NEWSLETTER

New Concepts In Global Tectonics

No. 1, December, 1996

Editors: **J. M. Dickins and D. R. Choi**

THEME AND AIMS OF THE NEWSLETTER

Geology became the science we know it today in the early part of the nineteenth century when Lyell completed a realistic geological time-scale by providing a subdivision for the Tertiary. Already great advances had been made by many workers but perhaps especially by Sedgwick and Murchison using the principles of William Smith applying relationships based on the recognition of strata from their contained fossils. At this time, Geology enjoyed great prestige but in the twentieth century Physics, perhaps now displaced by Mathematics, became the elitist science which overshadowed all others. Geology became regarded often as a second rate science.

Although enormous strides have been made in our knowledge of the earth and much has been added to Geology by Physics and Chemistry, we need to acknowledge that we are only at the beginning of tabulating and understanding what is at the surface of the earth , let alone what is underneath. In these circumstances, it is not surprising that theories on the structure and historical development of the earth have been rather conjectural, unsatisfactory and unfortunately often dogmatic.

In this context, in the 1950s and 60s the new theory of Plate Tectonics, was propounded by "Geophysicists" (Physicists) and mainly young Geologists with little experience, depth of understanding or respect for existing geology. The theory, although admittedly simplistic and with little factual basis but claiming to be all embracing was pursued by its proponents in an aggressive, intolerant, dogmatic and sometimes unfortunately an unscrupulous fashion. Most geologists with knowledge based locally or regionally were not confident in dealing with a new global theory which swept the world and was attractive in giving Geology a prestige not equalled since the nineteenth century.

The ideological influence and strength of the Plate Tectonic Theory has swept aside much well-based data as though it never existed, inhibited many fields of investigation and resulted in the suppression or manipulation of data which does not fit the theory. In the course of time the method has become narrow, monotonous and dull: a catechism repeated too often. As new data has arisen there is a growing scepticism about the theory. Most recently for example, the theory has failed to explain the nature of major earthquakes and their tectonic relationships.

Despite the claim of undisputed and universal validity, many individuals, groups and publications have examined alternative explanations. This Newsletter arises from the discussions following a symposium at the 30th International Geological Congress in Beijing in August, 1996, Alternative Theories to Plate Tectonics. A report on this Symposium is contained in the Newsletter.

The theme New Concepts in Global Tectonics is taken from an earlier Symposium held in association with the 28th International Geological Congress in Washington, D.C. in 1989. The proceedings of this symposium have been published (see later in the Newsletter).

Contents

Aims of the Newsletter include:

1. Forming an organizational focus for creative ideas not fitting readily within the scope of Plate Tectonics.

2. Forming the basis for the reproduction and publication of such work., especially where there has been censorship or discrimination.

3. Forum for discussion on such ideas and work which has been inhibited in existing channels. This should cover a very wide scope from such aspects as the effect of the rotation of the earth and planetary and galactic effects, major theories of development of the earth, lineaments, interpretation of earthquake data, major times of tectonic and biological change and so on.

4. Organization of symposia, meetings and conferences.

5. Tabulation and support in case of censorship, discrimination and victimization.

Report on the "Theories other than plate tectonics" session at the 30th IGC, Beijing, August, 1996

by J.M. Dickins, co-convenor

This session's organizers were gratified by more than seventy abstracts which were received for the symposium. This was a reflection clearly of the demand for such sessions but caused some difficulties in obtaining sufficient time for the symposium at the Congress. In the event ten papers were given and other presentations took place in the poster session. Both the oral and poster sessions caused great interest and at one stage in the oral session there was standing room only.

Areas covered in the abstracts, the presentations and the review included planetary and galactic effects on the earth, fractal analysis, geoid change, effects of rotation and spiral motion, polar wander, lineaments and polygonal structures, expansion and contraction of the earth, the pulsating earth, vertical movements, surge tectonics, plumes and evidence against subduction and sea floor spreading.

The following oral papers were delivered including:

Ma Zongjin: On strip tectonics

J.M. Dickins: Summary of contributions and review of alternative theories

D.R. Choi: Major structural elements in the Pacific Ocean

Den Jinfu: Three layer crust-mantle dynamics system of the China continent

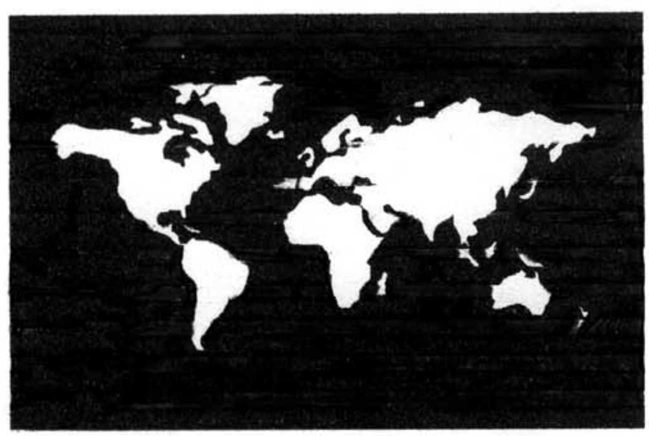
P.M. James: Tectonics of major geoid changes

Li Yangjian: Continental layer controlled tectonics

Y. Suzuki: Tectogenesis of the northwest pacific and surrounding island arcs

N.P. Romanovsky and L.A. Maslov: On the deep roots of the ore-magmatic systems of the Pacific Tectonic Belt

G.F. Makarenko: Geosyncline tsunami-wave instead of fixism and mobilism



The challenge of a cultural renaissance and the need for continual renewal

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We are at the end of the century and in the midst of a period of rapid change and transformation. The impact of this upon our view of reality, our sense of values, and our perception of facts is likely to be profound. It is increasingly clear that our theoretical frameworks are becoming inadequate to penetrate the laws of nature very much deeper. However, a new understanding is emerging of the relationship between humanity and the natural world that surrounds us.

