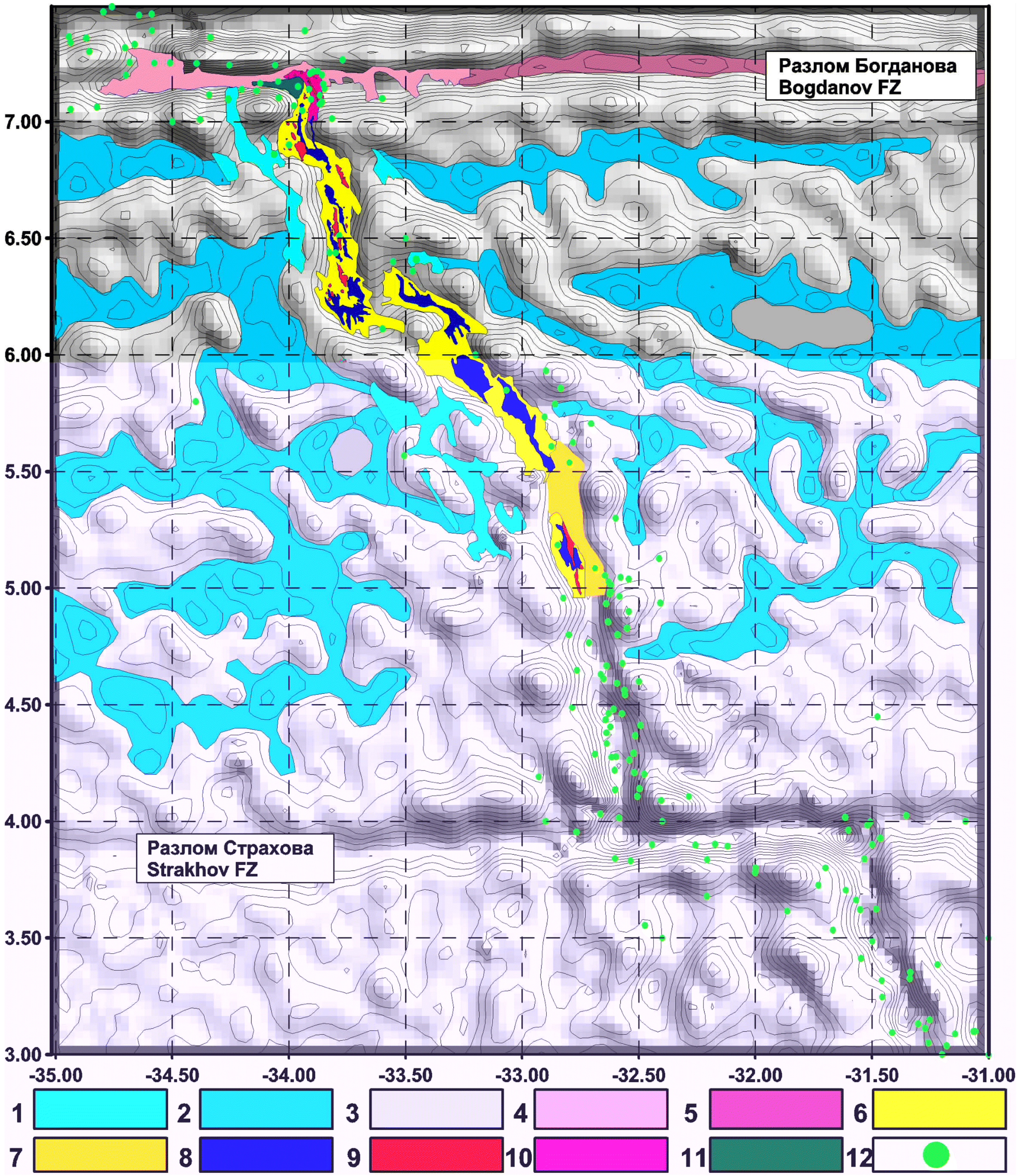

Figure 13. Tectonic scheme of the rift segment near the Sierra Leone Fracture Zone. 1–2 are seafloor depressions, according to: 1 – bathymetric survey, 2 – altimetric data; 3 – ridges and elevations; 4–5 – trough of the Bogdanov Fracture Zone, according to: 4 – athymetric survey, 5 – ltimetric data; 6–10 – rift segment: 6–7 – rift valley bottom, according to: 6 – bathymetric survey, 7 – altimetric data; 8 – interrift deeps; 9 – neovolcanic ridges and volcanic mounts; 10 – propagating neovolcanic ridge; 11 – bottom of the nodal basin; 12 – earthquake epicenters.

