

DEPARTMENT OF THE INTERIOR  
UNITED STATES GEOLOGICAL SURVEY  
MESOZOIC AND CENOZOIC TECTONIC ELEMENTS OF ALASKACompiled by Thomas G. Payne and J. Thomas Dutro  
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## DESCRIPTION OF TECTONIC ELEMENTS

(Age of negative elements refers to time of subsidence and to age of sediments  
accumulated thereon. Age of positive elements refers to time of erosion or little or no accumulation.)

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1. ARCTIC PLATEAUX. Age: Paleozoic, Tr. J. K1. Extends mostly Paleozoic, pre-Cambrian, and J-K intrusives. Source of sediments in 15.

15. YUKON-KOYUKUK GEOSYNCLINE. \* Age: K1-2; possibly Tr-J or Tertiary. \* Exposes K1 and older (?) sedimentary and volcanic rocks and granitic intrusives.

16. HOGATZA ARCH. Age: K2-3 or Tertiary. Exposes K1 and older (?) sedimentary and volcanic rocks and granitic intrusives.

17. SOUTHERN BORDER ARCH. Age: Cenozoic.

18. SELAWIK BASIN. Age: Cenozoic.

19. NORTON BASIN. Age: Cenozoic.

20. RUBY GEANTICLINE. Age: J1? and K. Exposes pre-Cambrian and possibly Paleozoic metamorphic rocks and J-K intrusives. Source of sediments in 15 and 26.

21. BROWNE TROUGH. Age: Eocene. A topographic trench occupied by Yukon River and Hess Creek, in which are remnants of Eocene rocks.

22. YUKON FLATS BASIN. Age: Cenozoic.

23. LINDA TANANA BASIN. Age: Cenozoic.

24. INNOVIA BASIN. Age: Cenozoic.

25. BETHEL BASIN. Age: Cenozoic.

26. KUSKOKWIM GEOSYNCLINE. Age: Tr, J, K1-3. Exposes pre-Cambrian, Paleozoic, Tr, J, and K1 rocks. Source of K2-3 sediments in north fork of Kuskokwim geosyncline.

28. TIGARA UPLIFT. Age: Tertiary (?). Part of Kuskokwim geosyncline trend.

29. KANDIK SEGMENT (OF 28). Age: K1-2; Tr-J (?). Part of Kuskokwim geosyncline trend.

30. NATION ARCH. Age: K or Tertiary. Exposes Paleozoic and pre-Cambrian rocks.

31. TANANA GEANTICLINE. Age: J-K. Exposes pre-Cambrian, Paleozoic, and J-K batholithic intrusives. Source of sediments in 26, 28, 29, and 39.

32. NUTZOTIN MOUNTAIN GEANTICLINE. Age: J-K. Exposes pre-Cambrian, Paleozoic, Tr, and J-K batholithic intrusives. Source of J and K1 sediments in 41.

34. HEALY TROUGH. Age: Tertiary. Coal-bearing Eocene sequence and younger gravels.

35. LOWER TANANA BASIN. Age: Cenozoic.

36. MIDDLE TANANA BASIN. Age: Cenozoic.

37. MINCHUMINA BASIN. Age: Cenozoic.

38. HOLITNA BASIN. Age: Cenozoic.

39. ALASKA RANGE GEOSYNCLINE. Age: Tr, J, K1-3.

40. NUTZOTIN SEGMENT (OF 39). Age: Tr, J, K1-3. Part of Kuskokwim geosyncline trend.

41. SEYAHU GEOSYNCLINE. Age: Tr, J, K1. Some trend as Alaska Range geosyncline.

42. NUSHAGAK BASIN. Age: Cenozoic.

43. TALKEETNA GEANTICLINE. Age: Jmu, K1-3. Exposes Paleozoic and J-K batholithic intrusives. Source of sediments in 39, 40, and 41.

44. PRINCE OF WALES GEANTICLINE. Age: Jmu, K1-3. Exposes Paleozoic, and J-K batholithic intrusives. Source of sediments in 41 and in belt of Mesozoic rocks bordering Gulf of Alaska.

45. COPPER RIVER BASIN. Age: Cenozoic.

46. TELLIKOF TROUGH. Age: Eocene.

47. MATANAGA GEOSYNCLINE. Age: Tr, Jmu, K1-3, and Paleocene (?). Paleocene (?) reported only in Matanaga Valley but may underlie Eocene in Cook Inlet basin.

