Denali

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Denali (/drˈnɑːli/)^{[5][6]} (also known as **Mount McKinley**, its former official name)^[7] is the highest mountain peak in North America, with a summit elevation of 20,310 feet (6,190 m) above sea level. With a topographic prominence of 20,156 feet (6,144 m) and a topographic isolation of 4,629 miles (7,450 km), Denali is the third most prominent and third most isolated peak after Mount Everest and Aconcagua. Located in the Alaska Range in the interior of the U.S. state of Alaska, Denali is the centerpiece of Denali National Park and Preserve.

The Koyukon people who inhabit the area around the mountain have referred to the peak as "Denali" for centuries. In 1896, a gold prospector named it "Mount McKinley" in support of then-presidential candidate William McKinley; that name was the official name recognized by the United States government from 1917 until 2015. In August 2015, following the 1975 lead of the state of Alaska, the U.S. Department of the Interior announced the change of the official name of the mountain to Denali. [8][9]

In 1903, James Wickersham recorded the first attempt at climbing Denali, which was unsuccessful. In 1906, Frederick Cook claimed the first ascent, which was later proven to be false. The first verifiable ascent to Denali's summit was achieved on June 7, 1913, by climbers Hudson Stuck, Harry Karstens, Walter Harper, and Robert Tatum, who went by the South Summit. In 1951, Bradford Washburn pioneered the West Buttress route, considered to be the safest and easiest route, and therefore the most popular currently in use.^[10]

On September 2, 2015, the U.S. Geological Survey announced that the mountain is 20,310 feet (6,190 m) high,^[1] not 20,320 feet (6,194 m), as measured in 1952 using photogrammetry.

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Denali Mount McKinley From the north, with Wonder Lake

Coordinates: 63°04′10″N 151°00′27″W

From the north, with Wonder Lake in the foreground

Highest point					
Elevation	20,310 ft (6190 m) top of snow [1][2] NAVD88				
Prominence	20,146 ft (6140 m) ^[3]				
Isolation	4629 mi (7450 km) ^[3]				
Listing	World most prominent peaks 3rd World most isolated peaks 3rd Continent high points 3rd Country high points 14th North America highest peaks 1st US highest major peaks 1st Alaska highest major peaks 1st U.S. state high points 1st				
Coordinates	63°04′10″N 151°00′27″W ^[4]				

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Geology and features

Denali is a granitic pluton lifted by tectonic pressure from the subduction of the Pacific Plate beneath the North American Plate; at the same time, the sedimentary material above and around the mountain was stripped away by erosion. ^[11] The forces that lifted Denali also cause many deep earthquakes in Alaska and the Aleutian Islands. The Pacific Plate is seismically active beneath Denali, a tectonic region that is known as the "McKinley cluster". ^[12]

Denali has a summit elevation of 20,310 feet (6,190 m) above sea level, making it the highest peak in North America and the northernmost mountain above 6,000 meters elevation in the world. [1] Measured from base to peak at some 18,000 ft (5,500 m), it is among the largest mountains situated entirely above sea level (although some Asian mountains i.e. Rakaposhi, Dhaulagiri and Nanga Parbat are even larger in this regard [13][14][15]). Denali rises from a sloping plain with elevations from 1,000 to 3,000 ft (300 to 910 m), for a base-to-peak height of 17,000 to 19,000 ft (5,000 to 6,000 m). [16] By comparison, Mount Everest rises from the Tibetan Plateau at a much higher base elevation. Base elevations for Everest range from 13,800 ft (4,200 m) on the south side to 17,100 ft (5,200 m) on the Tibetan Plateau, for a base-to-peak height in the range of 12,000 to 15,300 ft (3,700 to 4,700 m). [17] Denali's base-to-peak height is little more than half the 33,500 ft (10,200 m) of the volcano Mauna Kea, which lies mostly under water. [18]



Layout of the mountain

Denali has two significant summits: the South Summit is the higher one, while the North Summit has an elevation of 19,470 ft (5,934 m)^[11] and a prominence of approximately 1,270 ft (387 m).^[19] The North Summit is sometimes counted as a separate peak (see e.g., fourteener) and sometimes not; it is rarely climbed, except by those doing routes on the north side of the massif.

Five large glaciers flow off the slopes of the mountain. The Peters Glacier lies on the northwest side of the massif, while the Muldrow Glacier falls from its northeast slopes. Just to the east of the Muldrow, and abutting the eastern side of the massif, is the Traleika Glacier. The Ruth Glacier lies to the southeast of the mountain, and the Kahiltna Glacier leads up to the southwest side of the mountain. [20][21] With a length of 44 mi (71 km), the Kahiltna Glacier is the longest glacier in the Alaska Range.

