On the Kamiyakawa-Ikegawa Tectonic Line

By

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With 4 Text-figures

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ABSTRACT: The Kamiyakawa-Ikegawa tectonic line is a fault situated on the boundary between the Sambagawa southern marginal belt and the Chichibu northern zone, also through the body of the Mikabu greenrocks, in Central Shikoku. It can be traced about 80 km in the direction of its trend. The position of the fault corresponds to the tension part at the axis of an anticlinal structure. Since the tectonic line had intimate relation with the swelling of the zone of the Sambagawa metamorphism, it is certain that the tectonic line was initiated immediately after the Sambagawa metamorphism.

Acidic igneous rocks are exposed along the tectonic line in the districts characterized by psammitic and pelitic rocks, while, ultrabasic rocks are distributed along it in the Mikabu green rocks.

Judging from structure, stratigraphy and mineral assemblage, the author believes that the tectonic line was formed either along the axial part of the anticline, of which the Sambagawa southern marginal belt and the Chichibu northern zone form the northern and southern limbs, respectively, or in the Mikabu green rocks which lie upon those formations conformably. The movement amount of the tectonic line is proved to be insignificant. The author concludes that the boundary between the Sambagawa and the Chichibu zones is not a tectonic line, but an original anticlinal structure, to which the tectonic line is related.

CONTENTS

I. INTRODUCTION

The Kamiyakawa-Ikegawa tectonic line is a fault which is located on the boundary between the Sambagawa metamorphic zone and the Chichibu weak metamorphic zone in Central Shikoku.

The geology of the Sambagawa and the Chichibu zones along the highway from Iyo-Saijô to Tosa-Ino, Shikoku (so-called "Yoto-Route") was investigated and the structure and stratigraphy in these zones were clarified (ISHII etc., 1957). At that time, a discontinuous line was found between them and named the Kamiyakawa-Ikegawa tectonic line. It was nearly corresponded with the so-called "Mikabu Line" in the past.

It is momentous for learning the relation between the Sambagawa and the Chichibu zones to clarify geological meaning of the tectonic line. Moreover, it is certain that knowledge of stratigraphy and structure around the tectonic line is remarkably important as mediation of geological relation between the metamorphic and the weak metamorphic zones.

Since 1961, the author has proceeded with the survey of geological relation between the Sambagawa and the Chichibu zones in Central Shikoku. He reported the relation between them in the district of Agawa, Kôchi Pref., especially, through geological structure, stratigraphy and mineralogical constituents (Suzuki, 1964a). Since characters of the tectonic line became fairly clear as the result of his subsequent investigation into the geology around the tectonic line in the other districts, he outlines the tectonic line in the present paper.

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II. Situation

The Kamiyakawa-Ikegawa tectonic line borders the Sambagawa zone to the north which is composed of crystalline schists decreasing metamorphic grade from the north to the south, and the Chichibu zone to the south which is composed of rocks suffering weak or no metamorphism. The author describes, at first, an outline of geology around the tectonic line.

In Central Shikoku, the Sambagawa metamorphic zone is divided, by the Kiyomizu tectonic zone characterized by the remarkable thrusting shear movement (Kojima etc., 1956; Kojima and Suzuki, 1958), into two parts, namely, the Sambagawa metamorphic zone proper to the north, which occupies most portion of the zone, and the Sambagawa southern marginal belt to the south. The latter is a narrow belt (<4 km in width) consisting of crystalline schists of lower metamorphic grade.

In the western half of the district surveyed, the Chichibu northern zone is located to the south of the Sambagawa southern marginal belt, the Kamiyakawa-Ikegawa tectonic line lying between them, as described above. Acidic igneous rocks consisting of quartz-porphyry or granite-porphyry intrude along the tectonic line.

In the eastern and the most western districts surveyed, complex bodies mainly consisting of phyllitic, diabasic, gabbroic and agglomeratic green rocks, named the Mikabu green rocks, are distributed in the Sambagawa southern marginal belt as well as in the northern part of the Chichibu northern zone. The

Kamiyakawa-Ikegawa tectonic line is continuously found in these bodies.

