



CIRCUM-PACIFIC COUNCIL FOR ENERGY AND MINERAL RESOURCES
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ENERGY-RESOURCES MAP OF THE CIRCUM-PACIFIC REGION

NORTHWEST QUADRANT

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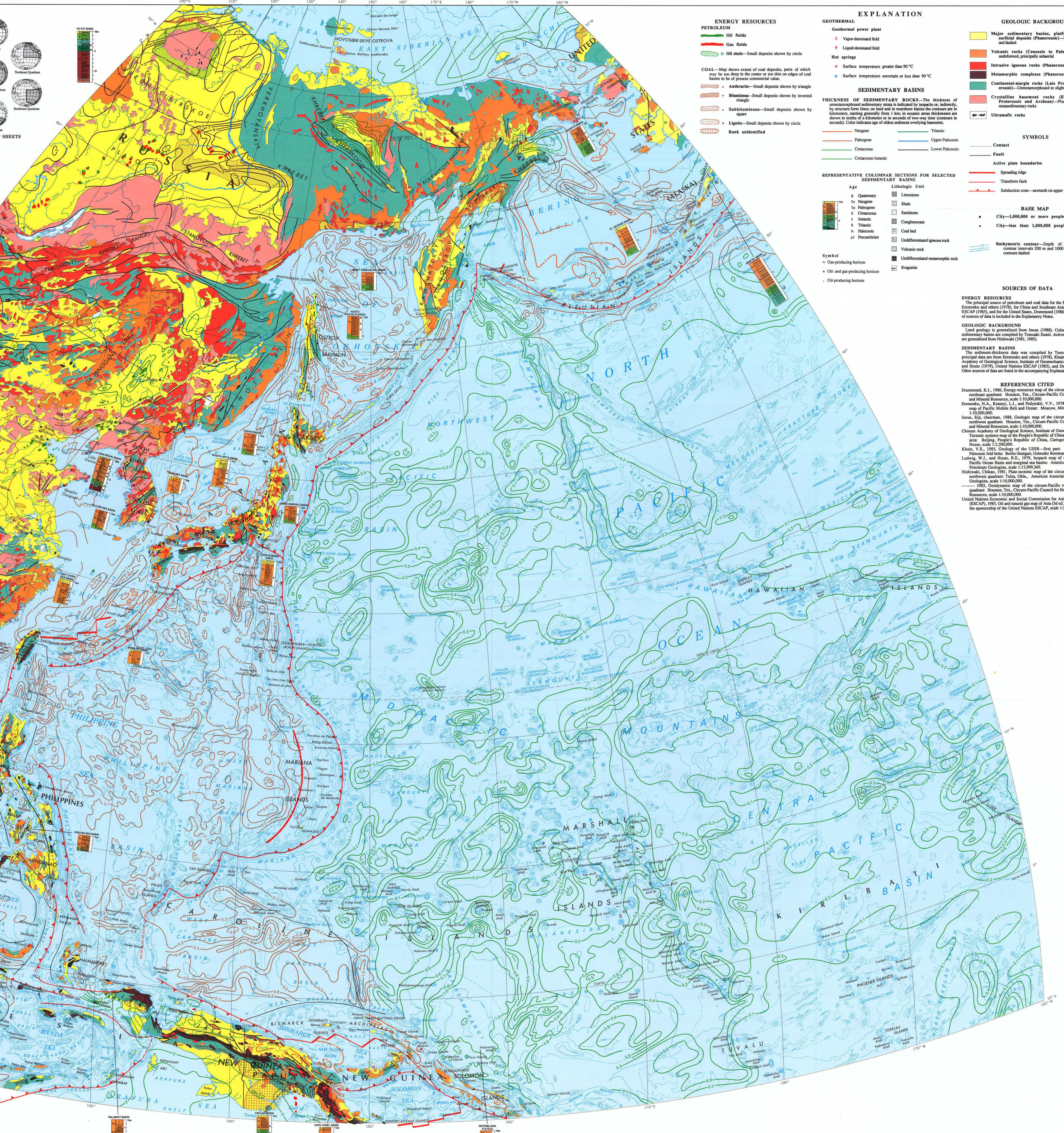
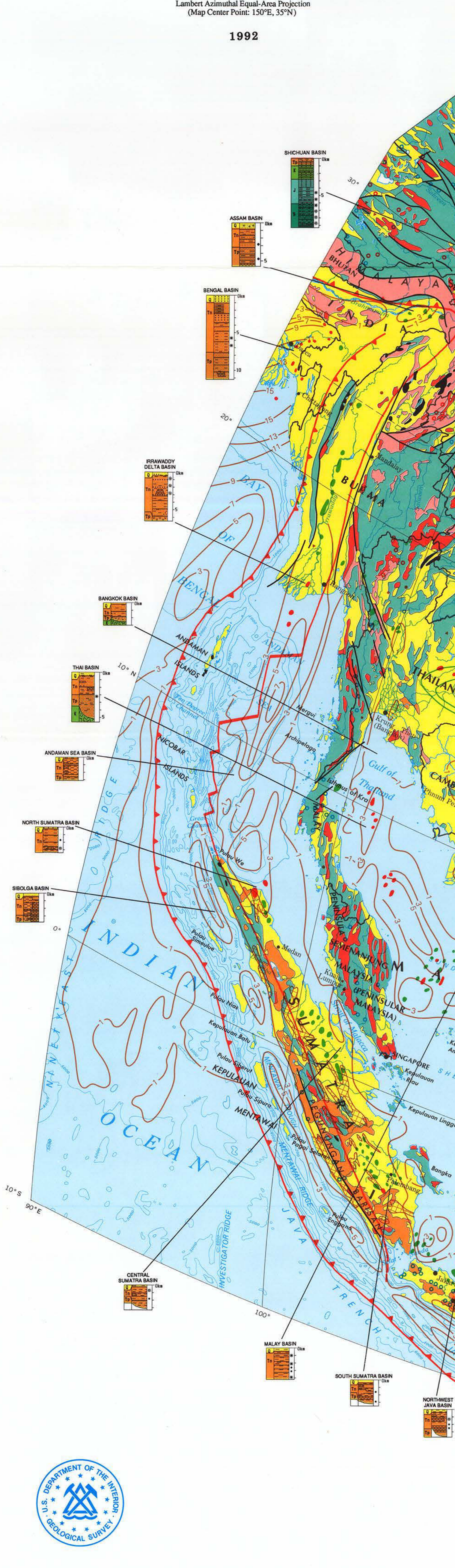
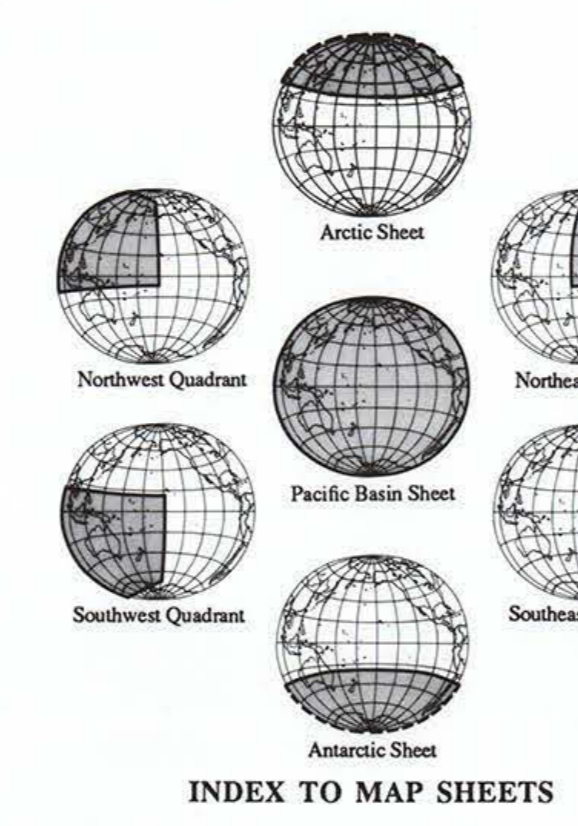
MAP PRODUCTION BY U.S. GEOLOGICAL SURVEY
Compilation coordinated by George Gryz
Cartography by Frank J. Siddonska, Jr.