In the field of industrial production it is clear that new products must continually innovate in order to keep up with the times. The pace of creative research and development must constantly be forced in order to produce technological novelty, for obsolescence and closure await the less innovative enterprises. Thus the life cycles of products become ever shorter. Take, for example, the automotive industry, which is forever changing the styles and motors of cars, or the personal computer industry, which has been changing at such a pace that the models of five years ago are now hopelessly obsolescent. In short, the world economy has become so competitive that it has become crucially dependent on its own capacity to innovate.

In cultural terms, how have the geosciences been reacting to the challenge thrown down by deteriorating environmental quality?

The Static Vision of Traditional Geology

In a world of incessant transformation, we geologists are still clinging tenaciously to old fashioned ideas that were current a quarter of a century ago. Such ideas have acquired the status of dogma even when they are supported by the most unstable of logical foundations. The diversity of ideas that once existed in the earth sciences disappeared with the mass acceptance of the theory of plate tectonics. This oversimplified and over-schematic scheme, which was intended to explain the dynamism of the earth, has quite simply become a dogma that has distorted scientific thought over recent decades. A clear sign of this is the fact that it has been defended using false assertions, misconceptions, misunderstandings and reasonings that are decidedly fragile. The standard textbooks have helped to promulgate it as dogma. Established opinions and assumptions have been considered more important than the renewed induction of observations derived from fact. Moreover, in discussions the possible alternative viewpoints have been completely ignored. Official Science disregards their very existence, and neither does it seriously tackle the contradictions inherent in the conventional model. Thus does the dogma strengthen and take root in us. After 25 years global geology appears still to be hopelessly attached to the myths of plate tectonics.

There has so far been no critical examination of the historical and cultural aspects of the theory and how they relate to the real problems posed by our planet. There has instead been a lack of understanding of the complexity and historical depth of geological phenomena. The model needs to be redefined continually in order to take account of the impact of new observations from the real world, but this has not happened. There has been no process of innovation and of creative synergy among the various new conceptual hypotheses. The model has not evolved dynamically as it should have done and has thus not improved in quality. The manipulation of facts has prevailed over the search for their true significance, and thus the geological establishment has preferred myopically to rest on its laurels by endlessly regurgitating results that confirm the dominant approach. In short, there has been a persistent resistance to all forms of change in as much as the model has been assumed a priori to be the end product of scientific rationality.

How can one possibly attempt to solve the world's very serious environmental problems using a global model that has become old fashioned, that was conceived 25 years ago when relatively little was known about the oceanic areas of the globe?

If I may make a comparison which I believe to be relevant, that what could happen to the earth sciences in the future is similar to that which once occurred to American economic doctrine, which was knocked sideways by the "Japanese miracle". The discovery that Japanese industry could take off and thrive in the face of prevailing theories and apparent good sense was indeed a shock to the world's largest economy. Similarly, one fine day it will become apparent that geological reality functions in a very different way to that which is specified by the standard models of the old culture, which in the long term is bound to be counter-productive.

Profound Cultural Changes

Goethe wrote that "Hypotheses are scaffolds which must be erected before constructing the building and dismantled when it is finished: they are indispensable to the work, but must not be mistaken for the building itself." Why does the frame of reference of the geosciences still consist of the same scaffolding that was erected many years ago? Why must we continue to view the world in such an artificial manner instead of approaching reality in a liberal, open and unbiased spirit? Why can we not maintain the liveliness of our creativity instead of retreating inside the shell of conceptual systems that are both rigid and static?

In my opinion, it is time to begin a period of mature reflection which will enable us to recast the foundations of the geosciences. In order to do this it is necessary to come out of the straitjacket of conventional theories and try to observe reality in a more dispassionate manner. It is, moreover, necessary to re-analyze without prejudice the various theories that have been proposed in recent years but so far largely ignored.

An Alternative View of the Earth

The sheer variety of situations to be compared with the conventional theoretical model has begun to wear down the enthusiasm of even the greatest proponents of the theory. Take the Mediterranean geologists. Every year there is talk of the Benioff plane, but when seismic profiling is used to look for it no trace can be found.

Reflection seismic profiling and drag sampling have given sustenance to the idea that parts of the oceans are formed of sunken and 'oceanized' pieces of continental crust. In fact, an extensive part of the northwest Pacific basin was interpreted in 1987 by D. R. Choi as a product of the collapse of ancient continental masses. It has always been said that there is a substantial rheological difference between oceanic and continental crust, yet on the basis of seismic profiles and DSDP wells in a publication of 1988, I was able to demonstrate and document the existence of the 'Indoysian fold belt', a young Apennine-style fold chain that extends for 2500 km under the equatorial Indian Ocean.

Published seismic lines clearly demonstrate that part of the so-called oceanic crust of the central Atlantic Ocean is composed of accretionary prisms which are not dissimilar to those that are present in island arc systems. On this basis in 1992, I proposed in a special issue of *Terra Nova* that "the ocean basins were not created by expansional sea-floor spreading, but were in reality caused by the juxtaposition of many small oceans of diverse ages formed in systems of contractional arcs."

We may continue the debate in other fields. For example, geochemical dogma has always indicated that the Earth's crust has grown. However, various planetary and terrestrial data induce one to believe instead that a massive recycling of continental crust has occurred, as R. L. Armstrong originally suggested.

