

## Characteristics of lithology and tectonic setting in the Korean peninsula

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### 1. Introduction

Korean Peninsula geographically lies adjacent to China and Japan. On the half of the northern border of Korea is formed by the Amnok and Duman rivers which separate it from Manchuria. A 16-kilometer segment of the Duman river to the east also serves as a natural border with Russia. The west coast of the Korean Peninsula is bounded by the Korean Bay to the north and the Yellow Sea to the south; the east coast is bounded by the East Sea. Two hundred kilometers separate the peninsula from eastern China. The Japanese islands of Honshu and Kyushu are located 206 kilometers to the southeast, just across the Korea Strait. Because of its unique geographical location, Chinese culture filtered into Japan through Korea; a common cultural sphere of Buddhism and Confucianism was thus established between the three countries.

The total area of the peninsula, including the islands, is 222,154 square kilometers of which about 45 percent (99,313 square kilometers), excluding the area in the Demilitarized Zone (DMZ), constitutes the territory of South Korea. There are about 3,000 islands belonging to Korea. The islands are located mostly around the Yellow Sea; only a handful of them lie off the East Sea. Ulleungdo, the largest island in the East Sea, serves as a major fishery base as does Dokdo island. Important islands within South Korea's territory include Jeju, the largest island, which lies off the southwest corner of the peninsula, Geojedo, Ganghwa, and Namhaedo.

Nearly 70 percent of the Korean Peninsula is covered by mountains and hills. Located mostly in the southern and the western regions, these hills give way gradually to increasingly higher mountains toward the eastern and the northern end. On the whole, the western and southern slopes of the peninsula are wide with some plains and basins along rivers, while the eastern slope is very narrow because the high mountains hug the East Sea coastline.

Most of the high mountains are located along the Tebaeksan range which parallels the east coast, running roughly north-to-south. West of this range are the drainage basins of the Han-gang and Geumgang rivers. This range is extended to the Nangnimsan range in North Korea, forming the geological and geomorphological backbone of the peninsula and constituting the drainage divide between the western and eastern slopes of the peninsula. Mt. Nangnimsan (2,014 meters), Mt. Geumgangsán (1,638 meters), Mt. Seoraksan (1,708 meters), and Mt. Taebaeksan (1,567 meters) are some of the highest summits along these ranges. Just southwest from the Taebaeksan range is another important range, the Sobaeksan, which culminates in the massive Mt. Jirisan (1,915 meters).

### 2. General Geology and tectonic setting

Physiographically, Korea is a mountainous peninsula extending south-southeast from the northeastern part of the China mainland. The north-northwest, south-southeast trend forms the Taebaeksan range, which is close to the east coast. The east coast is of an uplifted topography, showing a relatively straight shoreline, whereas the west coast shows the features of a submerging shoreline. The mountains are not high, rarely exceeding 1,200 meters, but they are found almost everywhere. As a consequence, the terrain is rugged and steep. Only near the west and southwest coasts are there extensive flat alluvial or deluvial plains and more subdued rolling hilly lands.

Being a mountainous peninsula, Korea is of a diverse geologic make-up. It is composed largely of Precambrian rocks, such as granite gneisses and other metamorphic rocks. Two separate blocks of Paleozoic Strata are found in South and North Korea. The one in the South covers the Taebaeksan range, and the one in the North is near Peoyongyang. Mesozoic Strata are found in the southeastern part of the peninsula and Cenozoic

strata are limited to some small areas scattered around the peninsula. Jurassic and Cretaceous granites intrude through the older rocks in a northeastward-southwestward direction in some places, but show no specific trend in others(Fig. 1). Unlike nearby Japan, Korea is a stable landmass with no active volcanoes and rare earthquake shocks, although the islands of Ulleungdo and Jeju do are of volcanic origin. Mt. Paektusan in the North is capped with a caldera lake, and Mt. Hallasan on Jeju do island has a small crater lake.

The Korean Peninsula lies within the Chino-Korean platform (Fig 1). Generally speaking, the Precambrian basement of the Peninsula is tectonically related to that of Manchuria and China. The Pyeongbuk-Kaema Massif forms the southern part of Liao-Gaema Massif of southern Manchuria, and the Gyeonggi and Mt. Sobaeksan massifs of the peninsula can be correlated with the Shandong and Fujian Massifs of China.

The Paleozoic sediments, lying on the Precambrian Massifs in the Pyeong-an and Okcheon basins, can be correlated with those in the Yellow River and Yangtze basins. On the other hand, the Mesozoic rocks of the Gyeongsang Basin in the southeastern part of the peninsula can be said to extend toward the Gwanmon Basin in the southwestern tip of Japan across the Korea Strait. The Pohang Tertiary sedimentary rocks, distributed mainly in the southeastern corner of the land, lie on Mesozoic rocks.

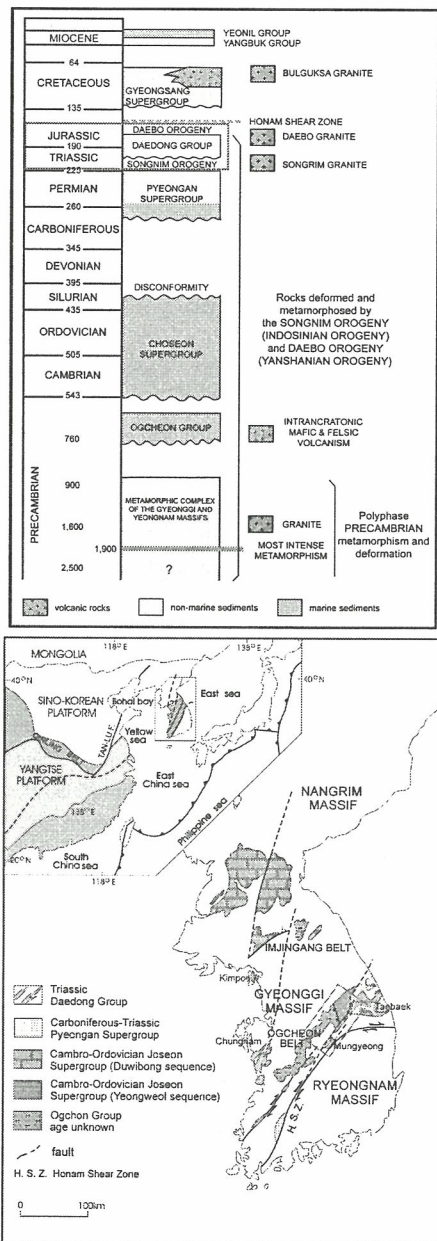


Fig. 1. Simplified geologic system and tectonic map of Korea .