Naming

The Koyukon Athabaskans who inhabit the area around the mountain have for centuries referred to the peak as *Dinale* or *Denali*. The name is based on a Koyukon word for "high" or "tall". [22] During the Russian ownership of Alaska, the common name for the mountain was *Bolshaya Gora* (Russian: Большая Гора, *bolshaya* = Russian for *big*; *gora* = Russian for *mountain*), which is the Russian translation of *Denali*. [23] It was briefly called Densmore's Mountain in the late 1880s and early 1890s [24] after Frank Densmore, an Alaskan prospector who was the first European to reach the base of the mountain. [25]

In 1896, a gold prospector named it *McKinley* as political support for then-presidential candidate William McKinley, who became president the following year. The United States formally recognized the name Mount McKinley after President Wilson signed the Mount McKinley National Park Act of February 26, 1917. [26] In 1965, Lyndon B. Johnson declared the north and south peaks of the mountain the "Churchill Peaks", in honor of British statesman Winston Churchill. [27] The Alaska Board of Geographic Names changed the name of the mountain to *Denali* in 1975, which was how it is called locally. [7][28] However, a request in 1975 from the Alaska state legislature to the United States Board on Geographic Names to do the same at the federal level was blocked by Ohio congressman Ralph Regula, whose district included McKinley's hometown of Canton. [29]

On August 30, 2015, just ahead of a presidential visit to Alaska, the Barack Obama administration announced the name *Denali* would be restored in line with the Alaska Geographic Board's designation. [9][30] U.S. Secretary of the Interior Sally Jewell issued the order changing the name to Denali on August 28, 2015, effective immediately. [8] Jewell said the change had been "a long time coming". [31] The renaming of the mountain received praise from Alaska's senior U.S. senator, Lisa Murkowski, [32] who had previously introduced legislation to accomplish the name change, [33] but it drew criticism from several Ohio politicians, such as Governor John Kasich, U.S. Senator Rob Portman, U.S. House Speaker John Boehner, and Representative Bob Gibbs, who described Obama's action as "constitutional overreach" because he said an act of Congress is required to rename the mountain; [34][35][36] The *Alaska Dispatch News* reported that the Secretary of the Interior has authority under federal law to change geographic names when the Board of Geographic Names does not act on a naming request within a "reasonable" period of time. Jewell told the *Alaska Dispatch News* that "I think any of us would think that 40 years is an unreasonable amount of time." [37]

Indigenous names for Denali can be found in seven different Alaskan languages. [38] The names fall into two categories. To the south of the Alaska Range in the Dena'ina and Ahtna languages the mountain is known by names that are translated as "big mountain". To the north of the Alaska Range in the Lower Tanana, Koyukon, Upper Kuskokwim, Holikachuk, and Deg Xinag languages the mountain is known by names that are translated as "the high one", [39] "the tall one" (Koyukon, Lower and Middle Tanana, Upper Kuskokwim, Deg Xinag, and Holikachuk), or "big mountain" (Ahtna and Dena'ina). [40] Asked about the importance of the mountain and its name, Will Mayo, former president of the Tanana Chiefs Conference, an organization that represents 42 Athabaskan tribes in the Alaskan interior, said "It's not one homogeneous belief structure around the mountain, but we all agree that we're all deeply gratified by the acknowledgment of the importance of Denali to Alaska's people." [41]

The following table lists the Alaskan Athabascan names for Denali. [40]

Literal meaning	Native language	Spelling in the local practical alphabet	Spelling in a standardized alphabet	IPA transcription
'the tall one'	Koyukon	Deenaalee	Diinaalii	/di'næli/
	Lower Tanana	Deenadheet, Deenadhee	Diinaadhiit, Diinaadhii	/di'næðid/
	Middle Tanana	Diineezi	Diinaadhi	/diˈnæði/
	Upper Kuskokwim	Denaze	Diinaazii	/di'næzi/
	Deg Xinag	Dengadh, Dengadhi	Dengadh, Dengadhe	/dεˈŋað, dεˈŋaðε/
	Holikachuk	Denadhe	Diinaadhii	/diˈnæði/
'big mountain'	Ahtna	Dghelaay Ce'e, Deghilaay Ce'e	Dghelaay Ke'e, Deghilaay Ke'e	/dγεˈlɔj ˈkɛ²ε/
	Upper Inlet Dena'ina	Dghelay Ka'a	Dghelay Ka'a	/dγεˈlaj ˈka²a/
	Lower Inlet Dena'ina	Dghili Ka'a	Dghili Ka'a	/dɣili ˈka²a/