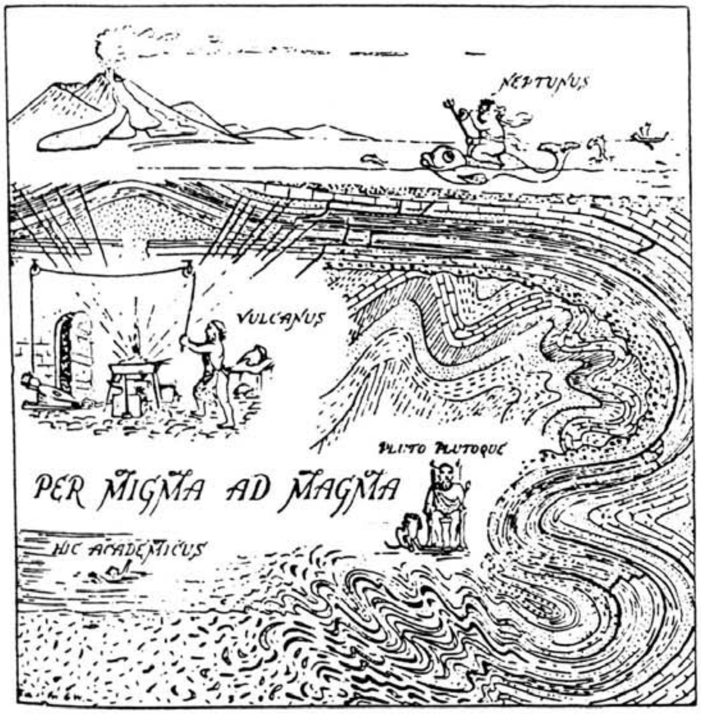
It appears that the continents have deeper roots than theory would predict. Seismic velocity data show that the roots of the stable continental shields extend up to 400 km into the interior of the mantle. If continental structures can extend so deeply into the earth, this places severe restrictions on continental drift. Clearly, deep roots would tend to inhibit the movement of the continental plates.

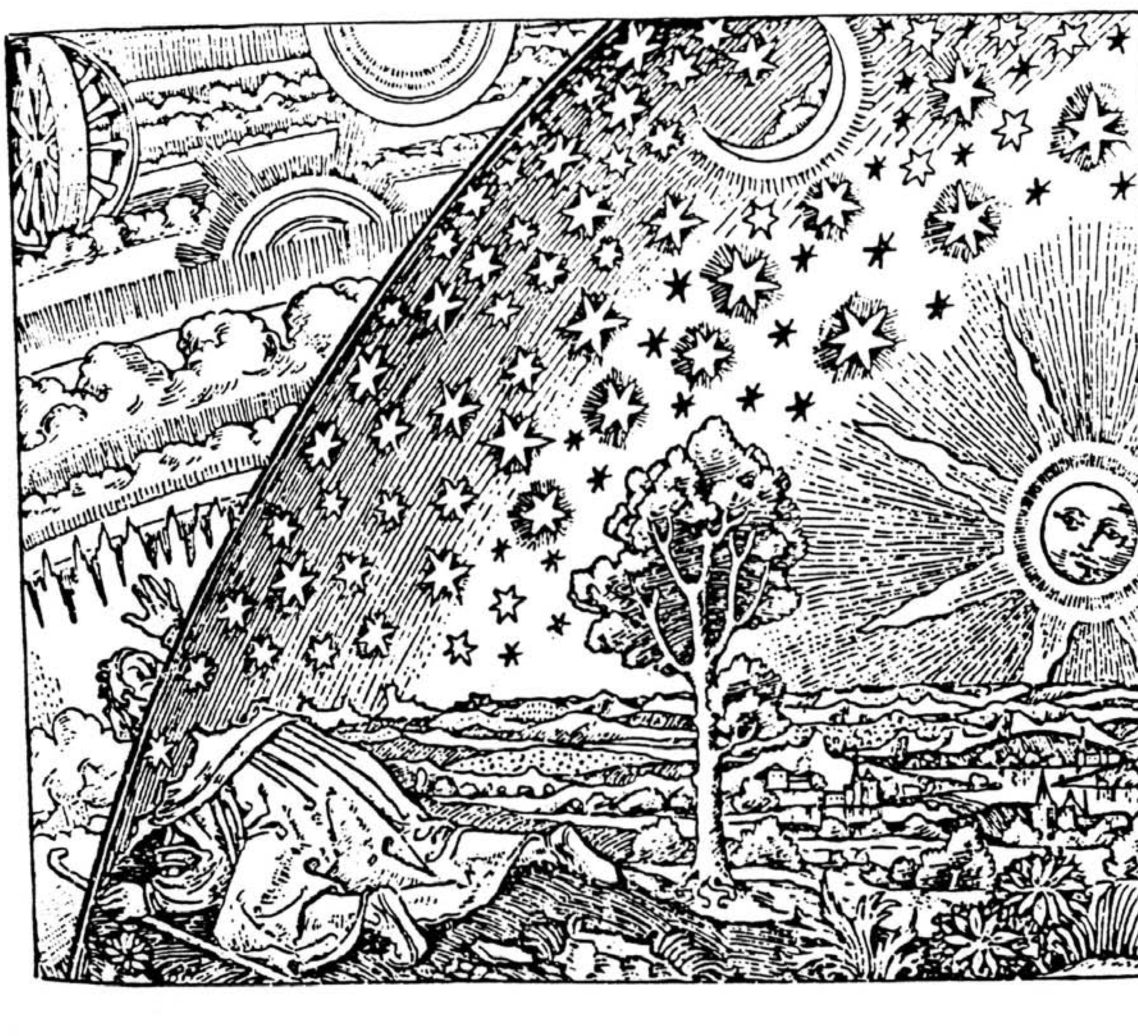
Normal geological and environmental events, such as regressions and transgressions and volcanic activity, are better able to explain the anomalous enrichment of iridium that is present at the K/T boundary than is the hypothesized and well-publicized fall of an extraterrestrial object to earth. Such exoticism seems better suited to the context of a Greek tragedy than to a real geological scenario.

In fact, the geological record is not a casual combination of events, rock types and facies, as the upholders of the traditional model would have it. Instead, there is a logic which must be learned little by little during years of painstaking study in the field. It is understandable that failure to appreciate this quasi-deterministic logic would lead one to prefer an asteroid as the easy way out, but it would be better to seek more expert opinion before broadcasting such a theory about.

The fundamental problems are cultural more than they are geological. A global model of the earth system can only stem from a bottom-up approach based on free dialogue and synergy between diverse levels of reasoning and points of view based on various types of experience. Like a delicate plant, the growth of such a model requires years of patient nurture and transplanting. It is not sufficient merely to make a theoretical model at one's office desk and impose it, top-down, upon reality.

