dated sediments is much less than that in the adjacent troughs, but in most places, the thickness of the rocks comprising the second stage is identical for both troughs and orogenically uplifted areas. The last fact suggests that the large vertical movements of the inner Arctic Ocean occurred mainly in late Mesozoic-Cenozoic time. It was during this time that the present morphometric form of the Arctic Ocean basin was created.

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MESOZOIC SEQUENCE IN ARCTIC ALASKA

Early Mesozoic rocks in Arctic Alaska reflect a continuation of deposition in the late Paleozoic Cordilleran geosyncline. Starting in Early Jurassic time the broad Cordilleran geosyncline was warped into 3 small geosynclines, the Colville, Koyukuk, and Kandik, separated by the east-trending Brooks Range geanticline and the narrow southwest-trending Ruby geanticline. These structural highs and lows were areas of erosion and deposition throughout the rest of the Mesozoic.

Orogeny was widespread in the Cretaceous. One major orogeny took place during the Aptian, and all post-Aptian strata lie with angular discordance on earliest Cretaceous to Devonian beds. Orogeny continued in Cenomanian time, and by late Cretaceous, folding was largely complete in the Koyukuk and Kandik geosynclines. The Brooks Range was uplifted at the end of Cretaceous time, and the rocks of the Colville geosyncline were moderately to strongly deformed. Major thrust plates developed, and the strata were thrust northward, so that rocks of similar age but widely different facies were commonly juxtaposed.

Early Triassic beds are primarily confined to northeastern Alaska, where 500–1,000 ft of strata show a distinct northward coarsening of clastic components, indicating a source in that direction. Middle and Late Triassic times are represented by widespread deposits of black phosphatic limestone, calcareous shale, and chert several hundred feet thick. These shelf deposits are similar to, and largely concordant with, the underlying Paleozoic strata.

During the Jurassic the Colville and Kandik geosynclines received 2,000–10,000 ft of monotonous dark pyritic shale, siltstone, and graywacke. At the same time, mafic igneous flows and tuffs were accumulating in the Koyukuk area. These rocks are largely discordant on older strata, and locally discordant between successive Jurassic units.

The depositional pattern established in the Jurassic continued into the Early Cretaceous, when 5,000–15,000 ft of mainly flysch-type sediments accumulated in the geosynclines. By middle Albian time, conditions favoring deposition of subgraywacke prevailed. Shifting shorelines caused better sorting in the 3,000–10,000 ft of interfingering marine and nonmarine clastic rocks deposited during the rest of Cretaceous time.

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EPI-PALEOZOIC HORST-ANTICLINORIA AND SHELF TROUGHS OF ARCTIC MARGIN OF EURASIA

The most intensively developing morphostructures of the Arctic margin of Eurasia are predetermined by mobile belts developed on ancestral Paleozoic eugeosynclines. There are horst-anticlinoria which are cut by shoreline or in places intersect it; in the latter case, they extend deeply into the Arctic shelf area (Novaya Zemlya and others). These rejuvenated mountains are replaced along their trends by graben-subsidences and then by shelf (epicontinental) troughs. The troughs are especially distinctive and varied within the Barents-Kara Sea, linking the Paleozoic synclinal zones of Scandinavia, Severnaya Zemlya, Urals-Novaya Zemlya, and Spitsbergen that extend into this part of the Arctic shelf. In the Laptevykh-Chukchi Sea sector where the mobile belts are connected only with some blocks of Paleozoic eugeosynclinal basement (Brooks, Wrangel, and others), epicontinental troughs are less prominent.

The mobile belts also are the weakened zones of tectonosphere controlling pre-fracturing and gradual subsidence of stable (intertrough) areas. Epicontinental troughs, replaced horst-anticlinoria, and graben-subsidences are replaced in turn by marginal and continental slopes. Coastal lowlands and nearshore shelves are replaced by outer shelves, avant-shelves, and bathyal and abyssal plateaus. Thus, a genetic series of linear and areal morphostructures may be distinguished; their presence proves the development of oceanization of the Arctic margin of Eurasia and the origin of the deep-water Arctic basin.

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METAMORPHIC BELTS OF NORTHWESTERN PACIFIC REGION

Metamorphic belts and complexes of the northwestern Pacific region may be subdivided into 6 types corresponding to certain types of metamorphism.

1. Early Precambrian granulitic and high-temperature migmatite gneissic massifs (Omolon, Okhotsk, Khankaiy, partly Chukotsk massifs).

2. Precambrian(?) kyanite-staurolite schist-gneissic complexes (massifs) such as Hida, Abukuma massifs, partly Chukotsk and central Kamchatka's massifs reworked by later orogeny.

3. Zonal belts of andalusite-sillimanite type, associated with granitoids and blocks of types 1 and 2: (a) Paleozoic (Pylgyn, Su-chan); (b) Mesozoic (Taygon, central Kamchatka, Kitakami-Abukuma, Kyoke belts, *etc.*).

4. Glaucophane-schistic belts, most specific, closely associated with ophiolitic belts, commonly treated as ancient boundary zones of oceanic platform. (a) Paleozoic (Pen-yin, San-gun, Matsugadaira-Motai, etc.) (b) Early Paleozoic (Pekulney-Vayega, Ganal, Susunai, Kamuikotan, Sanbagawa, *etc.*).

5. Green schistic uniformly metamorphosed rock series (such as pre-Amur Riphean rock series type).

6. Poorly metamorphosed rock series (prehnite-pumpellyitic and lomontitic facies) of different age. Treated as external zones or second-stage metamorphism of types 3–5; also as independent transient-to-low temperature metasomatosis.

Comparisons of the peculiarities found in these types, their tectonic positions and age succession, in addition to their relation with granitoids implies the validity of 2 concepts suggested by Miyashiro about paired belts and that of de Roever-Marakushev about successive age changes in the different types of metamorphism supplementing each other. This may be reflected as an idealized scheme, distinguishing zones of subsidence from zones of uplift.