



DISCUSSION

The geologic structure and history of various parts of the continental shelf southeast and southwest of Kodiak Island have been described in several reports (von Huene, 1972; Fisher, 1979; Haines and Moore, 1979; Fisher and von Huene, 1980; Moore and Alvarado, 1980); we give only a brief summary here. This map is a compilation of the published structure maps and includes some new seismic-reflection data. Only 24-fold seismic data collected for or by the U.S. Geological Survey (Fisher, 1979; Fisher and von Huene, 1980) were used. Haines and others (1978) showed detailed analyses of refraction velocities from sonobuoys deployed over the shelf (table 1).

The horizon contoured here is a unconformity. The age of rocks under the unconformity varies geographically because the continental shelf near Kodiak Island is divided tectonically by the Border Ranges fault (MacKewett and Fisher, 1974; Fisher, 1981). On the northeast side of this fault a narrow, north-south-trending belt of Jurassic schist and gneiss separates the fault from a thick section of sedimentary rocks on the Alaska Peninsula and under Shelikof Strait; these rocks are as old as middle Paleocene but are mainly of Mesozoic age. Northwest of this fault, Tertiary rocks are thin, and rocks under the unconformity are mainly Mesozoic in age. Southeast of the Border Ranges fault, the oldest known rocks are in a Cretaceous mélange -- the Dyak Complex -- that is adjacent to the fault. The deformed Upper Cretaceous turbidites of the Kodiak Formation are faulted against the southeast side of the mélange. Southeast of the Kodiak Formation lie deformed Tertiary turbidites of the Ghost Rocks, Sitkalidak, and Sitkalak Formations. Southwest of Kodiak Island, then, rocks under the contoured unconformity are as old as Cretaceous; and southeast of the island, rocks under the unconformity are thought to be of Paleocene age (Fisher and Haines, 1980), and they could be as old as Late Cretaceous.

Microfossils collected from rocks above the unconformity near Albatross Bank show that these rocks are mostly late Pliocene or Pliocene and younger in age, although microfossils also indicate that some rocks are as old as middle Miocene (McClain and others, 1980a, b). Rocks above the unconformity east to the northeast, in the area of Shelikof Strait, these rocks are probably no older than Pliocene or Pleistocene.

The continental margin near Kodiak Island is structurally segmented by tectonic boundaries -- one boundary strikes north-south along the southwest coast of Kodiak Island; the other strikes northwest between Shuyak Island and the Barren Islands (von Huene and others, 1979; Fisher and others, 1981). The boundaries are marked by offset volcanoes, terminated structural trends, and separated zones of after-slope tectonic deformation.

Before the late Miocene or Pliocene, the shelf southeast of Kodiak Island and near Tugidak basin was exposed and eroded. Then the shelf subsided differentially, separating Albatross and Stevenson basins by an area underlain by pre-Pliocene rocks of unknown age, perhaps during the Pliocene. The shelf was deformed, creating major elevated shelf structures such as Tugidak Bank, Albatross Bank, and the Portlock Anticline. As these structures rose, the basins continued to subside. Much of the strata that record the history near the shelf break are missing in and near Shelikof Strait. During the late Miocene or Pliocene, this area appears to have been exposed; the transgressing ocean apparently reached the strait during the Pliocene or Pleistocene.

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CORRELATION OF MAP UNITS

ALASKA PENINSULA	VICINITY OF KODIAK ISLAND	
QTv	QT1 Pleistocene and Pliocene	QUATERNARY
Ts	Tnc Middle Miocene to Upper Oligocene(?)	
	Tal Oligocene	
	Tsa Oligocene and Eocene	TERTIARY
	Tgr Eocene and Paleocene	
	Tqd Paleocene	
Ks	Kk Upper Cretaceous	CRETACEOUS
	Ku Lower Cretaceous	
	Kuu	
Jsv	Jqd Lower Jurassic	JURASSIC
	Js	
	Tsv	TRIASSIC

- EXPLANATION OF MAP SYMBOLS**
- CONTACT--Dashed where approximately located
 - U --- FAULT--Dashed where concealed, U = upthrown, D = downthrown
 - ▲ --- THRUST FAULT--Dashed where concealed, bars on upthrown block
 - ||| --- NORMAL FAULT--Hachures on downthrown block
 - ANTICLINE--Dashed where location of axis is inferred
 - BATHYMETRIC CONTOUR--Contours in meters (100, 200, 500, 1000, 2000, and 4000). From Dunlavey and others (1980)
 - TRACKLINE OF 24-FOLD SEISMIC-REFLECTION DATA
 - STRUCTURE CONTOUR--Dashed where inferred. Contour interval 0.25 km
 - --- STRUCTURAL LOW
 - LINE OF TRUNCATION OF CONTOURED HORIZON AT SEA FLOOR
 - --- REFRACTION LINE--Number of line shown at start of line, data shown in table 1

DESCRIPTION OF MAP UNITS

QTv	VOLCANIC ROCKS	Ks	SEDIMENTARY ROCKS
Ts	SEDIMENTARY ROCKS	Kk	KODIAK FORMATION
QT1	TUGIDAK FORMATION	Ku	UYAK COMPLEX
Tnc	NARROW CAPE FORMATION	Kuu	ULTRAMAFIC ROCKS ASSOCIATED WITH THE UYAK COMPLEX
Tal	SITKINAK FORMATION	Jsv	SEDIMENTARY AND VOLCANIC ROCKS
Tsa	SITKALIDAK FORMATION	Jqd	QUARTZ DIORITE
Tgr	GHOST ROCKS FORMATION	Js	SCHIST
Tqd	QUARTZ DIORITE	Tsv	SEDIMENTARY AND VOLCANIC ROCKS

MAP SHOWING THE GEOLOGIC STRUCTURE OF THE CONTINENTAL SHELF SOUTHEAST AND SOUTHWEST OF KODIAK ISLAND, ALASKA, FROM 24-FOLD SEISMIC DATA
By Michael A. Fisher and Roland von Huene
1982

Onshore geology generalized from Burk (1965), Moore (1987), Conolly and Moore (1979), and Determan and others (1978). Structure map compiled 1981.

Geologic names used here are in accordance with the Alaska Geological Society, 1980, and the U.S. Geological Survey, 1980.

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