I believe that the time has come to make a strong effort to renew our sense of constructive creativity in the geosciences. Otherwise we will not be able to face up to the challenge of renewing our discipline.





Report from Japan

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1. Process of Acceptance of Plate Tectonics

Japanese geoscientists have contributed little to the foundation of the plate tectonics, except for the presentation of the fundamental data of seismicity, and most of them had not seriously considered it before 1970s.

In 1970s, many geologists in the Geological Society of Japan and the Association for the Geological Collaboration in Japan seemed to take interest in the plate tectonics, assuming a critical attitude to it, judging from the titles of symposia in the annual meeting and publication. *The Earth Science*, a bimonthly journal of the association published a special issue titled 'Problems on the plate tectonics viewed from the structural geology of the Japanese islands'.

Judging from the fact that the Geological Society had the symposium on the evolution of the plate tectonics in 1984, and that the Association for the Geological Collaboration had a symposium on the Jurassic accretion and Cretaceous igneous activity in 1987, we can say that the plate tectonics was premised on the discussion, and most geologists adopted it without due consideration at this stage.

Many books on the plate tectonics has been published, and interpretations of destructive earthquakes and volcanic activities based on the tectonics have been shown on newspapers, televisions, weekly magazines and others. It has been taught in primary and high schools without any comment under the directions of the government, so it is now common knowledge not only for the mass population, but for most geoscientists. We have moved against such a state, organizing the group for study and research, and have obtained some results.

2. Communicated Study and Research Association for the Study of Structural Geology

Association for the Study of Structural Geology

The Association for the study of structural geology was organized to advance the structural geology and geotectonics in Japan, actively cultivating the borders among geology, geophysics and geochemistry under the leadership of Fujita in 1966. The number of members has increased from 20 or so to about 500. It has a general meeting twice a year.

Its activity resulted in the publication of 'Formation of the Japanese islands' by Fujita in 1972, 'Invitation to geology' by Fujita in 1975, 'Seismic activity in the Japanese islands' by Suzuki in 1975 and 'Evolution of the earth - Expanding earth' by Gorai in 1978. Those authors were against the plate tectonics, based on their own background of geological study of the Japanese islands and their neighbourhood.

Fujita and his collaborators (The Research Group for the Study of Green Tuff Disturbance, 1970) analyzed the process of the generation of Green Tuff orogenic movement at early Miocene in age and showed that it began by the upheaval and collapse of the basement, followed by the subsidence and deposition of talus-like deposits, and then volcanic activity and sedimentation (Fig. 1). They insisted that the movement must go on under the endogenous process of its own lower crust or upper mantle, based on the analyses of deformation and faults, and demonstrated it by the centrifuged analogue experiment using sands (Komuro et al., 1977). They emphasized that the process could not be explained by the external push or pull action.

Fujita (1990) published the revised edition entitled 'Formation of the Japanese islands-Circum-Pacific orogeny' in which the plate tectonics was criticized. Suzuki (1975) examined the seismicity in relation to the geologic structure of the Japanese islands and showed that the seismic activity went on in the periphery of the blocks, so each block spread its root vertically into the mantle. He insisted that the geological control of seismicity was applicable not only to the shallow earthquakes but also to the deep ones, so the subduction process along the deep earthquake zone was impossible under the Japanese islands. Suzuki (1985) published the revised edition of 'Seismic activity of the

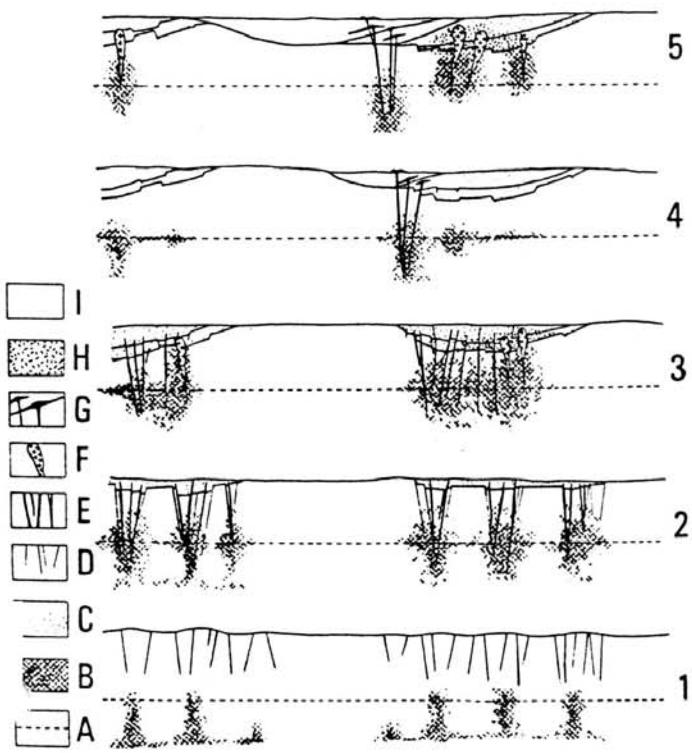

Fig. 1 Scheme pf formative process of the Green Tuff geosyncline (Fujita 1972)
1: Generation of uplift and rupture, 2: Formation of collapse basin and beginning of the first igneous activity (basic & acidic volcanism), 3: Generation of depression, development of the first igenous activity and secondary acidic igneouos activity and partial metamorphism, 4: Migration of sedimentary basin (Shogi-daoshi structure). and terrigenous sedminetation and secondary basic volcanism (Sheet or lacoloth dolerite or gabbro), 5: Progress of migration of basin and secondary basic or acidic igneous activities. A: Mohoroviciv's discontinuity, B: Fluctuate part by heat and material of asthenolith of mantle, C; Pyroclastic member (Green tuff or propylite), D: Fault, E: Volcanic rocks, F: Acidic volcano-plutonic rocks, G: Dolerite sheet or neck, H: Altered part, I: Terrigenous sediments.