48. COOK INLET BASIN. Age: Cenozoic.

50. NUSHAGAK GEOSYNCLINE. Age: Jmu, K1-3(?)

51. CHUGACH MOUNTAINS GEOSYNCLINE. Age: K2(?) K3. Found evidence of K3 rocks. K2 possibly represented in thick slate-graywacke-conglomerate sequence.

52. MIDDLE GULF OF ALASKA GEOSYNCLINE. \* GRAWACKE-SLATE SEQUENCE BORDERING GULF OF ALASKA. See note from Gulf of Alaska area of map.

53. YAKATAGA GEOSYNCLINE. Age: Tertiary. Includes Eocene, Oligocene, Miocene, and Pliocene. Maximum thickness about 25,000 feet.

54. MIDDLEFOOT SHELF. Age: Tertiary. Probably continuous with Tertiary deposits built southward in shelf form. Continuous with but probably thinner than Tertiary in Yakataga geosyncline.

55. SHUMAGIN SHELF. Age: Tertiary (?).

56. ALEUTIAN TRENCH. Age: Quaternary and Tertiary (?). Adjacent to Middlefoot shelf believed to be area of thick Quaternary sedimentary accumulation. Subsidence and accumulation may have begun in Tertiary time.

## ABBREVIATIONS

Tr - Triassic; J - Jurassic;  
J1 - Lower Jurassic; Jm - Middle Jurassic;  
J2 - Upper Jurassic; C - Cretaceous;  
K1 - Lower part of Cretaceous;  
K2 - Middle part of Cretaceous;  
K3 - Upper part of Cretaceous.

Most of the following lists of rocks  
range include bodies of Cenozoic extrusive rocks, of large size. Active  
volcanoes in Aleutian Islands, Alaska  
Peninsula, Aleutian Range, and  
Wrangell Mountains.

Paleocene (?) reported only in Matanaga Valley but may underlie Eocene

in Cook Inlet basin.

50. NUSHAGAK GEOSYNCLINE. Age: Jmu, K1-3(?)

Possibly developed in Tertiary. Exposes Paleozoic, Tr, and J1 rocks.

51. CHUGACH MOUNTAINS GEOSYNCLINE. Age: K2(?) K3.

Found evidence of K3 rocks. K2 possibly represented in thick slate-graywacke-conglomerate sequence.

52. MIDDLE GULF OF ALASKA GEOSYNCLINE. \* GRAWACKE-SLATE SEQUENCE BORDERING GULF OF ALASKA. See note from Gulf of Alaska area of map.

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Probably continuous with Tertiary deposits built southward in shelf form. Continuous with but probably thinner than Tertiary in Yakataga geosyncline.

55. SHUMAGIN SHELF. Age: Tertiary (?).

56. ALEUTIAN TRENCH. Age: Quaternary and Tertiary (?).

Part adjacent to Middlefoot shelf believed to be area of thick Quaternary sedimentary accumulation. Subsidence and accumulation may have begun in Tertiary time.

\* NOTE: Field investigations in the central part of the Yukon-Koyukuk geosyncline subsequent to the preparation of this illustration indicate that the location of the geosynclinal axis may be partly in areas north of Lat. 64° N. The axis appears to trend nearly due north, rather than northward as shown in the illustration.

## EXPLANATION

## SEDIMENTARY ROCK UNITS

Geosynclinal or basin. Known to be or possibly caused by Cenozoic tectonic movement.

Boundary of tectonic element.

Geanticline or arch, indicating general strike of folds, faults, cleavage, and foliation. Arrow indicates plunge.

Geanticline or trough, indicating general strike of folds, faults, cleavage, and foliation. Dotted where geosynclinal deposits have been uplifted and mostly eroded. Arrow indicates plunge.

K3

Cretaceous, upper part, and older Mesozoic rocks. Youngest known Mesozoic rocks are Albion or Cenomanian. Albion present regionally. Cenomanian definitely known only in Colville geosyncline; probably present elsewhere but not well known; lack of detailed field studies.

K2

Cretaceous, middle part, and older Mesozoic rocks. Youngest known Mesozoic rocks are Albion or Cenomanian. Albion present regionally. Cenomanian definitely known only in Colville geosyncline; probably present elsewhere but not well known; lack of detailed field studies.

K1

Cretaceous, lower part, and older Mesozoic rocks. Youngest known Mesozoic rocks are early Neocomian.

bc

Basement complex. Paleozoic and (or) pre-Cambrian. Includes Triassic and Lower Jurassic in some areas. In most areas includes igneous bodies of Jurassic and (or) early Cretaceous ages; many are batholithic size.

Submarine contours in fathoms

Base from Alaska Map E

Seamounts not shown

PACIFIC OCEAN

PACIFIC OCEAN