SCALE 1:10,000,000
Lambert Azimuthal Equal-Area Projection
(Map Center Point: 30°N, 170°W)

1992

CIRCUM-PACIFIC MAPS
This map is one in a series of maps covering the Pacific, Atlantic, and Arctic regions. The maps have been compiled as part of the Circum-Pacific Map Project, a cooperative international effort to show the relation of mineral and energy resources to such phenomena as geology, tectonics, and crustal evolution. The project is being carried out by the Circum-Pacific Council for Energy and Mineral Resources.
The Map Project is made up of six panels of earth scientists from countries in the Pacific region who contribute to maps of the Northwest, Northeast, Southeast, Southwest, the Arctic and Antarctic areas. Eight series of maps are already published or are being prepared for future publication: Geographic, Base, Plate-Tectonic, Geodynamic, Geologic, Tectonic, Mineral Resources, and Energy Resources. The six overlapping maps cover the Pacific Basin as a scale of 1:17 million. All are printed on the Lambert azimuthal equal-area projection. The latter map shows the boundaries of the quadrant maps and the boundaries of the Arctic and Antarctic areas.
Geographic names are as recommended by the U.S. Board on Geographic Names, taking into account the recommendations of the Circum-Pacific Map Project panel. Names and boundaries on the map do not necessarily reflect recognition of the political status of an area by those involved in the preparation and publication of these maps.