At Nishinotani, Ikegawa, the most western part, the tectonic line is recognized by the existence of a dyke of quartz-porphyry. To the west of that place, however, it is not traceable, as described later in detail. On the other hand, to the east, it is traceable to Kashio, Miyoshi, Tokushima Pref., the most western part, passing through Omoiji, Jizôji and Ôsugi, by the existence of shear zone and acidic igneous or ultrabasic rocks. So it is recognized for the distance of about 80 km to ENE–WSW direction (Fig. 1).

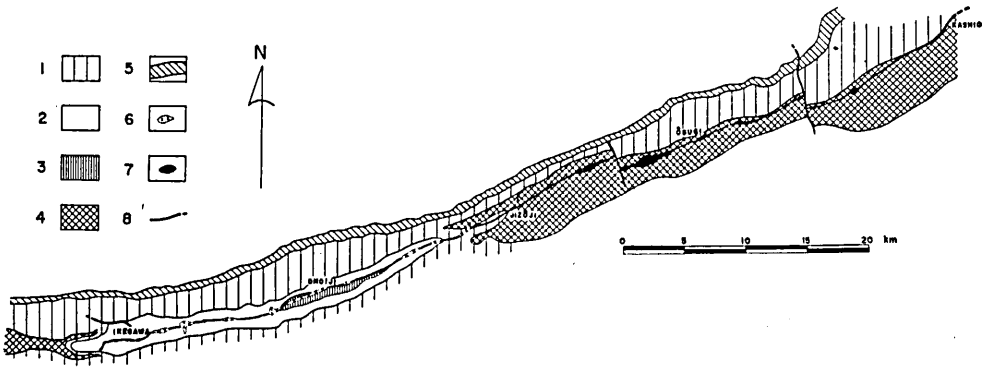

Fig. 1. Locality of the Kamiyakawa-Ikegawa tectonic line in Central Shikoku.
1. the Kuzukawa and the Kuzukawa equivalent formations,
2. the Omoiji and the Omoiji equivalent formations,
3. the Karakoshi and the Karakoshi equivalent formations,
4. the Mikabu green rocks, 5. the Kiyomizu tectonic zone,
6. acidic igneous rocks, 7. ultrabasic rocks, 8. fault.

III. Structure and Stratigraphy around the Tectonic Line

A. The Omoiji District

At the district, the Sambagawa southern marginal belt and the Chichibu northern zone show an anticlinal structure, the tectonic line being located nearly as an anticlinal axis. Namely, the schist formations of the Sambagawa southern marginal belt have monoclinic structure with the dip of ca. 50°– 60° to the north. On the other hand, the formations of the Chichibu northern zone have monoclinic structure with the dip of ca. 40°– 50° to the south. The Kamiyakawa-Ikegawa tectonic line in this district is characterized by shear zones, fault breccias and dykes of quartz-porphyritic rocks and granite-porphyry along it.

The geological map of this district is shown in one of the other papers by the author (Suzuki, 1964a, Fig. 5).

The Sambagawa southern marginal belt of the district consists of the following three formations in the ascending order: the Karakoshi, the Omoiji and the Kuzukawa formations (Fig. 1). The Karakoshi formation consists mainly of

green-schists with thin layers of black-schist. The Omoiji formation consists mainly of sandstone-schists with thin layers of black-schist, green-schist and quartz-schist. The Kuzukawa formation consists of alternative layers of quartz-schist and black-schist in the lower part and of alternative layers of green-schist, limestone-schist and black-schist in the upper part. Though the thickness of the Karakoshi formation is obscure, those of the Omoiji and Kuzukawa formations are ca. 900 m and 650 m, respectively.

On the other hand, though the Chichibu northern zone is a weak metamorphic zone suffered the Sambagawa metamorphism, degree of metamorphism has a tendency to grow weak rapidly at the southern part.

Formations of rocks in the Chichibu northern zone are almost correlative to these three formations of the Sambagawa southern marginal belt. So they are styled the Karakoshi, the Omoiji and the Kuzukawa equivalent formations, respectively (Suzuki, 1964a). The thicknesses of the Omoiji and the Kuzukawa equivalent formations are ca. 600–700 m and ca. 700–850 m, respectively, though that of the Karakoshi equivalent formation is obscure.

