

HISTORICALLY ACTIVE VOLCANOES OF ALASKA REFERENCE DECK

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IC 59 v.3 is an unusual publication—it is in the format of playing cards! Each full-color card provides the location and photo of a historically active volcano and up to four icons describing its historical activity. The icons represent characteristics of a volcano, such as a documented eruption, fumaroles, deformation, or earthquake swarms; two legend cards are provided. The IC 59 playing card deck was originally released in 2009 when AVO staff noticed the amusing coincidence of exactly 52 historically active volcanoes in Alaska. A second version was created in 2017, which added Tana (now more properly called Tana̅ Anguna̅) and Herbert, due to previously undocumented, persistent fumaroles. This new version for 2023 adds Mount Edgecumbe, in Southeast Alaska, which we learned in 2022 has been experiencing a magmatic intrusion with accompanying deformation. The new deck also consolidates Katmai and Novarupta more properly onto one card instead of two. We have also added Shrub, a mud volcano in the Wrangells.

About Shrub mud volcano:

Shrub is part of the Klawasi Group of mud volcanoes, which comprises Shrub, Upper Klawasi, and Lower Klawasi. These mud volcanoes are located in the Copper River Basin of Southcentral Alaska, near the west slope of Mount Drum. They sit on land administered by Ahtna, Incorporated. Shrub is the most northern of the three and lies about 25 km east of the community of Glennallen. Starting during the summer of 1996, Shrub began to erupt CO₂-rich gas and warm, saline mud, producing mud flows that traveled down the flanks of its edifice and extended out from its base (Richter and others, 1998). Although no magma has reached the surface from the Klawasi Group mud volcanoes, analyses of carbon and helium isotopic compositions of the gas discharged from the Klawasi Group suggest the gases are derived from both magmatic and crustal sources (Sorey, 2000). New extrusions of mud were observed at Shrub in 2017 and 2019 and are ongoing as of this publication (Cameron and others, 2023).

ACTIVITY ICONS



Documented, unquestioned eruption. If a volcano has both documented and suspected eruptions, only the solid symbol is displayed on the card.



Suspected eruption. Often an eruption documented in a historical account with very little information. Current geologic knowledge must not contradict the eruption account.



Fumaroles above, at, or near the boiling point. If a volcano has both boiling-point or superheated fumaroles and fumaroles of unknown temperature, only the solid symbol is displayed.



Fumaroles of unknown temperature. This symbol is displayed on the card if the volcano has fumaroles, but the temperature of the fumaroles is not known to be near, at, or above boiling point.



Significant, measured, volcanic-related, **deformation** (changes to a volcano's ground surface elevation due to magma movement).



Documented **earthquake swarm** with strongly suspected volcanic cause.