Japanese islands', in which a new model explaining the deep earthquake zone was proposed. Showing the wide extent of crustal movement accompanying intense igneous activity in East Asia including the Japanese islands since Mesozoic, Gorai insisted that the subduction process could not explain the movement and proposed the expanding process of the earth.

Earth Seminar

Most of the members of the Association for the Study of Structural Geology had given their approval to the plate tectonics and their geological study seemed to apply the tectonics to the explanation of the geologic structure and geologic development. Some members organized the Earth Seminar to study the tectonic concepts other than the plate tectonics, led by Fujita in 1989. It has 20 members. They read papers by V. V. Beloussov, A. A. Meyerhoff and others in turn and published 'A search for the new tectonic concepts of the earth' in 1993 (Fujita et al.), which introduced various geotectonic hypotheses including the plate tectonics.

Tectonic Colloquium

Some members who could not agree with the state of the Association for the Study of Structural Geology, organized the Tectonic Colloquium under the leadership of Fujita, Suzuki, Kodama, and Tsunoda in 1991. Since then it has had a general meeting twice a year. They pay regard to the field geology and the geophysical study in relation to the geology. It has 55 members composed of geologists and some geophysicists. Most of the Japanese geologists attending the session of the tectonic concepts other than plate tectonics at the 30th IGC were the members of the colloquium.

Neotectonic Research Group

The triangulation stations and levelling bench marks are set closely in the Japanese islands, and triangulation and levelling surveys have been executed every several tens years since 1900 or so. The Neotectonic Research Group was organized under the leadership of Suzuki in 1985 and has studied the geodetic crustal movement in relation to seismicity. The group has about 10 members. The result was published as 'A study on the geodetic crustal movement in Central Honshu, Japan' by Iikawa in 1991. The levelling surveys showed that the mountains upheaved and the plains subsided even for several tens years, and the block-like movement was discriminated in the levelling data. The study clarified the strength of the crust to be 10^{-5}, based on the triangulation where the destructive earthquakes occurred. He showed that the radial distribution pattern of main strain axes in many areas contradicted the plate tectonics.

'Block tectonics in view of seismicity in the Japanese islands' by Kobayashi et al. and 'Block tectonics in view of geodetic earth movement in the Japanese islands' by Iikawa et al. were presented at the poster session at the 30th IGC this year.

Personal Contributions

Isolated from those groups, Matsumoto, Minato, Hoshino and Hunahashi contributed to the global tectonics other than the plate tectonics. Matsumoto (1975) reviewed the tectonic movement in the circum-Pacific region in Phanerozoic era, and proposed the movement of whole mantle. Minato et al. (1978) published 'Abean orogeny', in which they described upper Paleozoic orogeny in Northeast Japan and explained it by the endogenous process under the orogenic belt. Hoshino (1991) issued 'Basaltic age-critical review of some geological categories' in which he advocated his eustasy hypothesis to explain the submarine topography and geology, and geology and sedimentation process of Neogene and Quaternary basins. Hunahashi (1995) published 'Formation of the earth, its geological development' in which he criticized the plate tectonics.

3. Critical Study and Its Result

Mechanism of Folding

The Green Tuff orogeny has proceeded along the Japanese islands since early Miocene and a folding zone has been formed along the Japan Sea, in which some folds are still in progress. Based on the morphological, kinematic and stress analyses of those folds, Suzuki et al. (1971) showed that the folds are the surficial expression of vertical movements of the basement blocks. Triangulation in the active folding region does not exhibit horizontal shortening but expansion in the direction crossing the folding axes, so the folds cannot be the result of buckling (Iikawa and Suzuki, 1977).

Kodama et al. (1985) proposed the virtual basement displacement (VBD) method simulating the geologic development by computer in order to draw the three dimensional figures of geologic structure and analyze the stress and strain state at each tectonic stage. They applied the method to Niigata oil and gas field in the Green Tuff region and showed the more complex folds in the deep on the block-like basements.

The Neogene and Quaternary formations in the South Kanto area, Central Honshu are characterized by brachy folds in east-west direction. Mitsunashi et al. (1990) applied the VBD method to those folds and indicated the surficial folding on the block-like basement (Fig. 2).

The Fossa Magna region crossing the central Honshu was affected by the Green Tuff orogeny and characterized by thick sediments and intense folding. Studying the folds in Northern Fossa Magna region, Yano (1976) attributed their mechanism to bending due to the upheaval of the