So the author concludes that the Sambagawa southern marginal belt and the Chichibu northern zone form an anticline, judging from rock facies and structure. Moreover, it is conceivable that the Kamiyakawa-Ikegawa tectonic line was formed along the axial part of the anticline in which the Sambagawa southern marginal belt and the Chichibu northern zone form the northern and the southern limbs, respectively. Actually, at the Sambagawa southern marginal belt of the Omoiji district, there are places where the bedding schistosities are nearly horizontal and the axial plane cleavages of fold are nearly vertical. At the northern and southern parts of these places, the bedding schistosities dip 10° –20° to the north and to the south, respectively. It is conceivable that these places are axial parts of the anticline, and that the tectonic line exceptionally exists in the place of ca. 100 m to the south from these places.

Moreover, there is no mineralogical discontinuity between the Sambagawa southern marginal belt and the Chichibu northern zone. Namely, basic rocks are characterized by the stable formation of actinolite-epidote-chlorite-quartz-albite and these two zones are continuous with respect to metamorphic grade.

Deformed fusulinid fossils which are of *Neoschwagerina* sp. comparatively evolved were found in the thin layers of limestone-schist in the green-schist of the Karakoshi equivalent formation at Terano and Uchino, Agawa, by Hashimoto (1955). This formation, therefore, suggests the age of the middle Permian. Kojima etc. (1956, 1961) correlated the Karakoshi and the Omoiji formations of the Sambagawa southern marginal belt to the Koboke formation of the Sambagawa zone proper, judging from rock facies and its thickness. So the author infers that the rocks of the Koboke formation are sediments deposited in the age of the middle Permian, because of the Karakoshi equivalent formation suggesting the age by the fossils, as described above.

Judging from linear structures and distribution of rock facies, the author concludes that the Kamiyakawa-Ikegawa tectonic line in this district is a hinge fault which was formed at the axial part of the anticline and rotated in the clockwise direction in the formation of the Sambagawa southern marginal belt and in the anticlockwise direction in the formation of the Chichibu northern zone on an axis of NNW–SSE direction, as looked from the south (SUZUKI, 1964a).

B. THE IKEGAWA DISTRICT

As the Mikabu green rocks are exposed around the Kamiyakawa-Ikegawa tectonic line at the Ikegawa district, the most western district, there is a suitable place to know the relation among the Sambagawa southern marginal belt, the Mikabu green rocks and the Chichibu northern zone.

The Sambagawa southern marginal belt and the Chichibu northern zone show also an anticlinal structure and the Kamiyakawa-Ikegawa tectonic line is located nearly at the axial part of this structure, as well as in the Omoiji district. It is also characterized by shear zones, fault breccias and dykes of quartz-porphyritic rocks and granite-porphyry along it. The formations of the Sambagawa southern marginal belt have a monoclinic structure with the dip of ca. 40°– 70° to the north, sometimes nearly vertical. On the other hand, those of the Chichibu northern zone have a monoclinic structure with the dip of 40°– 70° to the south, as shown in Fig. 2. At the western part of this district, however, the dips of the formations of these two zones are nearly horizontal.

The Sambagawa southern marginal belt consists of two formations: the Omoiji and the Kuzukawa formations. The Omoiji formation consists mainly of sandstone-schist with thin layers of black-schist, quartz-schist and limestone-schist. There are predominate layers of black-schist in the lower part of the formation. The Kuzukawa formation consists of alternative layers of quartz-schist and black-schist in the lower part and of alternative layers of green-schist, limestone-schist, black-schist and quartz-schist in the upper part. Petrofabric analyses of the limestone-schists in this formation were studied (SUZUKI, 1962).

The thicknesses of the Omoiji and the Kuzukawa formations are ca. 600–700 m+and ca. 600 m+, respectively.

On the other hand, the Chichibu northern zone consists of two formations: the Omoiji and the Kuzukawa equivalent formations. The Omoiji equivalent formation consists mainly of sandstone-schist with thin layers of black-schist. The Kuzukawa equivalent formation consists of alternative layers of quartz-schist and black-schist in the lower part and of alternative layers of green-schist and limestone-schist with thin layers of quartz-schist, sandstone-schist and black-schist in the upper part.

The thicknesses of the Omoiji and the Kuzukawa equivalent formations are ca. 400–650 m+and ca. 300 m+, respectively.