Volcano	Photo Caption
Card Back	Sunlit plume above Pavlof Volcano. Incandescence from lava fountaining visible at summit. View is from Cold Bay. Photo by Doug Damberg, June 2, 2014.
Card Box	Steaming Pavlof Volcano (left) and Pavlof Sister (right), as viewed from the west shore of Unga Island. Photo by Carl Schaefer, June 8, 2017.
Akutan	Akutan volcano summit caldera and active intracaldera cinder cone. Photo by Cindy Werner, USGS, August 18, 2015.
Amak	View of seabirds on Izembek Lagoon, with Amak Island in the distance. Photo by C. Dau, U.S. Fish and Wildlife Service, October 1, 1984.
Amukta	Amukta volcano, on Amukta Island. Photo by U.S. Fish and Wildlife Service, May 31, 1972.
Aniakchak	Aerial view of snow-covered, 6-mile-wide, Aniakchak Caldera on the Alaska Peninsula. View is towards the northeast. Chiginagak Volcano is the high peak on the horizon. Photo courtesy of Roy Wood, National Park Service, 2013.
Atka	The Atka volcanic complex forms the northern part of Atka Island, and includes a possible older caldera and several younger vents, including Korovin Volcano, Mount Kliuchef, and Sarichef Volcano. Photo shows steaming from the Korovin crater lake on July 25, 2019. Photo by Taryn Lopez, UAFGI/AVO.
Augustine	Augustine Volcano viewed from the lagoon on the north side in the morning on June 6, 2022. Photo by Matt Loewen, USGS/AVO.
Bogoslof	Bogoslof Island, August 16, 2018, as viewed from R/V Tiglax. Photo by Cyrus Read, USGS/AVO.
Carlisle	Carlisle Island volcano, as seen from the summit ridge of Tanaġ Angunaġ volcano on August 5, 2015. Photo by John Lyons, USGS/AVO.
Chiginagak	Mount Chiginagak volcano and north flank fumaroles, September 10, 2020. Photo by Malcolm Herstand, DGGS/AVO.
Cleveland	Mount Cleveland's summit, emitting volcanic gases, and northwest flank, June 21, 2021. Photo by Malcolm Herstand, DGGS/AVO.
Douglas	Aerial view of the summit crater lake of Mount Douglas. Photo taken September 10, 2020, by Wyatt Mayo, DGGS/AVO.
Dutton	An AVO field technician upgrades volcano monitoring station DTN on the flank of Mount Dutton volcano. Photo by David Fee, UAFGI/AVO, July 19, 2019.
Edgecumbe	Mount Edgecumbe with Crater Ridge behind and to the north. Photo by Max Kaufman, UAFGI/AVO, May 19, 2022.
Emmons	Mount Emmons and Emmons Lake, within Emmons Lake Caldera in the background. Aghileen Pinnacles (much older volcanic rocks) in the foreground. Photo taken July 17, 2018, by Katherine Mulliken, DGGS/AVO.
Fisher	Fisher Caldera, looking northwest from the south caldera rim, across the caldera floor, to the drainage of Turquoise Lake. Eickelberg Peak is in the background on the right. Photo courtesy of Pete Stelling, 2000.
Fourpeaked	Fourpeaked Mountain during fieldwork in August 2021. The Fourpeaked Glacier is in the foreground. Photo by Matt Loewen, USGS/AVO.
Gareloi	Gareloi Volcano, in the western Aleutian Islands, Alaska. Leveed lava flows from a 1980s eruption drape the south flank of the southern summit crater. The white zone on the crater headwall is an extensive fumarole field. Photo by Game McGimsey, USGS/AVO, September 25, 2003.
Gilbert	Mount Gilbert, a little-studied volcano, forms the northern part of Akun Island. Active fumaroles were documented in the early 1900s. Photo courtesy of Chris Nye, DGGS/AVO, May 10, 1994.

Volcano	Photo Caption
Great Sitkin	West flank of Great Sitkin Volcano on June 11, 2021. Deposits from the May 25, 2021, eruption are visible near the summit crater. Photo by Matt Loewen, USGS/AVO.
Griggs	South flank of Mount Griggs viewed from Valley of Ten Thousand Smokes. Photograph by G. McGimsey, U.S. Geological Survey, July 16, 1990.
Herbert	Herbert Volcano, June 18, 2021. Herbert is a small, island volcano within the "Islands of Four Mountains" group of the central Aleutian Islands. Photo by Malcolm Herstand, DGGs/AVO.
Iliamna	Iliamna Volcano, with Lateral Glacier in the foreground. Photo by Matt Loewen, USGS/AVO, August 14, 2019.
Kagamil	View of Kagamil Volcano from the south. White and reddish patches mark active fumarole areas low on the southern flank. Photo by Steve Smith, August 5, 2003.
Kanaga	East flank of Kanaga Volcano, June 11, 2021. Photo by Matt Loewen, USGS/AVO.
Kasatochi	Kasatochi Island volcano, November 17, 2012, four years after its 2008 eruption. Photo by Roger Clifford.
Katmai- Novarupta	View of the Mount Katmai collapse caldera, which formed in 1912 during the largest eruption of the 20th century. During this eruption, most of the magma was stored beneath Katmai, and erupted from a new vent, Novarupta, about 6 miles away. Photo by Darren Tan, UAFGI/AVO, taken June 12, 2022.
Kiska	Gas plume at Kiska Volcano, created by multiple, individual fumaroles. The yellow material is sulfur. Photo by Taryn Lopez, UAFGI/AVO, September 10, 2015.
Kukak	Active fumaroles on Kukak Volcano. Photo by Judy Fierstein, USGS, July 31, 1999.
Kupreanof	Fumarole field at Mount Kupreanof, June 30, 2019. Photo by Matt Loewen, USGS/AVO.
Little Sitkin	The active stratovolcano on Little Sitkin Island, nestled within the eroded remnants of a nested double caldera. Photo by Ellie Boyce, UAFGI/AVO, June 4, 2021.
Mageik	Mount Magiek in the background, as viewed from Mount Martin, foreground. Photo by Taryn Lopez, UAFGI/AVO, July 13, 2013.
Makushin	Fumaroles at the summit of Makushin Volcano, July 21, 2017. Photo by Cyrus Read, USGS/AVO.
Martin	Summit of Mount Martin, viewed from the southeast. Visible degassing occurs from a large fumarole field on the northwest shore of the summit crater lake. Photo by Christoph Kern, USGS, July 16, 2021.
Shrub mud volcano	Shrub mud volcano, looking east, with the Wrangell Mountains in the background. Photo by Tim Orr, September 16, 2021.
Okmok	Okmok Volcano, looking southwest, April 28, 2021. Photo by Burke Mees.
Pavlof	Pavlof Volcano on July 23, 2017, looking toward the southwest. Photo by Chris Waythomas, July 23, 2017, USGS/AVO.
Peulik	Mount Peulik, viewed from Lower Ugashik inlet, January 13, 2006. Photo by Robert Dreezen.
Recheshnoi	Mount Recheshnoi, Umnak Island, August 10, 2019. Photo by Malcolm Herstand, DGGs/AVO.
Redoubt	North flank of Mount Redoubt, August 9, 2019. Photo by Wyatt Mayo, DGGs/AVO.

