DISTRIBUTION OF HOLOCENE FORAMINIFERA IN THE GULF OF ALASKA

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ABSTRACT

The Gulf of Alaska is a large embayment in southeastern Alaska. Holocene foraminiferal faunas from 95 samples were examined in order to learn the distribution of species with respect to water depth and other environmental parameters. The sampled area extends from the Kodiak Shelf to Cape Fairweather and ranges in depth from the beach to 2623 meters (or 8600 feet). The 600-foot contour line approximates the edge of the continental shelf.

Beach samples were collected from Icy Cape and Point Riou. Several hundred dart samples from the continental shelf and slope were collected by multicompany groups. An inch of sediment from the top of each dart core was preserved for studies of Holocene faunas. Of these, we selected 93 samples at evenly-spaced intervals across the shelf and slope. There is a gap in sample coverage between the beach and a depth of 18 meters.

An attempt at staining the shelf samples with Rose Bengal failed for technical reasons. The slope samples were more successfully stained, but the stained specimens are too few for statistical treatment. Therefore, our sample counts are of the total fauna, living and dead specimens. We counted 300 or more specimens per sample where possible.

Beach faunas — *Elphidium clavatum* and *Elphidiella nitida* are dominant; the former occurs in abundance to the shelf edge.

Shallowest significant occurrences of selected species:

18 meters — *Trichohyalus ornatissimus*
Cibicides fletcheri

38 meters — *Cassidulina limbata*

55 meters — *Cassidulina tortuosa*

66 meters — *Cassidulina norcrossi*

90 meters — *Uvigerina juncea*

99 meters — *Florilus labradoricus*

113 meters — *Epistominella pacifica*
Cibicides aff. *C. mckannai*

275 meters — *Buliminella tenuata*

595 meters — *Bolivina spissa*
Ehrenbergina compressa

833 meters — *Bulimina mexicana*

994 meters — *Cassidulina lomitensis*
Uvigerina dirupta

1174 meters — *Eponides subtener*

1403 meters — *Valvulineria glabra*

1662 meters — *Hyperammina elongata*
Pullenia bulloides

1723 meters — *Saccorhiza ramosa*

2102 meters — *Ammomarginulina sandiegoensis*

2516 meters — *Uvigerina senticosa*

Species diversities, as calculated using the Shannon and Weaver equation, increase from 0.4 at the beach to 1.4 at 280 meters, drop back to 1.0 between 500 and 1000 meters and increase gradually to 1.55 at 2623 meters.

The percentages of planktonic foraminifera relative to total faunas increase from zero near shore to 58 percent at 167 meters water depth. From the latter depth to our deepest sample there is wide sample-to-sample variation (0 to 63 percent), but no consistent trend.

On the lower slope in many samples the planktonic and arenaceous faunas are mutually exclusive, or nearly so. For example, at 2516 meters the fauna is 75 percent arenaceous with no planktonics, while at 2623 meters the fauna is 45 percent planktonic with no arenaceous forams.

The uneven distribution may be due to winnowing by ocean-bottom currents. Currents may have removed most of the plankton and some of the benthics from some locations, leaving behind a concentration of arenaceous forms. The displaced planktonics and benthics may be locally redeposited in drifts of a few centimeters thickness, effectively covering the indigenous arenaceous populations. Adjacent sample locations are 250 to 300 meters apart horizontally.

On the continental shelf there are two distinctive, mutually exclusive, benthic faunas, a "blue" assemblage dominated by *Elphidium* and *Elphidiella* and a "gold" assemblage dominated by *Cassidulina californica, C. limbata, C. tortuosa* and *Cibicides lobatulus.*

The two assemblages are independent of water depth, but are related to bottom topography and associated sediments. The "blue" assemblage occurs with fine-grained sediments in areas of low relief. The "gold" assemblage occurs with coarse sediments on submarine banks, ridges and areas of uneven topography.

The environmental data gained from the study of Recent faunas in the Gulf of Alaska may be useful for interpreting Late Neogene paleoenvironments in high latitudes.

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