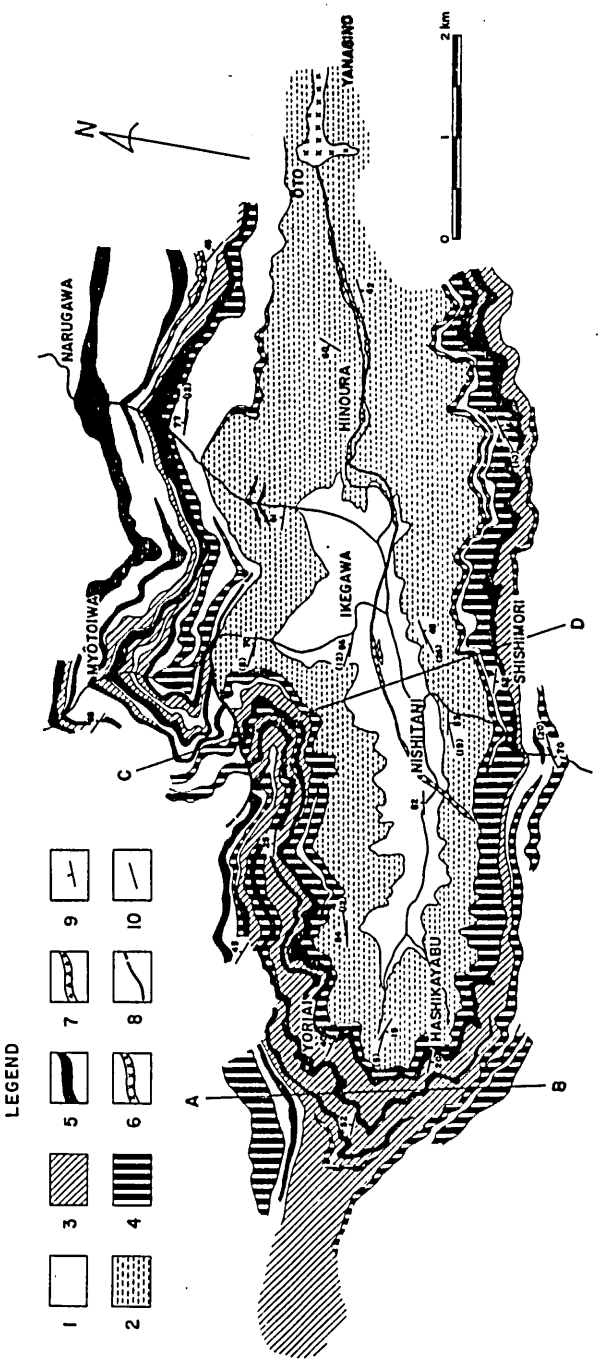

Fig. 2. Geological map of the Ikegawa district.

1. black-schist,
2. sandstone-schist,
3. green-schist and the Mikabu green rocks,
4. quartz-schist,
5. limestone-schist,
6. acidic igneous rocks,
7. fault breccia,
8. fault,
9. strike and dip of bedding schistosity,
10. trend and plunge of lineation.

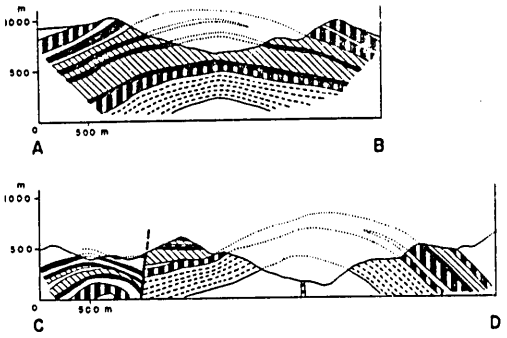

FIG. 3. Geological profiles of the Ikegawa district.
See Fig. 2 as for legend.

At the western part of this district, the Kamiyakawa-Ikegawa tectonic line disappears and the rocks of the formations of the Sambagawa southern marginal belt and the Chichibu northern zone are completely joined together, as shown in Figs. 2 and 3. As the formations are nearly horizontal at this part, the anticlinal structure is also obscure. Namely, the sandstone-schist and black-schist of the Omoiji formation follow those of the Omoiji equivalent formations. The strike of the rocks is nearly N–S and the dip is 10°–30° to the west. In the same way, the limestone-schist, quartz-schist and green rocks of the Kuzukawa and the Kuzukawa equivalent formations are joined together and the formations form a gentle anticlinal structure.

