

Tangkubanparahu. The Nganjuk-Kertosono area is an intermontane basin filled with volcanoclastic rocks that have been washed away from the volcanoes Wilis, Anjasmoro, Pandan, and Kelut.

Artesian conditions are not distinct at Yogyakarta, but potential artesian basins underlie both the Bandung and the Nganjuk-Kertosono areas. In the latter a clay layer of lacustrine-paludal origin acts as a confining bed. Specific capacities at Yogyakarta average between 0.5 and 5 l/second/m of drawdown. Water-bearing parts in the lower breccias and lavas at Bandung have a specific capacity between 0.5 and 1 l/second/m of drawdown, whereas the specific capacity of the aquifers in the overlying lahars range between 1 and 5 l. A piezometric surface about 10 m above the ground is measured at wells drilled to the upper zone. Specific capacities in the Nganjuk-Kertosono area vary considerably depending upon the material which was derived from several sources.

Groundwater is expected to be used increasingly in the three areas for domestic purposes, for irrigation, and by industry.

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GROUNDWATER POTENTIAL OF LIMESTONE TERRANES—EXAMPLES FROM INDONESIA

The groundwater potentials of the areas of Gunung Kidul, central Java, and Lenteng on Madura Island are typical of limestone terranes in Indonesia.

In the Gunung Kidul area, southward dipping middle Miocene limestone, about 200 m thick, is deeply dissected by solution channels which probably follow fractures. The whole area exhibits a typical karst morphology. Baron spring on the south coast of Java has a dry- and rainy-season discharge that fluctuates between 6 and 20 cu m per second. This spring is thought to be the main outlet through which the area is drained.

Two groups of aquifers are present in the Lenteng area, one between 8 and 70 m below ground surface and the second below 228 m. In the proximity of Lenteng Village the groundwater potential of the upper group is 0.33 cu m per second.

Both areas have a relatively dense population (about 400 persons per sq km), but the groundwater potential at present is practically untapped.

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GEOLOGIC STRUCTURAL SYNTHESIS OF PACIFIC AREA AS BASIS FOR ESTABLISHING REGULARITIES OF DISTRIBUTION OF MINERAL RESOURCES

Geologic studies of the Pacific Ocean and its margins have advanced in the Soviet Union. Some of the results are presented on the unique published maps. (a) Tectonic Map of Eurasia, scale 1:5,000,000 (1966); (b) Geological Map of the Pacific Mobile Belt and the Pacific, scale 1:10,000,000 (1973); and (c) Tectonic Map of the Pacific Segment of the Earth, scale 1:10,000,000 (1970). Moreover, many maps and books have been published which deal with the geology and mineral resources of the northwestern segment of the Pacific including the eastern USSR.

A geologic map synthesizes the data on stratigraphy, age, and composition of sedimentary, volcanic, and intrusive rocks on the Pacific continental margins, in the island arcs, and on the Pacific Ocean floor. The arrangement of geologic complexes of different age and character reflects various styles of tectonic systems on the inner structure: ancient platform—peri-oceanic belt—ocean. A regular rejuvenation of geologic complexes from continental nuclei toward the ocean is indicated. The map also shows that the distribution of sediment types on the Pacific floor is determined by such factors as climatic zonation, position of zones of upwelling and subsidence of waters, and depth of the ocean; whereas, in the perioceanic zones, a tectonic factor influencing intensity of supply of terrigenous and volcanic material is especially important.

The tectonic map presents the structural formation of the Pacific area which is divided into four principal categories: folding zones of the ocean margins, recent geosynclinal zones, thalassogenes (large parts of the oceanic floor), and the East Pacific mobile belt. The structural analysis, on the whole, shows that plate tectonics fails to explain the constitution of the Pacific area. This hypothesis does not conform to the concept of the Circum-Pacific belt as the earth's structural zone of planetary importance. However, horizontal movements of rather large blocks and sheets of the Earth's crust are real.

The geologic-structural synthesis creates the basis for general metallogenic constructions. Further studies on concentric zonation in the arrangement of ore deposits around the Pacific Ocean appear promising. The zone adjacent to the ocean is rich in gold and copper; the next continentward zone is characterized by rich deposits of tin and tungsten (in addition to gold) in Asia, and lead and zinc in North America. The ophiolitic belts are characterized by peculiar complexes of metals. Study of morphologic and geodynamic properties of ore-controlling faults poses a special problem.

The ocean floor is characterized by extensive accumulations of manganese-polymetallic ores and locally by metasomatic phosphorites.

The geologic-structural synthesis is important for prediction of oil and gas prospects. About 140 actual and possible gas and oil basins have been recorded in the Pacific margins. Most of them are associated with depressions and basins within folded zones and oceanic depressions. The basins in the perioceanic sector are composed mostly of Cenozoic deposits; the main productive strata are Miocene to Pliocene in age. Oil and gas already have been detected in about half of the basins.

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DEPOSITS OF BOLIVIAN TIN BELT

It is surprising that the Bolivian tin belt does not cross the national frontiers either north into Peru or south into Argentina. Lithologic and tectonic controls can explain this anomaly. The length of the belt is about 1,000 km.

Three metallogenic cycles of different age can be distinguished. The oldest is in the northern part of the High Cordillera and is related to pegmatites and pneumatolytic veins in granitic batholiths of Triassic-Jurassic age. South of the latitude of La Paz is the Miocene metallogenic cycle with its abundant tin and wolframite veins, from the vicinity of Viloco to Colquiri. South