



GLACIATION OF THE PEBBLE PROJECT AREA, SOUTHWESTERN ALASKA

Thomas D. Hamilton
Anchorage, AK

Abstract:

The Pebble Limited Partnership and its general partner, Pebble Mines Corp. owns the Pebble Project situated on the Alaska Peninsula about 320 km southwest of Anchorage. It lies about 30 km north of Iliamna Lake and is about the same distance northwest of the community of Iliamna. The Pebble claim block contains a world-class porphyry deposit of copper, gold, and molybdenum. Surficial geologic mapping of the Pebble deposit area was carried out by a helicopter-supported field program in the summer of 2007.

The surficial geology of the Pebble deposit area is dominated by the direct and indirect effects of Pleistocene glaciation. Although very little glacier ice was generated within the map area itself, glaciers from two principal sources entered the map area from the north, east, and south. A large valley glacier fed from Aleutian Range icefields flowed southwestward down the Lake Clark structural trough; it then split into two separate tongues that extended down the present-day Chulitna and Newhalen drainages. Those glaciers overflowed low divides to penetrate the map area from the north and northeast, respectively. A second major ice body that probably extended westward from an ice cap over lower Cook Inlet filled the broad basin now occupied by Iliamna Lake. That glacier expanded northward, filling southern parts of the Pebble deposit area. At various times, these glaciers blocked each of the three major drainages that issue from the map area, creating ice-dammed lakes that filled lowlands in headward parts of each drainage. Subsequent ice wastage was by stagnation rather than retreat of glacial termini, resulting in extensive areas of ice-contact meltwater deposits and in numerous meltwater channels that today are abandoned or contain only very small streams. Lakes enclosed behind moraine dams persisted in some lowlands. Former glacier-dammed lakes are marked by broad expanses of unusually smooth, poorly drained, and gently sloping terrain that terminate abruptly upslope at consistent altitudes and commonly are bordered by beach ridges and deltaic deposits.

Alaska Geological Society Luncheon

Date & Time: Thursday, Feb. 21st, 11:30 am - 1 pm

Program: Glaciation of the Pebble Prospect

Speaker: Thomas Hamilton

Place: BP Energy Center

Reservations: Please make your reservation before noon Tuesday, Feb. 19th, 2008.

Cost: Seminar only, no meal: free
Reserve a hot lunch*:
Members: \$20
Nonmembers: \$22

Reserve a box lunch:
Member: \$13
Nonmember: \$15

No Reservation: \$25 hot / \$18 box
(on an "as-available" basis only)

*If there are not enough hot lunch requests to reach catering minimum, a box lunch reservation will be substituted.

E-mail reservations: peterags@acsalaska.net
Or phone (907) 334-5329

For more information: visit the AGS website:

www.alaskageology.org

At least four episodes of glaciation are recognized in the map area. The oldest, which preceded the Brooks Lake glaciation of Detterman and Reed (1973), is marked by ice-abraded uplands with thin patches of drift and by a conspicuous moraine in the southwest part of the map area. The younger three glacial advances correspond to the three oldest stades of the Brooks Lake glaciation, which Detterman and Reed (1973) equate with the late Wisconsin glacial substage

of the standard North American glacial succession. This interval is dated at about 25,000 to 10,000 radiocarbon years before present (^{14}C yr BP) elsewhere on the Alaska Peninsula and in the upper Cook Inlet region. During each of the two oldest stades, termed Kvichak and Iliamna, by Detterman and Reed (1973), ice filled the Lake Clark trough and coalesced with the huge glacial lobe that filled the basin of Iliamna Lake. Glaciers entered the map area from the north, east, and south at those times. During the subsequent Newhalen stade, glaciers no longer filled the basin of Iliamna Lake; they extended only short distances southwest and south of Lake Clark, and penetrated into only the extreme northeast corner and east-central margin of the map area. Although no radiocarbon dates are available from the map area,

broadly limiting dates elsewhere on the Alaska Peninsula and correlations with upper Cook Inlet suggest that Newhalen stade glaciation may have occurred about 14,000-13,500 ^{14}C yr BP. The final meltout of stagnating glacier ice in the Pebble Project area may have continued for several thousand years after active glaciers receded.

REFERENCE:

Detterman, R.L. and Reed, B.L., 1973, surficial deposits of the Iliamna quadrangle, Alaska: U.S. Geological Survey Bulletin 1368-A, p. A1-A64.

Speaker's Biography:

Tom Hamilton received degrees in geology and Quaternary geology from the Universities of Idaho, Wisconsin, and Washington. He has been involved in Alaskan geology since 1960, working at various times as UAF professor, USGS scientist, and independent consultant. His primary field of interest, Quaternary geology, provides a broad umbrella that has permitted him to work in diverse subdisciplines such as glacial and periglacial geology, geo-archeology, paleoecology, and environmental geology. These studies have taken him from Chukotka across northern Alaska into the Yukon, and southward as far as the caves of Prince of Wales Island. Tom presently wears two hats: *Emeritus* geologist with the USGS and proprietor of his own consulting firm.