Volcano	Photo Caption
Seguam	View of Pyre Peak, the site of Seguam Island's most recent eruptions, and its recent lava flows. Photo courtesy of Brad Singer, University of Wisconsin-Madison, 2004.
Segula	Segula Peak, with Davidof Island in the foreground on June 8, 2021. Photo by Matt Loewen, USGS/AVO.
Semisopochnoi	Steam emissions from the north crater of Mount Young on Semisopochnoi Island on June 8, 2021. Photo by Cyrus Read, USGS/AVO.
Shishaldin	Aerial view of Shishaldin Volcano with Isanotski Volcano in the background taken from a helicopter overflight during geology field work on August 15, 2018. Photo by Matt Loewen, USGS/AVO.
Snowy	View of Snowy Mountain. Photo by Judy Fierstein, USGS, August 4, 2003.
Spurr	View of Mount Spurr and its flank vent, Crater Peak, looking north. Photo by Game McGimsey, USGS/AVO, September 16, 2007.
Tanaġ Angunaġ	Tanaġ Angunaġ volcano, on the eastern half of Chuginadak Island, July 25, 2016. Photo by John Lyons, USGS/AVO.
Tanaga	Tanaga Volcano from the northeast. Photo by Matt Loewen, USGS/AVO, May 23, 2021.
Trident	The multiple peaks of Trident Volcano as viewed from the top of Baked Mountain in the Valley of Ten Thousand Smokes, Alaska. Photograph by Game McGimsey, USGS/AVO, July 12, 1990.
Ukinrek Maars	One of the two maars formed during the 1977 eruption at Ukinrek Maars. Photo by Tina Neal, USGS/AVO, July 3, 1993.
Veniaminof	Mount Veniaminof summit cone and 2018 lava flows. Photo taken on June 29, 2019 by Matt Loewen, USGS/AVO.
Vsevidof	Mount Vsevidof, with Mount Recheshnoi behind it, as viewed from Nikolski, Alaska. Photo by Malcolm Herstand, DGGS/AVO, June 18, 2021.
Westdahl	Westdahl Peak's summit. The Westdahl group of volcanoes includes Westdahl, the site of historical eruptions, Faris Peak, Pogromni, and Pogromni's Sister. Photo by Cyrus Read, USGS/AVO, August 1, 2008.
Wrangell	Two small plumes rise from summit fumaroles on Mount Wrangell, March 15, 2010. Photo by Game McGimsey, USGS/AVO.
Yunaska	The eastern volcanic center on Yunaska Island; a large shield with two overlapping calderas. Photo by Malcolm Herstand, DGGS/AVO, June 18, 2021.

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