History

The Koyukon Athabaskans, living in the Yukon, Tanana and Kuskokwim basins, were the first Native Americans with access to the flanks of the mountain. A British naval captain and explorer, George Vancouver, is the first European on record to have sighted Denali, when he noted "distant stupendous mountains" while surveying the Knik Arm of the Cook Inlet on May 6, 1794. The Russian explorer Lavrenty Zagoskin explored the Tanana and Kuskokwim rivers in 1843 and 1844, and was likely the first European to sight the mountain from the other side. A sight of the cook Inlet on May 6, 1794.

William Dickey, a New Hampshire-born resident of Seattle, Washington who had been digging for gold in the sands of the Susitna River, wrote, after his returning from Alaska, an account in the *New York Sun* that appeared on January 24, 1897.^[44] His report drew attention with the sentence "We have no doubt that this peak is the highest in North America, and estimate that it is over 20,000 feet (6,100 m) high." Until then, Mount Logan in Canada's Yukon Territory was believed to be the continent's highest point. Though later praised for his estimate, Dickey admitted that other prospector parties had also guessed the mountain to be over 20,000 feet (6,100 m). [45]

On November 5, 2012, the United States Mint released a twenty-five cent piece depicting Denali National Park. It is the fifteenth of the America the Beautiful Quarters series. The reverse features a Dall sheep with the peak of Denali in the background.^[46]



Hudson Stuck and Harry Karstens, coleaders of the first successful summit of Denali in 1913

Climbing history

The first recorded attempt to climb Denali was by Judge James Wickersham in 1903, via the Peters Glacier and the North Face, now known as the Wickersham Wall. Because of the route's history of avalanche danger, it was not successfully climbed until 1963.^[47]

Famed explorer Dr. Frederick Cook claimed the first ascent of the mountain in 1906. His claim was regarded with some suspicion from the start, but was also widely believed. It was later proved false, with some crucial evidence provided by Bradford Washburn when he was sketched on a lower peak.



High camp (17,200 ft or 5,200 m) of the West Buttress Route pioneered by Bradford Washburn, photographed in 2001

In 1910, four area locals – Tom Lloyd, Peter Anderson, Billy Taylor, and Charles McGonagall – known as the Sourdough Expedition, attempted to climb Denali despite a lack of climbing experience. The group spent approximately three months on the mountain. Their purported summit ascent day included carrying a bag of doughnuts each, a thermos of hot chocolate, and a 14-foot (4.2 m) spruce pole. Two of them reached the North Summit, the lower of the two, and erected



The reverse side of the Denali National Park quarter

the pole near the top. According to the group, the time they took to reach the summit was a total of 18 hours. Until the first ascent in 1913, their claims were disbelieved, in part due to false claims they had climbed both summits.

In 1912, the Parker-Browne expedition nearly reached the summit, turning back within just a few hundred yards of it due to harsh weather. Hours after their ascent, the Great Earthquake of 1912 shattered the glacier they had ascended. [48][49]

The first ascent of the main summit of Denali came on June 7, 1913, by a party led by Hudson Stuck and Harry Karstens. The first man to reach the summit was Walter Harper, an Alaska Native. Robert Tatum also made the summit. Using the mountain's contemporary name, Tatum later commented, "The view from the top of Mount McKinley is like looking out the windows of Heaven!" [50] They ascended the Muldrow Glacier route pioneered by the earlier expeditions, which is still often climbed today. Stuck confirmed, via binoculars, the presence of a large pole near the North Summit; this report confirmed the Sourdough ascent, and today it is widely believed that the Sourdoughs did succeed on the North Summit. However, the pole was never seen before or since, so there is still some doubt. Stuck also discovered that the Parker-Browne party were only about 200 feet (61 m) of elevation short of the true summit when they turned back.

The mountain is regularly climbed today. In 2003, around 58% of climbers reached the top. But by 2003, the mountain had claimed the lives of nearly 100 mountaineers over time. ^[51] The vast majority of climbers use the West Buttress Route, pioneered in 1951 by Bradford Washburn, ^[10] after an extensive aerial photographic analysis of the mountain. Climbers typically take two to four weeks to ascend Denali. It is one of the Seven Summits; summiting all of them is a challenge for mountaineers.