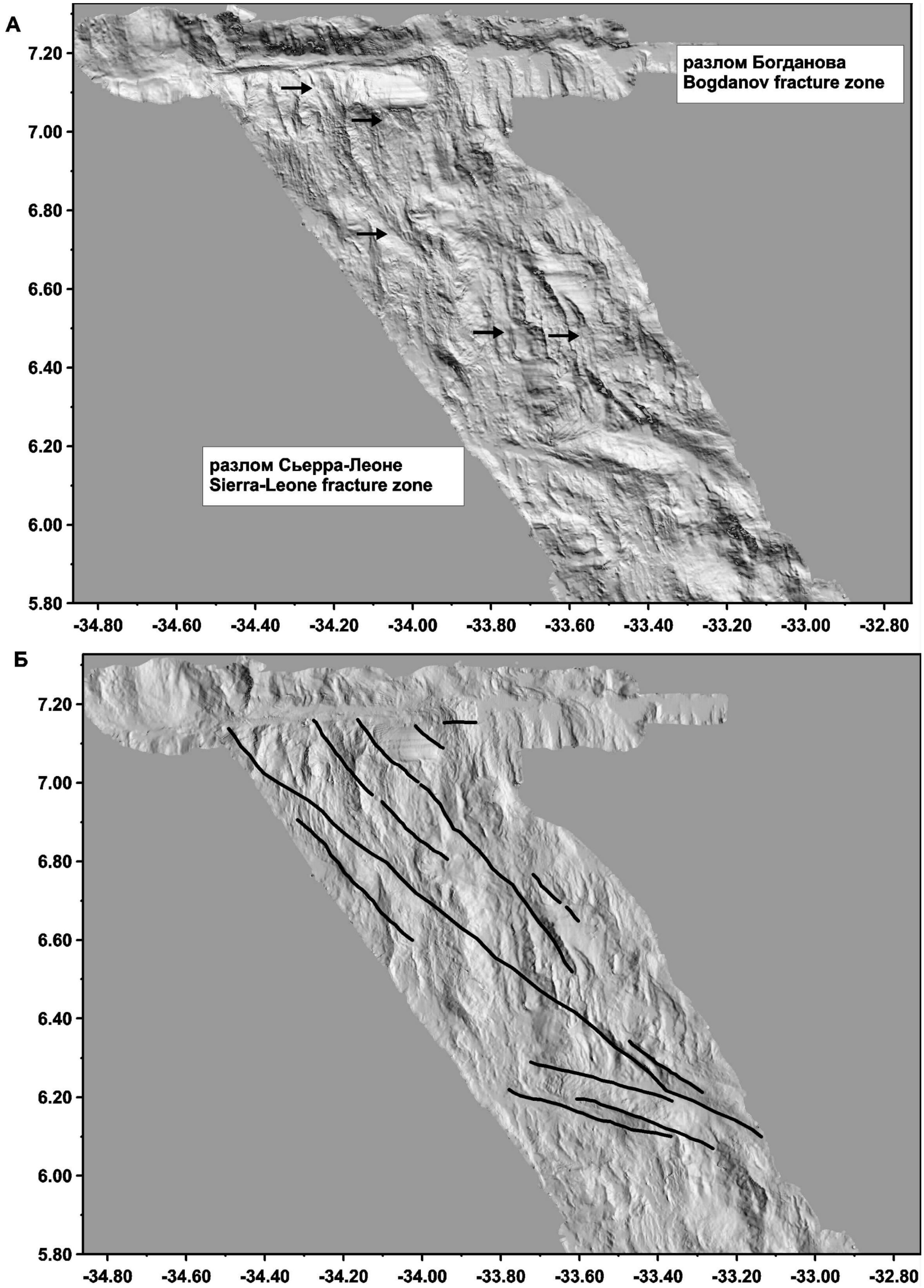

Figure 14. System of northwest-trending faults in the area of the Sierra Leone Fracture Zone. (a) Bathymetric map constructed with the use of the shaded relief technologies. Arrows show northwest-trending faults. (b) Interpretation results.