The occurrence of the Mikabu green rocks in this district is particularly interesting. These rock bodies are continuously exposed from the most western part of this district to Tokudani, Oda-cho, Ehime Pref., through Mimido, Mikawa-mura, Ehime Pref. (KAWADA etc., 1962). So it is conceivable that this part lies to an eastern end of the bodies.

The Mikabu green rocks in this district consist of agglomeratic, phyllitic and diabasic green rocks. Moreover, it is noticeably recognized that the rocks are shifted to the green-schists in the Kuzukawa and the Kuzukawa equivalent formations, respectively, by the careful pursuit of them to the east (Figs. 2 and 3). So it is conceivable that the Mikabu green rocks in this district are contemporaneous deposits with the basic rocks of the Kuzukawa and the Kuzukawa equivalent formations, and are probably mafic pyroclastic sediments accompanied with calcarious and silicious rocks of a geosyncline anticedent to the Sambagawa metamorphism.

Mineralogically, the Sambagawa southern marginal belt and the Chichibu northern zone are continuous with respect to metamorphic grade, for basic rocks are representative of actinolite-epidote-chlorite-quartz-albite-rocks both in these two zones, except existence of relic augite in the Mikabu green rocks and in the rocks of the Chichibu northern zone.

The Kamiyakawa-Ikegawa tectonic line is traceable to Nishinotani (Fig. 2). It is recognized by existence of a small dyke of quartz-porphyry intruded to the NNE–SSW direction but is obscure to the west of that place.

Lineation in the formations of the Sambagawa southern marginal belt inclines almost with plunge of ca. 10° to the west, though it sometimes plunges to the east with low angle. On the other hand, that in the formations of the Chichibu northern zone inclines with plunge of 10°– 20° to the west. So it is not conceivable that the Kamiyakawa-Ikegawa tectonic line in this district is a hinge fault.

C. The Jizôji-Ôsugi District

In this district, the Mikabu green rocks are continuously exposed near the boundary of the Sambagawa southern marginal belt and the Chichibu northern zone, as well as at the western part of the Ikegawa district (Fig. 1).

The geological maps of this district are shown in other papers by the author (Suzuki, 1962, 1964b).

At the western end of this district, the Kamiyakawa-Ikegawa tectonic line is located along an axis of the anticlinal structure which continues from other districts investigated by the author to this district. It is characterized by shear zones and dykes of acidic igneous rocks, which intrude partially along the tectonic line in the Mikabu green rocks near Jizôji.

In other parts of this district, the tectonic line is situated along the northern margin within the Mikabu green rocks and is characterized by shear zones and ultrabasic rocks (Fig. 1).

It is interesting that the rocks developed along the tectonic line are characterized by acidic rocks to the west of the district near Jizôji, namely, Aikawa, Tosa-mura, ca. 2 km east distant from Jizôji and, on the other hand, by ultrabasic rocks to the east, and that they do not overlap one another.

The Mikabu green rocks near Ôsugi are ca. 3000 m in width to the N-S direction and are divided into following four types: agglomeratic, phyllitic, diabasic and gabbroic green rocks. Agglomeratic green rocks are distributed in the central part of the Mikabu green rocks (ca. 1500 m in width to the N-S direction) and form a syncline. Phyllitic, diabasic and gabbroic green rocks are divided into two groups in the northern and southern sides of the agglomeratic green rocks. In each group, gabbroic green rocks are distributed in the central part and are surrounded by diabasic green rocks. They are transitional each other. Though gabbroic green rocks are coarsed, they often show porphyritic or ophitic textures under microscope. So they are judged to be coarsed facies of diabasic rocks. Gabbroic and diabasic green rocks are conceivable to have intruded as sheets. Phyllitic green rocks are exposed outside of diabasic green rocks. From the dips of the schistosities in phyllitic green rocks, the structure in each group is considered to be an anticline, in which there are gabbroic green rocks in the lower part, diabasic in the middle part and phyllitic in the upper

part. Moreover, agglomeratic green rocks are exposed on the phyllitic green rocks.