ENERGY-RESOURCES MAP SERIES
Maps of the Energy-Resources Series show generalized geologic background, sediment deposits and structure from lines, oil and gas fields, oil shale, coal deposits, and geothermal energy sites. Ocean-area sediment thickness, on a bathymetric contour base, are also shown.



ENERGY RESOURCES
PETROLEUM
Oil fields
Gas fields
Oil shale—Small deposits shown by circle
Coal—Map shows extent of coal deposits, parts of which may be too deep in the center or so thin on edges of coal basins to be of present commercial value.
Anthracite—Small deposits shown by triangle
Bituminous—Small deposits shown by inverted triangle
Subbituminous—Small deposits shown by square
Lignite—Small deposits shown by circle
Rank unidentified
Geothermal
Vapor-dominated field
Liquid-dominated field
Hot springs
Surface temperature greater than 90 °C
Surface temperature uncertain or less than 90 °C

SEDIMENTARY BASINS
THICKNESS OF SEDIMENTARY ROCKS—The thickness of unconsolidated sedimentary rocks is indicated by isopachs or, indirectly, by structure from lines, on land and in shallow basins the contours are in kilometers, ranging generally from 1 km. in oceanic areas thicknesses are shown in units of a kilometer or its second of two-way time (columns in seconds). Color indicates age of oldest sediment overlying basement.
Neogene
Paleogene
Cretaceous
Cretaceous-Tertiary
Tertiary
Upper Paleocene
Lower Paleocene

REPRESENTATIVE COLUMNAR SECTIONS FOR SELECTED SEDIMENTARY BASINS
Age
Quaternary
Tertiary
Cretaceous
Jurassic
Triassic
Paleozoic
Precambrian
Lithologic Unit
Limestone
Shale
Sandstone
Conglomerate
Coal bed
Undifferentiated igneous rock
Volcanic rock
Undifferentiated metamorphic rock
Enigmatite

BASE MAP
City—1,000,000 or more people
City—less than 1,000,000 people
Bathymetric contour—Depth of water in meters; contour interval 200 m and 100 m. Intermediate contours dashed

EXPLANATION
SYMBOLS
Active plate boundaries
Spraying ridge
Transform fault
Subduction zone—dashed on upper plate

ENERGY RESOURCES
The principal source of petroleum and coal data for the Far East Soviet is Ermakova and others (1975), for China and Southeast Asia, United Nations ESCAP (1965), and for the United States, Drummond (1986). A complete list of sources of data is included in the Explanatory Notes.

GEOLOGIC BACKGROUND
Land geology is generalized from Inoue (1988). Columnar sections of sedimentary basins are compiled by Tomoki Sumi. Active plate boundaries are generalized from Nishiwaki (1981, 1985).

SEDIMENTARY BASINS
The sediment thickness data was compiled by Tomoki Sumi. The principal data are from Ermakova and others (1975), Chao (1983), Chinese Academy of Geological Science, Institute of Geomechanics (1984), Ludwig and Houser (1979), United Nations ESCAP (1965), and Drummond (1986). Other sources of data are listed in the accompanying Explanatory Notes.

REFERENCES CITED
Drummond, R.J., 1986. Energy-resources map of the circum-Pacific region, northwest quadrant. Houston, Tex., Circum-Pacific Council for Energy and Mineral Resources, scale 1:10,000,000.
Ermakova, N.A., Kozlov, R.I., and Fedynin, V.V., 1978. Petroleum-coal map of Pacific Mobile Belt and Ocean. Moscow: Mirage SSSR, scale 1:10,000,000.
Inoue, Biji, chairman, 1988. Geologic map of the circum-Pacific region, northwest quadrant. Houston, Tex., Circum-Pacific Council for Energy and Mineral Resources, scale 1:10,000,000.
Chinese Academy of Geological Science, Institute of Geomechanics, 1984. Tectonic systems map of the People's Republic of China and adjacent sea area. Beijing: People's Republic of China, Cartographic Publishing House, scale 1:5,000,000.
Khan, V.I., 1985. Geology of the USSR—first part: old cratons and Paleozoic fold belts. Berlin-Sungay, Geobase Bonnenger, 272 p.
Ludwig, W.J., and Houser, R.E., 1979. Isopach map of sediments in the Pacific Ocean Basin and marginal sea basins. American Association of Petroleum Geologists, scale 1:15,000,000.
Nishiwaki, Chiao, 1981. Plate-tectonic map of the circum-Pacific region, northwest quadrant. Tulsa, Okla., American Association of Petroleum Geologists, scale 1:10,000,000.
—, 1985. Geodynamic map of the circum-Pacific region and Mineral Resources, scale 1:10,000,000.
United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), 1965. Oil and natural gas map of Asia (OAG). Prepared under the sponsorship of the United Nations ESCAP, scale 1:5,000,000.