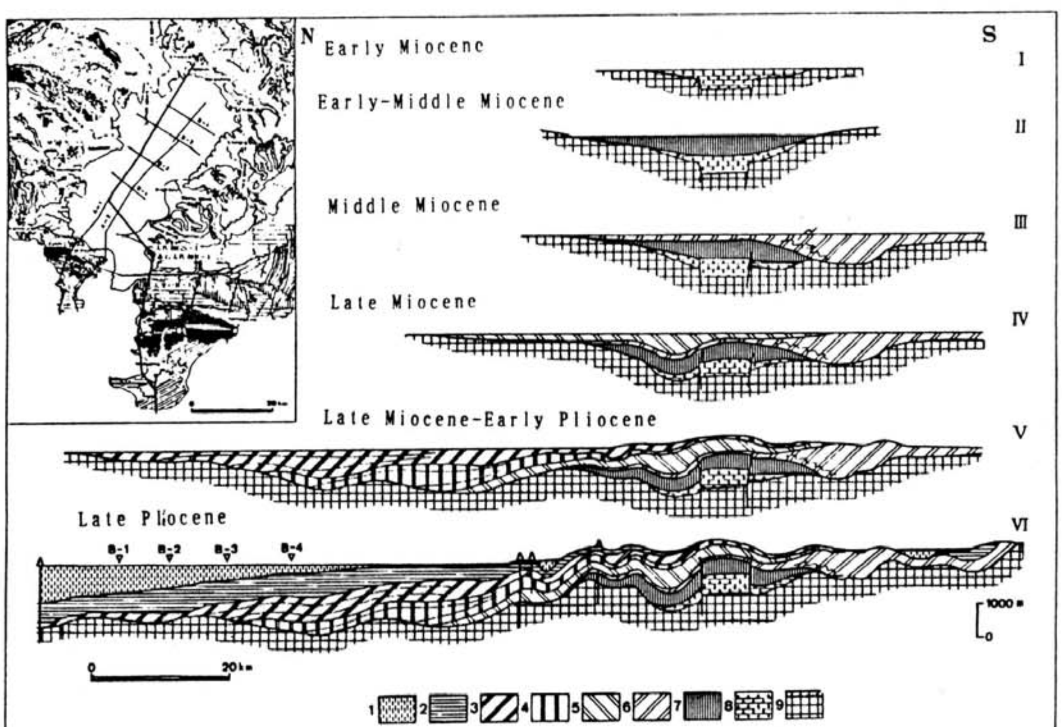

Fig. 2 Geologic development of South Kanto region (Mitsunashi, 1990)
1: Middle formations of Kazusa Group, 2: Lower formations of Kazusa Group, 3: Uppermost formations of Miura Group, 4: Upper formations of Miura Group, 5: Upper part of Middle formations of Miura Group, 6: Lower part of Middle formations of Miura Group, 7: Lower formations of Miura Group, 8: Lowermost formations of Miura Group, 9: Hayama, Hota and Mineoka Groups.

basement blocks and then buckling due to gliding along the slope.

Morphologically and kinematically studying the folds in Southern Fossa Magna region, Shiba (1991) thought that they were the response of surficial layers to the vertical movement of the basement blocks.

Collision of the Izu Peninsula

Plate tectonists insist on the northward movement and collision of the Izu Peninsula to Honshu arc and attribute the complicated and northward bend structure of Honshu arc to the movement. This argument is based on the paleomagnetic data.

Mitsunashi (1974) explained the northward bend of zonal structure of Honshu arc by the differential vertical movement and inclination of basement blocks. Fujita (1991) showed that the collapse subsiding basins were arranged *en echelon* and trended in N-S direction in early to middle Miocene in age, and were filled with volcanic and sedimentary deposits. He insisted that such phenomena contradicted the collision of the Izu Peninsula.

Studying the crustal movement and igneous activity in the central part of Honshu in Neogene period, Adachi (1996) came to the same conclusion, which was shown at the poster session at the 30th IGC.

Opening of the Sea of Japan

The hypothesis of the opening of Japan Sea and bending of Honshu arc in middle Miocene age was proposed, based on the paleomagnetic survey, and have been admitted by many geoscientists in Japan.

Suzuki (1972) opposed the hypothesis, based on the crossing structure of Honshu arc and Izu-Mariana one at the center of Honshu. Fujita and Ganzawa (1986) analyzed the igneous activity in Japan Sea and its surroundings since Mesozoic and showed that it has been reduced in its extent toward the sea. He pointed out that there was no indication of the opening and opposed the hypothesis.

Deep Earthquake Zone

The deep earthquake zone under the Japanese islands and their neighbourhood shows a part of cone, which spreads vertically into the upper mantle and reaches horizontally the Asiatic continent. Basin-forming movements bounded by normal faults, accompanying calc-alkali igneous activity have taken place from the inner zone of the Japanese islands to East Asia since Mesozoic.

Suzuki et al. (1978) pointed out that the west end of such crustal movement in Cenozoic era run nearly parallel to the contour lines of depth of deep earthquake zone (Fig. 3). They thought that the fact suggested some common cause deeper than the zone. Judging from the geologic development of East Asia and the Pacific Ocean, and the width of the crustal movement in East Asia, they attributed the cause to the differential vertical movement at the boundary between mantle and core, and carried out the computer experiment to fit the vertical movement of the earth's surface. Then the Asiatic continent upheaved where the horizontal tension and decreasing of pressure resulted in the crust and upper mantle, so the collapse subsiding basins and igneous activity might be expected, on the other hand the Pacific Ocean subsided (Fig. 4). An inclined zone of strain concentration from the Pacific Ocean to Asiatic continent appeared, corresponding to the deep earthquake zone.

Fujita (1987) analyzed the geologic development of East Asia including the Japanese islands and modified the model by Suzuki and others, introducing the activity of magma.

Suzuki (1993) applied the model to the Philippine and Indonesian island arcs. Suzuki et al. (1977, 1981) analyzed the P-wave radiation pattern of earthquakes in Kanto region, and showed that the faults at the hypocenters run nearly parallel to the boundary of block-like basins and horst. This fact indicates that such tectonic unit spreads its root vertically into the mantle, so the subduction supposed by the plate tectonics is impossible under Kanto region.

Yano and Wu (1995) insisted that the Mesozoic-Cenozoic tectonic activity of East Asian continental margin has been controlled by asymmetric arching extending 3,000 km or so with a slight oceanward vergence (Fig. 5). Voluminous magmatism occurred around arch axis and on the extensive back wing. They ascribed the tectonic movement of arching to the upwelling of thermal plume along the deep earthquake zone.

4. Future View

The Japanese islands are very important for the intense crustal movement accompanying destructive earthquakes and volcanic activities and the observation network for them. In addition to that, they have the deep earthquake zone dipping away from the Pacific Ocean toward the Asiatic continent. It is the fundamental issue for geoscientists to clarify the actual state of the zone.

We will endeavour to study them, propose the original hypotheses and advance them under collaborative work in order to contribute to the geosciences of the world.