So the geological structure of the Mikabu green rocks near Ôsugi is characterized by a syncline in the central part and two anticlines in the northern and southern sides (SUZUKI, 1964b). While the rocks of the Sambagawa southern marginal belt adjoin the Mikabu green rocks by a fault, those of the Chichibu northern zone lie on them conformably. The Kamiyakawa-Ikegawa tectonic line is distributed near an axial part of the anticline of the northern side in the Mikabu green rocks and is characterized by shear zone and ultrabasic rocks as serpentine.

On the other hand, the Mikabu green rocks near Jizôji are conformable to the rocks of the Sambagawa southern marginal belt and the Chichibu northern zone, and almost constituted by phyllitic, diabasic and gabbroic green rocks. Agglomeratic green rocks are rarely distributed. The geological structure in them is characterized by an anticline, as described above. So it is conceivable that agglomeratic green rocks either deposited only in a synclinal part or formed a syncline after deposition. Though it is not clear whether the anticline at the Jizôji district continues to that at the Ôsugi district, due to lack of careful investigation in the terrain between two districts, it is certain that the Kamiyakawa-Ikegawa tectonic line is distributed near an axial part of an anticline in the Mikabu green rocks, too.

In the Jizôji-Ôsugi district, the rocks of the Sambagawa southern marginal belt are constituted by green-schist, limestone-schist, quartz-schist and black-schist with thin layers of sandstone-schist. They are conceivable to belong to the Kuzukawa formation. On the other hand, the rocks of the Chichibu northern zone are mainly constituted by chert with thin layers of limestone, schalstein, slate and sandstone. They are conceivable to belong to the Kuzukawa equivalent formation.

IV. Acidic Igneous and Ultrabasic Rocks along the Tectonic Line

The rocks observed along the tectonic line are characterized by acidic rocks to the west of the Jizôji district, on the other hand, by ultrabasic rocks to the east of it, and they develop without overlapping mutually, as described above.

A. Acidic Igneous Rocks

They are continuously exposed along the tectonic line to the west of the central district and almost occur as dykes and exceptionally as stocks. They are mainly constituted by quartz-porphyry and partially by granite-porphyry, rhyolite and lithoidite.

ISHII etc. (1957) considered that they were the rocks which had intruded in

the same time as the igneous rocks of Miocene near Mt. Ishizuchi, judging from their rock facies, order of intrusion and accompanied relation.

These rocks are divided into two groups: quartz-porphyritic rocks and granite-porphyry.

Granite-porphyry is exposed in quartz-porphyritic rocks on the small scale and exerts thermal effect upon their surrounding quartz-porphyritic rocks and crystalline schists. Moreover, they hold xenolithes of quartz-porphyritic rocks and form chilled margin facies around their margin. So it is certain that they are the rocks which intruded later than quartz-porphyritic rocks.

1. Quartz-porphyritic rocks

They occupy the majority of acidic igneous rocks and generally assume a light brown colour. The rocks suffered weathering are characterized by the stripe structure parallel to surfaces of weathering.

They are divided into quartz-porphyry, rhyolite and lithoidite, and almost occur as dykes. However, at Takaiwa (ca. 4 km west of Omoiji) and Ôto (ca. 5 km east of Ikegawa), they occur as stocks, exceptionally; the former is ca. 700 m and the latter is ca. 250 m in diameter to the N–S direction.

Quartz-porphyry assumes a light brown colour and phenocrysts of quartz are visible to the unaided eye. Though rhyolite is similar to quartz-porphyry in colour, it is fine and has flow structure. Lithoidite assumes a white colour and is fine and compact. So phenocrysts are unvisible to the unaided eye.

Constituent minerals of these rocks are iniform. Phenocrysts are generally composed of quartz, plagioclase, biotite and potash-feldspar and sometimes tourmaline and garnet. Quartz is remarkably corroded and plagioclase is characterized by zonal structure. Groundmasses are composed of fine crystals of quartz, biotite and plagioclase. Owing to the thermal effect of granite-porphyry, feldspars are partially replaced by sericite and biotite forms as clots. Moreover, calcite, chalcopyrite, pyrrhotite and hematite exist. In rhyolite columnar plagioclases are arranged under the control of flow structure.

