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TITLE: Volcanic Hazards on the Alaska Peninsula and in the Aleutian Islands

ABSTRACT

More than 35 major volcanic centers of Quaternary age occur in the 1,200-km-long segment of the Aleutian volcanic arc between Cape Douglas on the Alaska Peninsula and Umnak Island in the eastern Aleutians. At least 21 of these centers have had historical volcanic activity, and at least 200 eruptions have been reported in the past 200 years (avg. 1/yr). These volcanic centers have also been the sites of at least 11 large caldera-forming eruptions (bulk volumes > 10 km^3) in the past 10,000 years, the most recent of which was Novarupta in 1912.

The region under discussion has a population of about 19,000, including Kodiak Island, concentrated in 20 towns and villages. Although this region is sparsely populated, most population centers are within 100 km of a historically active volcano. Hazards associated with the most common types of volcanic eruptions include hot pyroclastic flows and surges, mudflows, debris avalanches, landslides, floods, and ash fallout. At least three villages, Perryville, Meshik, and False Pass, are located in areas that have been overrun by hot pyroclastic flows in the past 10,000 years. All the population centers in the region have been subjected to heavy ash fall in the recent past and can expect to receive similar ash falls in the future. Among the larger ash falls are those recorded at Kodiak, which received an ash deposit of more than 25 cm after the 1912 eruption of Novarupta, 160 km to the northwest. The 1931 eruption of Aniakchak Volcano on the central Alaska Peninsula resulted in a heavy ash fall over a 100,000 km^2 land area region bounded by Unga and Kodiak Islands and the head of Bristol Bay, 500 km northeast of the volcano.

In addition to hazards associated with typical eruptions, large caldera-forming eruptions similar to the 1912 Novarupta event, though infrequent, have occurred at about a third of the volcanic centers in the region. The Aniakchak caldera-forming eruption 3,400 yr BP caused the collapse of a large volcanic cone, formed a crater 10 km in diameter, generated pyroclastic flows emplaced at temperatures of several hundred degrees Celsius over an area of more than 2,500 km^2 surrounding the volcano, and produced measurable ash falls 700 km away. Ash from the Novarupta eruption circled the Earth and may have resulted in a slight worldwide temperature drop of 0.2 $^{\circ}$C. Similar eruptions could have serious effects on life and commerce for hundreds of kilometers from the volcanic center.

Research on and monitoring of active and potentially active volcanic centers in the region is continuing, with the goal of predicting eruptions, their probable style, and their potential effects on life and property.