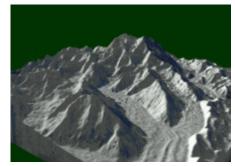
Timeline

- 1896–1902: Surveys by Robert Muldrow, George Eldridge, Alfred Brooks. [52]:221
- 1913: First ascent, by Hudson Stuck, Harry Karstens, Walter Harper, and Robert Tatum via the Muldrow Glacier route. [53]

- 1932: Second ascent, by Alfred Lindley, Harry Liek, Grant Pearson, Erling Strom. (Both peaks were climbed.)^{[52]:320[54]}
- 1947: Barbara Washburn becomes the first woman to reach the summit while her husband Bradford Washburn becomes the first person to summit twice. ^[55]
- 1951: First ascent of the West Buttress Route, led by Bradford Washburn. ^[10]
- 1954: First ascent of the very long South Buttress Route by George Argus, Elton Thayer (died on descent), Morton Wood, and Les Viereck. Deteriorating conditions behind the team pushed them to make the first traverse of Denali. The Great Traleika Cirque, where they camped just below the summit, was renamed Thayer Basin, in honor of the fallen climber. [56][57]
- 1959: First ascent of the West Rib, now a popular, mildly technical route to the summit. [56]
- 1961: First ascent of the Cassin Ridge, named for Riccardo Cassin and the best-known technical route on the mountain. The first ascent team members are: Riccardo Cassin, Luigi Airoldi, Luigi Alippi, Giancarlo Canali, Romano Perego, and Annibale Zucchi. [59][60]
- 1963: A team of six climbers (W. Blesser, P. Lev, R. Newcomb, A. Read, J. Williamson, F. Wright) made the first ascent of the East Buttress. The summit was attained via Thayer Basin and Karstens Ridge. See AAJ 1964.
- 1963: Two teams make first ascents of two different routes on the Wickersham Wall. [61][62]
- 1967: First winter ascent, via the West Buttress, by Dave Johnston, Art Davidson and Ray Genet. [63]
- 1967: Seven members of Joe Wilcox's twelve-man expedition perish, while stranded for ten days near the summit, in what has been described as the worst storm on record. Up to that time, this was the third worst disaster in mountaineering history in terms of lives lost. [64] Before July 1967 only four men had ever perished on Denali. [65]
- 1970: First solo ascent by Naomi Uemura. [66]
- 1970: First ascent by an all-female team, led by Grace Hoeman and the later famous American high altitude mountaineer Arlene Blum together with Margaret Clark, Margaret Young, Faye Kerr and Dana Smith Isherwood. [67][56]
- 1972: First descent on skis down the sheer southwest face, by Sylvain Saudan, "Skier of the Impossible".
- 1976: First solo ascent of the Cassin Ridge by Charlie Porter, a climb "ahead of its time". [59]
- 1979: First ascent by dog team achieved by Susan Butcher, Ray Genet, Brian Okonek, Joe Redington, Sr., and Robert Stapleton. [56]
- 1984: Uemura returns to make the first winter solo ascent, but dies after summitting. ^[68] Tono Križo, František Korl and Blažej Adam from the Slovak Mountaineering Association climb a very direct route to the summit, now known as the Slovak Route, on the south face of the mountain, to the right of the Cassin Ridge. ^[69]
- 1988: First successful winter solo ascent. Vern Tejas climbed the West Buttress alone in February and March, summitted successfully, and descended. [70]
- 1997: First successful ascent up the West Fork of Traleika Glacier up to Karstens Ridge beneath Browne Tower. This path was named the "Butte Direct" by the two climbers Jim Wilson and Jim Blow. [71][72]



Denali's West Buttress (lower left to upper right), August 2010



A three-dimensional representation of the mountain created with topographic data



South view from 27,000 feet (8,200 m)

■ 2015: On June 24, a survey team led by Blaine Horner placed two global positioning receivers on the summit to determine the precise position and elevation of the summit. The summit snow depth was measured at 15 ft (4.6 m). The United States National Geodetic Survey later determined the summit elevation to be 20,310 ft (6,190 metres).^[1]

Weather station

The Japan Alpine Club installed a meteorological station on a ridge near the summit of Denali at an altitude of 18,733 feet (5,710 m) in 1990.^[73] In 1998, this weather station was donated to the International Arctic Research Center at the University of Alaska Fairbanks.^[73] In June 2002, a weather station was placed at the 19,000-foot (5,800 m) level. This weather station was designed to transmit data in real-time for use by the climbing public and the science community. Since its establishment, annual upgrades to the equipment have been performed with instrumentation custom built for the extreme weather and altitude conditions. This weather station is the third-highest weather station in the world.^[74]

The weather station recorded a temperature of -75.5 °F (-59.7 °C) on December 1, 2003. On the previous day of November 30, 2003, a temperature of -74.4 °F (-59.1 °C) combined with a wind speed of 18.4 miles per hour (29.6 km/h) to produce a North American record windchill of -118.1 °F (-83.4 °C).