They hardly exert thermal effect to the surrounding crystalline schists.

2. Granite-porphyry

They are exposed on the small scale in the quartz-porphyritic rocks as stocks at Takaiwa and Ôto. They are considered to have intruded younger than quartz-porphyritic rocks, as described above.

They assume a darker colour than quartz-porphyritic rocks to the unaided eye and are remarkably porphyritic.

Constituent minerals are composed of quartz, plagioclase, biotite and potash-feldspar, and sometimes common hornblende, garnet and sphene. Phenocrysts are composed of biotite, corroded quartz, potash-feldspar and plagioclase with zonal structure. Biotite is sometimes bended and shows undulatory extinction.

Its axial colours are characterized by X=light yellow, Y and Z=reddish brown. Groundmasses are composed of fine crystals of quartz, biotite and plagioclase.

As they are extremely similar to quartz-porphyritic rocks as for constituent minerals, it is conceivable that granite-porphyry and quartz-porphyritic rocks were produced by the continuous igneous action.

The granite-porphyry holds various xenolithes. They are mainly composed of crystalline schists and quartz-porphyritic rocks. It is, however, interesting that gneissic rocks are involved in them. The rocks are characterized by banded structure which is alternated by dark and white bands. As a whole, they assume a dark colour. Constituent minerals are mainly composed of biotite, quartz, potash-feldspar and garnet, and sometimes plagioclase, sericite and hematite. Dark bands are composed of biotite and hematite. Biotite flakes are remarkably arranged parallel to banded structure. Moreover, the bands are dotted with garnet crystals. White bands are composed of quartz and potash-feldspar. Quartz are abundant overwhelmingly. So the rocks are considered to be garnet bearing banded gneisses.

B. Ultrabasic Rocks

They are intermittently distributed along the tectonic line to the east of the central district. The maximum width of them to the N–S direction is ca. 600 m. They show peculiar topography of conical shape.

As constituent minerals are mainly composed of antigolite and magnetite, sometimes relic augite and olivine, the ultrabasic rocks are serpentine.

At Umenomoto (ca. 2.5 km west of Ôsugi), monoclinic pyroxenes are recognized as vein in serpentine. Their chemical compositions are as follows[1]: $SiO_2=52.02$, $Al_2O_3=0.79$, $TiO_2=0.19$, $Fe_2O_3=9.26$, $MnO=0.65$, $CaO=24.76$, $MgO=14.37$, $K_2O=0.016$, $Na_2O=$ trace, $P_2O_5=0.02$ and $H_2O=0.06$ (weight percentage).

From the chemical composition, the X-ray diffraction data and the optical and physical characters, the monoclinic pyroxene is judged to be diopside[2].

It is conceivable that the ultrabasic rocks are products by serpentinization of the Mikabu green rocks along the tectonic line, for they are exposed only in the Mikabu green rocks and border obscurely on them, and have relic minerals.

V. Geological Meaning of the Tectonic Line

The Kamiyakawa-Ikegawa tectonic line is a fault situated at the boundary between the Sambagawa southern marginal belt and the Chichibu northern metamorphic zone, through the Mikabu green rocks, in Central Shikoku. It corresponds to the tension part at the axis of an anticline. It can be traced

1) They were analysed by the member of the Technical Laboratory of the Kôchi Prefecture.
2) The author will describe this pyroxene in another paper in detail.

without break for a distance of about 80 km in ENE–WSW direction.

From the western part to the central one of the district under consideration, the tectonic line is located at the axial part of an anticline, of which the Sambagawa southern marginal belt and the Chichibu northern zone form the northern and the southern limbs, respectively. It is characterized by shear zones, fault breccias and dykes of acidic igneous rocks. On the other hand, from the central to the eastern part, the tectonic line is located at the axial part of an anticline in the Mikabu green rocks. It is characterized by shear zones and ultrabasic rocks. These two anticlines are believed to be continuous.

In the most western part, it has been recognized that the Mikabu green rocks represent a different rock facies contemporaneous with the Kuzukawa and the Kuzukawacquivalent formations. So, it is conceivable that they have been formed upon the rock facies rich in psammitic and pelitic rocks of the Omoiji and the Omoijiequivalent formations.

