

1. GEOLOGY
2. GEOLOGIC PROVINCES

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The Japanese Islands constitute part of the island arcs which string out along the western edge of the Pacific Ocean. They are an area where a wide variety of geologic phenomena are conspicuously active.

The Japanese Islands have undergone a number of crustal movements from the Paleozoic to the Recent. Above all, the crustal movements which took place in the late Mesozoic and the Neogene produced the great influence on Japan's present tectonic features.

Tectonically, the Japanese Islands are generally divided into two parts—Northeast Japan and Southwest Japan—by the great rupture zone called Fossa Magna, which runs from south to north in the middle of Honshū. Northeast Japan is widely covered with Cenozoic rocks, and most of the pre-Tertiary rocks are distributed as isolated landmasses. In Southwest Japan, on the other hand, Paleozoic and Mesozoic rocks are widely distributed, and the distribution of Cenozoic rocks is rather limited. Southwest Japan is further divided into the inner zone (Japan Sea side) and the outer zone (Pacific Ocean side) by the Median Tectonic Line. A prominent zonal structure in parallel with the Median Tectonic Line is observed in the Outer Zone of Southwest Japan.

The main section of Hokkaidō which excludes the southwestern peninsular part is considered to belong to a geotectonic unit different from Northeast Japan.

The oldest rocks ascertained from fossils in the Japanese Islands are those of the Silurian, but there is a large possibility that there exists a Precambrian basement. The distribution of the Devonian and the Silurian Systems is limited and sporadic. The Permian and the Carboniferous Systems are considerably widely distributed, thus making it possible to produce limestone in great quantities.

In the Japanese Islands, different types of metamorphic rocks are distributed in the pattern of a long belt. Hida metamorphic rocks and those in Abukuma and Hidaka were formed as a result of the regional metamorphism of a high-temperature and low-pressure type, whereas Sangun, Sanbagawa and Kamuikotan metamorphic rocks were formed as a result of the regional metamorphism of a low-temperature and high-pressure type. The ages in which the influences of these types of metamorphism were felt are the late Paleozoic or the Mesozoic.

Sedimentary rocks and igneous rocks of the Mesozoic are distributed in

many places to a considerably wide degree. Much igneous activity took place in the Cretaceous, and most of the rocks illustrated as pre-Tertiary intrusive rocks are granitic rocks of the Cretaceous. The majority of the effusive rocks of the Cretaceous are rhyolites or dacites.

Cenozoic sedimentary and effusive rocks account for about one-half of the national land. The distribution of the Paleogene formation is limited, but most of the Japanese coal is produced from it. In the Miocene, the Japanese Islands entered a new geologic evolution which was characterized by the development of the island arcs. Violent submarine volcanism, accompanied by the so-called Green Tuff, took place in Tisima Rettō (Archipelago), areas along the Japan Sea and the Fossa Magna zone. In general, the Quaternary System is thinly and almost horizontally sedimented and forms a tableland or lowland. The area in which Quaternary volcanism took place corresponds to the Green Tuff region.

Due to the complexity of the geology, the mineral resources of Japan are rich in variety, but most of the ore deposits are small in scale.

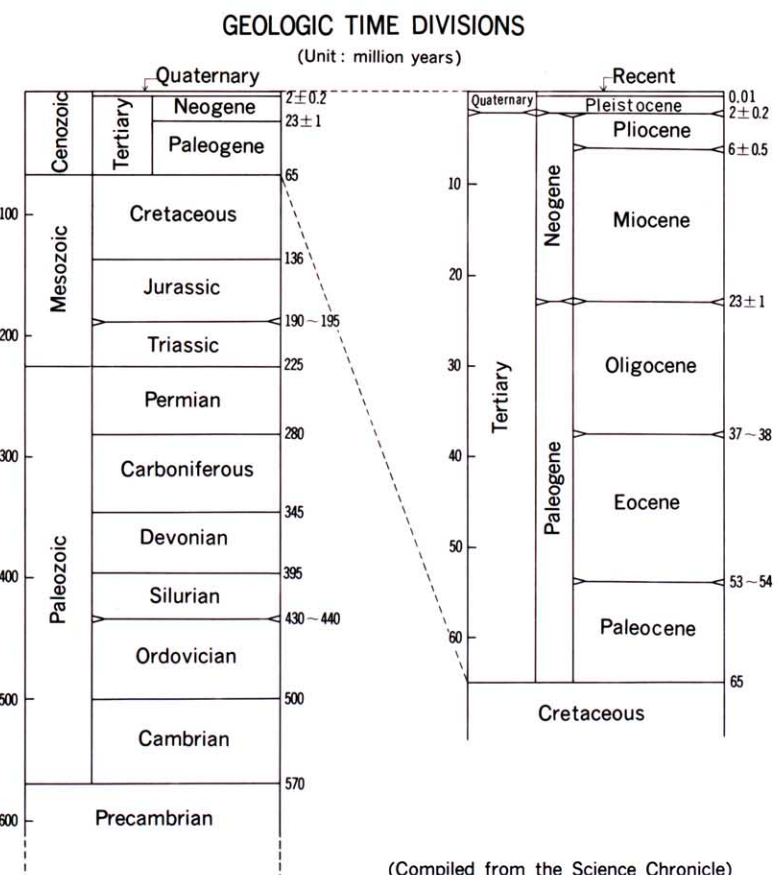
Salient Points of the Legend and Map Compilation