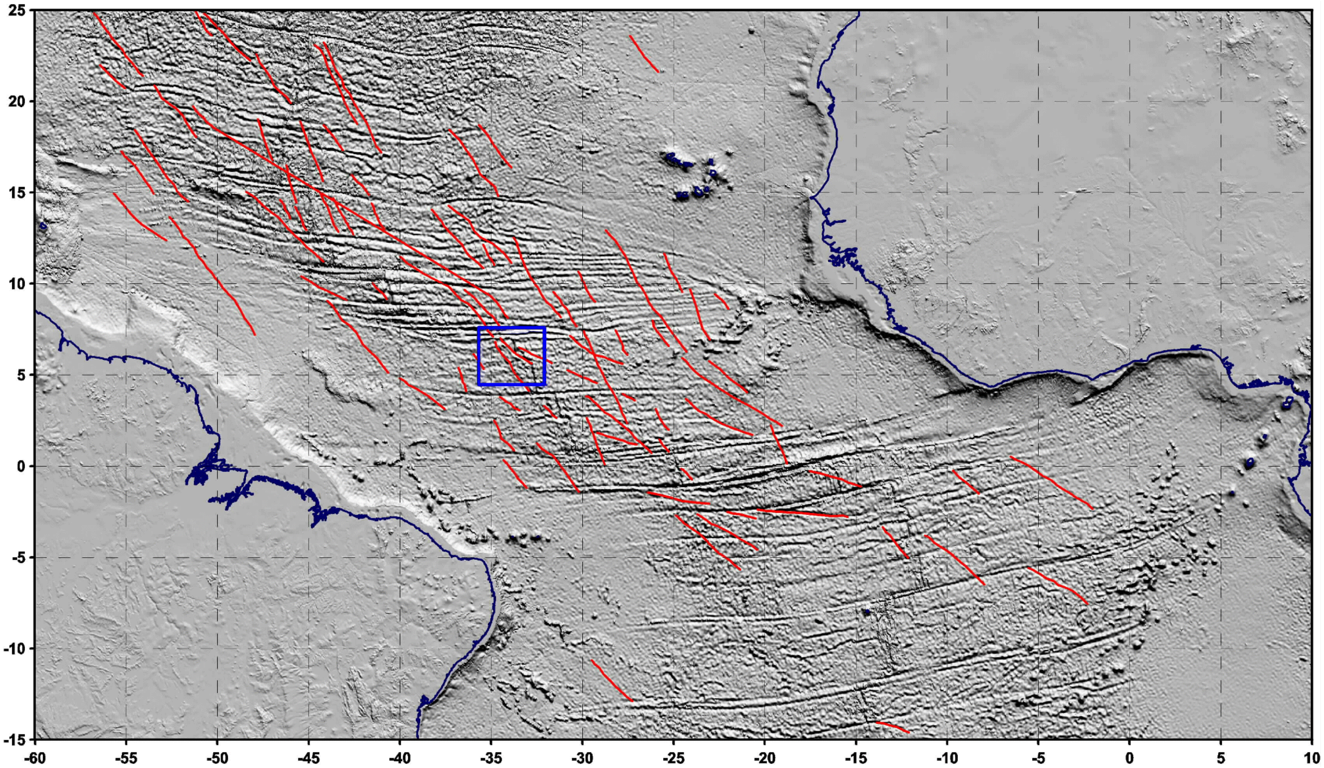

Figure 15. System of northwest-trending faults in the Central Atlantic. The cartographic background is predicted topography [*Smith and Sandwell,* 1997]. The square shows the approximate study area during Cruise 22 of the R/V "Akademik Nikolai Strakhov."

azimuth of 327° and trends for 20 km at a width varying from 8 to 11 km. It is bounded by scarps 700–800 m high. The southeastern part of the depression is characterized by anomalous depth, atypical of this MAR segment (with a maximum of 4975 m). Because of the unique character of this depression, we propose to name it the "Markov Deep," after Mark Solomonovich Markov, a renowned tectonist of the Geological Institute, Russian Academy of Sciences (see *http://atlantic.tv-sign.ru/names/russian/names_r.html* for details).

In the south, the Markov Deep is bounded by a 9 by 10.3-km swell, whose minimum depth is 2822 m. It corresponds to a positive gravity anomaly, which is commensurable with that of Leonov Seamount. The depression behind the seamount has isometric outlines and depths up to 4674 m. Southward, it grades to a narrow valley of complicated configuration, which separates two nearly parallel narrow (2–3 km) ridges with depths of 2685 and 2641 m.

The southernmost (within our study area) portion of the rift valley was mapped only partly (Figure 11). Its western portion is a depression elongated in a roughly northern direction (347°) with depths of 4000–4200 m, which is divided by ridges (perhaps of volcanic genesis, trending 343°) with a minimum depth of 3452 m.