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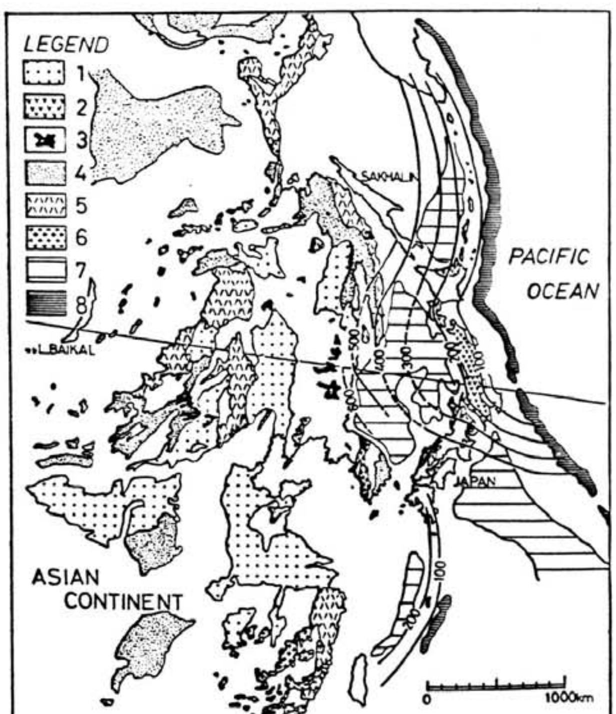

Fig. 3 Outline of geology of the Japanese islands and surrounding East Asia and contour lines of depth of deep earthquake zone (Suzuki et al., 1978)
1: Tertiary and Quaternary basin, 2: Tertiary volcanic rocks, 3: Tertiary and Quaternary alkali olivine basalt, 4: Mesozoic basin (continental), 5: Mesozoic volcanic rocks,
6: Mesozoic granitic rocks, 7: Marginal sea, 8: Trench.

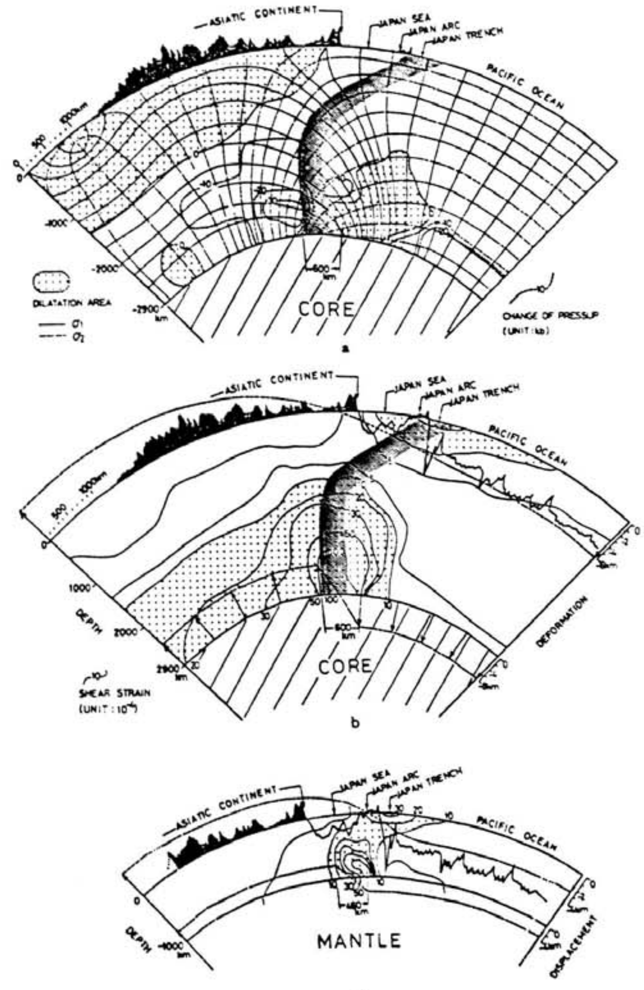

Fig. 4 Experimental result showing stress distribution in mantle and deformation of the earth's surface due to the differential vertical movement at depth (Suzuki et al., 1978).
a: Distribution of stress and dilatation area in mantle due to the differential vertical movement at the boundary between mantle and core. b: Differential vertical movement at the boundary between mantle and core and resulted surface deformation. An inclined zone of relatively concentrated area of stress takes place. c: Deformation of surface of the earth and an inclined zone of relatively concentrated area of shear due to differential vertical movement at depth of 1,000 km.

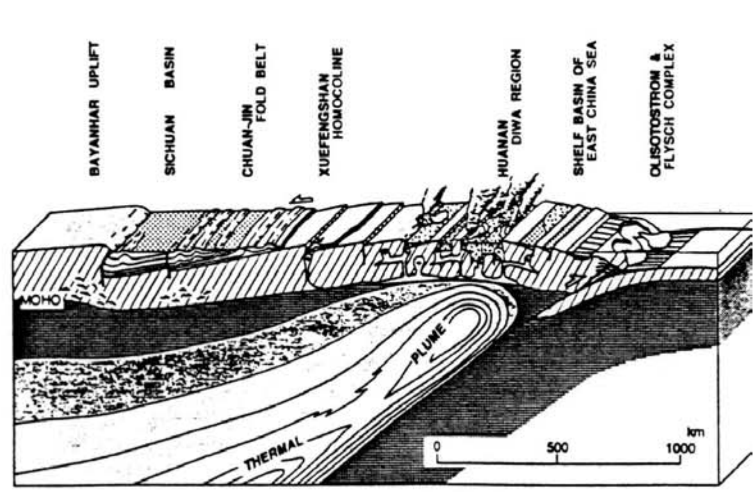

Fig. 5 Geometry, kinematics and dynamics in the southern part of the Eastern Asian continental margin (vertically exaggerated) (Yano and Wu, 1995)

Geopolitics Corner

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The suppression of the compressional rift model

In 1969 I began working for the Australian Geological Survey Organisation (AGSO) and by 1974 had discovered the closed tectonic framework in Australia produced by bifurcating networks of basement ridges (see Fig. 1 and Anfiloff, 1992).

Maps of basic geology and topography show that hills and basement ridges bifurcate across the continent, cutting across broad regions of subsidence. In 1976 I presented at a conference the idea that Australia is being squeezed by radial compression which is channelled along basement ridges, jostling the highly fractured rigid crust to produce a rectilinear network of compartmented rifts. Detailed analysis of geophysical data over Australia later resulted in the compressional rift model, the most fundamental and pervasive tectonic framework in continents, and the cause of earthquakes.