1. Hida belt: Zone of Variscan syn-kinematic plutonism and metamorphism.
2. Sangun belt (including Hida marginal belt, and Maizuru belt), Zyōetu belt: Zone of Variscan regional metamorphism.
3. Tanba-Mino belt, Asio belt: Zone of Variscan geosynclinal deposits (Permian and Upper Carboniferous).
4. Paleozoic sediments of Akiyosi facies: Paleozoic sediments of limestone facies (Permian and Carboniferous).
- 5-I Ryōke belt: Zone of Mesozoic syn-kinematic plutonism and metamorphism in Southwest Japan (metamorphic rocks derived from the Paleozoic deposits).
- 5-II Abukuma belt: Zone of Mesozoic regional metamorphism and syn-kinematic plutonism in Northeast Japan (including metamorphic rocks derived from the Paleozoic deposits).
- 6-I Sanbagawa belt: Zone of Mesozoic regional metamorphism (metamorphic rocks derived from the Paleozoic deposits).
- 7-I Titibu belt: Zone of imbricated structure of geosynclinal Paleozoic sediments (Silurian-Permian) and Mesozoic neritic sediments.
- 7-II Southern Kitakami belt (including eastern Abukuma belt): Zone of Variscan geosynclinal deposits (Silurian-Permian) and Cretaceous granites, including folded Mesozoic neritic sediments in the southeastern part.
- 7-III Northern Kitakami belt: Zone of Variscan geosynclinal deposits (Permian and Late Carboniferous) and Cretaceous granites.
- 8-I Sanbōsan belt: Zone of geosynclinal deposits of Late Carboniferous to Middle Mesozoic age.
- 8-II Eastern Kitakami belt: Zone of geosynclinal deposits of Late Carboniferous to Middle Mesozoic age and Cretaceous granites.
- 9-I Northern Simanto belt: Zone of geosynclinal deposits mainly of Mesozoic age.
- 9-II Southern Simanto belt: Zone of geosynclinal deposits mainly of Paleogene age.
- 10 Distribution area of Taisyū Group: Zone of folded flysch-like sediments of Paleogene age on the Tusima Islands.
- 11-I Hidaka non-metamorphic belt: Zone of geosynclinal deposits of Mesozoic age.
- 11-II Hidaka axial metamorphic belt: Zone of syn-kinematic plutonism and metamorphism.
- 11-III Kamuikotan belt: Zone of regional metamorphism.
- 11-IV Hidaka frontal belt: Zone of middle and upper structural stage (Upper Cretaceous, Paleogene and Neogene).
- 5-III Ainosima belt: Zone of Mesozoic plutonism and metamorphism.
- 6-II Nisisonogi belt: Zone of Mesozoic regional metamorphism (metamorphic rocks derived from the Paleozoic deposits).
- 7-IV Motobu belt: Zone of Variscan geosynclinal deposits and Early Paleogene granites.
- 9-I Kunigami belt: Zone of geosynclinal deposits mainly of Mesozoic age.
- 9-II Simaziri belt: Zone of geosynclinal deposits mainly of Paleogene age.
- 12 Kuril Arc: Zone of Upper Cretaceous and Paleogene deposits.
- 13-I Green Tuff belt: Zone of Early Miocene volcanism, mainly submarine.
- 13-II Zone of volcanic rocks, corresponding to Green Tuff, in the Ryūkyū Arc: Zone of Miocene volcanism in the Ryūkyū Arc.
- 14-I Uetu folded zone: Zone of Neogene folding on the inner side of Honshū.
- 14-II Ōi Gawa folded zone: Zone of Neogene folding on the outer side of Honshū.

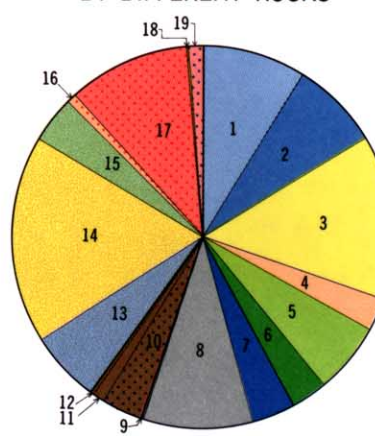
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Sources

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3. Chieko ONO and Hiroshi ISOMI, Comparison of Areas Covered by Different Rocks in the Japanese Islands, Bulletin of the Geological Survey of Japan, Vol. 18, No. 17, 1967.
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RATIOS OF AREAS COVERED BY DIFFERENT ROCKS



1. Recent
2. Pleistocene
3. Neogene
4. Paleogene
5. Mesozoic-Paleogene
6. Cretaceous
7. Jurassic and Triassic
8. Permian and Carboniferous
9. Devonian and Silurian
10. Sangun, Sanbagawa and Kamuikotan metamorphic rock
11. Ryōke, Abukuma and Hidaka metamorphic rock
12. Hida metamorphic rock
13. Quaternary effusive rock
14. Neogene effusive rock
15. Cretaceous effusive rock
16. Tertiary felsic intrusive rock
17. Pre-Tertiary felsic intrusive rock
18. Tertiary mafic intrusive rock
19. Pre-Tertiary mafic intrusive rock

(ONO and ISOMI, 1976)