The western segment is bounded by a mountain massif, which is composed of a series of subparallel ranges. Near 5°06′ N, they change their trend from northern to northwestern.

Discussion

The data obtained during Cruises 22 and 12 of the R/V "Akademik Nikolai Strakhov" [*Equatorial...,* 1997] indicate that the rift portion of MAR between the Strakhov and Bogdanov fracture zones consists of three major segments. Their tectonic styles and topographies should be analyzed taking into account the results of predicted topography. For these purposes, a map was constructed with the use of shaded relief technologies, which showed predicted relief contours with sections 100 m apart. This topographic background was utilized to portray digitized contours of certain seafloor features that were discovered during our researches. Taking the latter into account, we digitized the predicted relief, and all results were collated (Figure 13). For completeness, the maps also show data on the position of earthquake epicenters.

The southernmost segment is located between the Strakhov and 5°05′ N fracture zones. The rift valley trends in a general south–north direction, has a width of about 6 miles, is rectilinear in plan view, and is bounded by rift mountain ridges up to 12 miles wide, with the long ridges complicated by east–west trending saddles. The material dredged from this area contained only variably altered basalts. This segment of rift valley is marked by numerous earthquake epicenters.

The northernmost portion of the segment is partly covered by mapping. Changes in the structure of the valley begin near 5°N, where long interrift ridges appear, which can be interpreted as neovolcanic zones. The south–north trending rift mountains start to curve to the northwest near 5°N. At the same time, predicted topography results indicate that the rift valley retains its general trend up to 5°30′ N. It is also pertinent to note that the seismic activity drastically decreases.

The second segment is located between 5°30′ and 6°15′ N. The rift zone has a general strike at 320° and consists of three isolated depressions of complicated configuration, one of which is the deepest among Atlantic rifts. The western wall is composed of narrow long ridges.

The third segment is a topographically clearly pronounced rift valley with neovolcanic ridges, from which only basalts were recovered. Much strongly tectonized ultramafic rocks and gabbro were lifted from the rift walls [*Peyve,* 2000].

The rift segments north of the Sierra Leone Fracture Zone are characterized by a diverse seafloor forms (valleys, ridges, elongated mountains), trending to the northwest. The most realistic interpretation of this area seems to be a complicated tectonized zone of the same trend (Figure 14). These faults seem to be dextral strike-slip or normal faults, which are well pronounced in altimetric maps [*Sandwell and Smith,* 1997] and can be readily traced far away from the mapped area (Figure 15). Faults significantly affect the configuration of the rift valley. Furthermore, analysis of the position of this zone relative to the rift demonstrates that its westward deviation starts near this zone.

The analysis of the GEBCO bathymetric map led *Mazarovich* [1994] to hypothesize that the Central Atlantic is crossed by a fault array striking along azimuths from 310° to 330° within both the Mid-Atlantic Ridge and the abyssal basins. Altimetric data and new evidence obtained during cruises of the R/V "Akademik Nikolai Strakhov" confirm this notion. The faults intersect the rift valleys (for example, north of the Marathon Fracture Zone, between the Bogdanov and Sierra Leone fracture zones) with developing oceanic crust, as well as the active parts of the transform faults (for example, the San Paulu Fracture Zone). Where intersected by these faults, the rift valleys tend to "adapt" to their northwestern directions. The effect of the faults is perceptible even in the rift-valley floor, except the neovolcanic zones and interrift basins. Obviously, the faults developed in a stress field, which encompassed the whole Central Atlantic, and their genesis could not be directly related to the evolution of the spreading system. There seem to have been a superposition of two mechanisms: a change in the geoid's shape and the effect of variations of the Earth's inertia axes on masses on the spheroid surface, with these processes occurring simultaneously with the overall extension of the Atlantic. The superposition of distinct stress types ensured the normal-fault character of the faulting.

Another distinctive feature of the rift near the Sierra Leone Fracture Zone is its active northward propagation at a high extension velocity. This also follows from data on Bouguer anomalies (Figure 8). Hence, the local geodynamic situation is currently notably changing. It can be theorized that the "break-up" of the rift much farther northward should result in the "isolation" of the active portion of the Bogdanov Fracture Zone, with the main transformation area displaced northward, to the 7°20′ N Fracture Zone, and a significant part of the passive part becoming active.

Now, an expedition aboard the R/V "Akademic Ioffe" works in the area of the Sierra Leone Fracture Zone. Hopefully, this expedition will uncover new data on this very complicated part of the Central Atlantic.

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