At first AGSO and the Australian National University (ANU) declined to develop this idea, and later became actively opposed to it, even though no specific objections were ever raised, and indeed, by 1979 several holes drilled into basement ridges were already confirming the prediction of radial compression. The Australian gravity data made it possible to map buried basement ridges and their flanking rifts all over Australia, but in 1984 ANU took the unprecedented step of declaring that the gravity data was "*uninteresting and uninformative*" (Lambeck, 1984), and AGSO stopped using it as a constraint in modelling. Suppression of the compressional rift model continued unabated and by 1988 it reached the unprecedented stage where AGSO gave instructions to abandon work on the concept and insisted it not be published (despite AGSO's request not to publish, Symposium editors did publish the article, see Anfiloff, 1988). In 1990 AGSO tried to torpedo my publication 'The tectonic framework of Australia' (see Anfiloff, 1992) and in 1991 I was retrenched.

Between 1989 and 1993 three investigations into the suppression of the discovery were carried out in Canberra but no reason for the suppression emerged. In 1995 the devastating earthquakes at Kobe, Japan and Neftegorsk, Sakhalin confirmed the compressional rift model extremely well by revealing that the earthquakes emanated directly from basement ridges, and at Kobe dozens of aftershocks were aligned along a section of the hill passing behind the city. The compressional rift model was then presented at an earthquake conference in Japan and some experts recognised it in the local geology there (Kodama, 1996; Anfiloff and Choi, 1996). However Ministers in Canberra have been unable to provide expert advice to Japan regarding the application for earthquake prediction, and have still failed to explain why the discovery was suppressed.

In 1996 the popular magazine *Nexus* provided the non-scientific world with its first glimpse of the global phenomenon of what was dubbed the 'Killer Hills' (Anfiloff, 1996), but the Geological Society of London refused to publish the discovery stating that horizontal compression undermines the whole idea of isostasy on which all mathematical modellings of rifts are based. They also insisted that publication would "*produce controversy where none exists*". Yet inquiries in Australia about which 3-D model of tectonics is currently being used to explain earthquakes and explore for mineral deposits have produced an embarrassing silence. Apparently AGSO and ANU now believe there are no rifts in Australia at all, which is absurd, and they still have not developed a general tectonic model compatible with Australian gravity.

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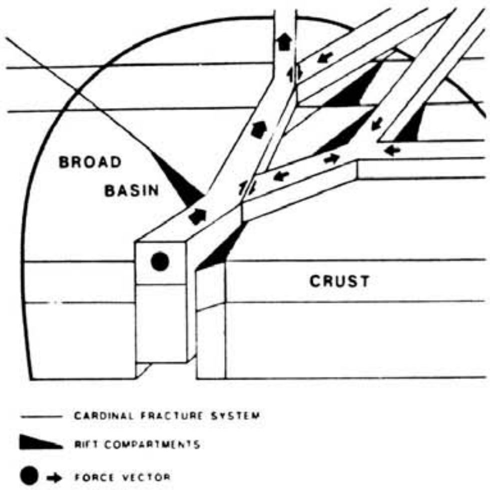

Fig. 1 Anfiloff's 'Basement ridge tectonics' model.

New title on Earth evolution

Alma Mater, Academic Publisher, Bergen, Norway, announces a forthcoming book (Estimated publication c. May 1997) by Prof. K. M. Storetvedt (University of Bergen), entitled:

Our Evolving Planet: Earth History in new perspective

This book discusses the presently chaotic and undecided situation in global geology and geophysics, and it urges for a highly needed change in the perception and evaluation of familiar data. Of the book's 13 chapters the first 7 consider the main dynamo-tectonic theories that during the last 150 years have been invoked to explain predominant features of the Earth. In particular, the development of continental drift and plate tectonics, and the shortcomings of these models, are discussed at some length. Following the formulation and acceptance of plate tectonics in the late 1960s the model was put to specific tests, but due to the 'pressure' of confirming the new popular framework these endeavours never turned out to become real scientific tests. Unsuspected observations were conveniently 'mopped under the rug', and basic conceptual problems were quietly suppressed. As the situation now stands, with a steadily growing need for invoking new parameters as well as ad hoc elaborations of the original model, there are strong reasons for believing that plate tectonics has deluded the Earth science community into a blind alley. In any case, due to all the 'rescue operations' the state-of-the-art is now so loaded with idiosyncratic complexity and observational paradoxes that the model ought to be considered one of the sore spots of the conscience of natural science. The author concluded that all central tenets of plate tectonics (sea floor spreading, subduction, transform fault etc.) should be abandoned. The message is conveyed that our main current problems are basically of theory-imposed nature, and that they are likely to disappear altogether when observations are related to a more realistic model.

In chapters 8 through 12 the author develops a new model of Earth evolution, *Global Wrench Tectonics*, and Chapter 13 gives a summary of the suggested development pattern from Precambrian times to the present. The basic philosophy of the new global model is that the Earth is a system of interlinking processes, suggesting interrelationships between its various phenomena. That is, an hypothesized solution of one global phenomenon should, if relevant, automatically lead to the prediction of other well-known phenomena. In this way the author builds up a coherent chain of interconnected observations, and through a series of predictions and confirmations a new theoretical structure of established. It is suggested that the evolutionary pattern of the Earth is intimately connected to mantle pluming and associated reorganisation of its internal mass, supposedly triggered off by planetary cooling, resulting in basalt being continuously added to the crust progressively replacing an original pan-global sialic crust. During planetary mass reconstitution the Earth has repeatedly changed its dynamical characteristics, demonstrated by the phenomenon of polar wander and by changes in rate of rotation, which apparently are the most important controlling factors for crustal evolution. During the course of geological time the Earth's 'lithosphere' has become increasingly mobilistic, but it was not until Alpine time that the continents underwent their inferred 'in situ' relative rotations, accounting for the observed between-continent palaeomagnetic discrepancies. The present state of the Earth is only the provisional end product of a long history of progressive planetary change.

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Next issue is scheduled in June, 1997. Please send your contributions before the middle of May, 1997.

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