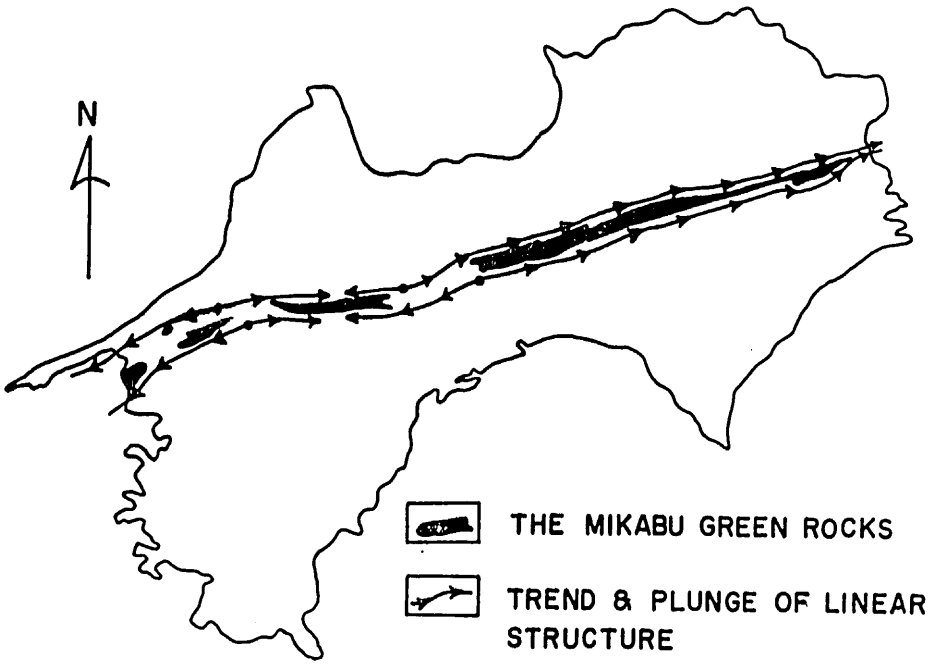

Fig. 4. Trend and plunge of linear structure around the Mikabu green rocks in Shikoku. The data after Hirayama etc. (1957), Kimura etc. (1959), Kawada etc. (1962) and Iwasaki (1963), are partially added to the author's.

The distribution of the Mikabu green rocks and the trend and plunge of linear structure around them in Shikoku are shown in Fig. 4. The axial culmination

of these formations is recognized in two districts, namely, the central district (the Omoiji district) and the western district (east of the Ôkuki district). In these districts, the Mikabu green rocks are not exposed, but psammitic and pelitic rocks of the lower formations than them predominate.

Since ultrabasic rocks distributed in the body of the Mikabu green rocks along the tectonic line have relic augite and olivine, the same as the relic minerals of the Mikabu green rocks, they are considered not to be intrusive ultrabasic rocks, but products of serpentinization of the Mikabu green rocks. Therefore, it seems that the lower portion of the surface of the fault is characterized by the intrusion of acidic igneous rocks, while, the upper portion by serpentinization.

The time of formation of the tectonic line is not certain, althougth it was inifiated not so long after the Sambagawa metamorphism and before the intrusion of acidic igneous rocks which was considered to be Miocene by Ishii etc. (1957). Since the tectonic line, however, has intimate relation with the swelling of the belt of crystalline schist of formations, produced by the Sambagawa metamorphism, it is certain that the tectonic line was initiated immediately after the Sambagawa metamorphism.

The tectonic line is a vertical fault, except for a hinge fault in the Omoiji district. Judging from structure, stratigraphy and mineral assemblage, the author believes that the amount of movement of the tectonic line is insignificant.

In Central Shikoku, it is certain that the Sambagawa southern marginal belt and the Chichibu northern zone are bordered by the tectonic line. However, the line does not represent the boundary between the metamorphic and the weak or non-metamorphic zones, but, petrologically as well as tectonically, the boundary of the Sambagawa and the Chichibu zones is represented by an anticlinal structure, to which the tectonic line is related, as suggested by Kojima etc. (1961).

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