Even in July, this weather station has recorded temperatures as low as -22.9 °F (-30.5 °C) and windchills as low as -59.2 °F (-50.7 °C).



The east side viewed from Denali National Park and Preserve, which surrounds the mountain

Historical record

The mountain is characterized by extremely cold weather. Temperatures as low as $-75.5\,^{\circ}F$ ($-59.7\,^{\circ}C$) and wind chills as low as $-118.1\,^{\circ}F$ ($-83.4\,^{\circ}C$) have been recorded by an automated weather station located at 18,733 feet (5,700 m). According to the National Park Service, in 1932 the Liek-Lindley expedition recovered a self-recording minimum thermometer left near Browne's Tower, at about 15,000 feet (4,600 m), on Denali by the Stuck-Karstens party in 1913. The spirit thermometer was calibrated down to $-95\,^{\circ}F$ ($-71\,^{\circ}C$), and the lowest recorded temperature was below that point. Harry J. Lek took the thermometer back to Washington, D.C. where it was tested by the United States Weather Bureau and found to be accurate. The lowest temperature that it had recorded was found to be approximately $-100\,^{\circ}F$ ($-73\,^{\circ}C$). Another thermometer was placed at the 15,000 feet (4,600 m) level by the U.S. Army Natick Laboratory, and was there from 1950 to 1969. The coldest temperature recorded during that period was also $-100\,^{\circ}F$ ($-73\,^{\circ}C$). [76]

Subpeaks and nearby mountains

Besides the North Summit mentioned above, other features on the massif which are sometimes included as separate peaks are:

- South Buttress, 15,885 feet (4,842 m); mean prominence: 335 feet (102 m)
- East Buttress high point, 14,730 feet (4,490 m); mean prominence: 380 feet (120 m)

- East Buttress, most topographically prominent point, 14,650 feet (4,470 m); mean prominence: 600 feet (180 m)
- Browne Tower, 14,530 feet (4,430 m); mean prominence: 75 feet (23 m)

Nearby peaks include:

- Mount Foraker
- Mount Silverthrone
- Mount Hunter
- Mount Huntington
- Mount Dickey
- The Moose's Tooth



Denali, here shrouded in clouds, is large enough to create its own localized weather

Taxonomic honors

- denaliensis
 - Ceratozetella denaliensis (formerly Cyrtozetes denaliensis Behan-Pelletier, 1985) is a species of moss mite in the family Mycobatidae sv:Ceratozetella denaliensis
 - Magnoavipes denaliensis Fiorillo et al., 2011 (literally "bird with large feet found in Denali") is a Magnoavipes ichnospecies of bird footprint
 from the Upper Cretaceous of Alaska and was a large heron-like bird (as larger than a sandhill crane) with three toes and toe pads.
 pt:Magnoavipes denaliensis
- denali
 - Cosberella denali (Fjellberg, 1985) is a springtail. sv:Cosberella denali
 - Proclossiana aphirape denali Klots, 1940 is a Boloria butterfly species of the Heliconiinae subfamily of Nymphalidae.
 - Symplecta denali (Alexander, 1955) is a species of crane fly in the family Limoniidae. sv:Symplecta denali
 - Tipula denali Alexander, 1969 is a species of crane fly in the family Tipulidae. sv:Tipula denali
- denalii
 - Erigeron denalii A. Nelson, 1945 or Denali fleabane is an Erigeron fleabane species.
 - Papaver denalii Gjaerevoll 1963 is an Papaver species and syn. of Papaver mcconnellii
- mckinleyensis or mackinleyensis
 - Erebia mackinleyensis (Gunder, 1932) or Mt. McKinley alpine is a butterfly species of the Satyrinae subfamily of Nymphalidae.
 - Oeneis mackinleyensis Dos Passos 1965 or Oeneis mckinleyensis Dos Passos 1949 is a butterfly species of the Satyrinae subfamily of Nymphalidae (syn. of Oeneis bore)
 - *Uredo mckinleyensis* Cummins 1952 or *Uredo mackinleyensis* Cummins 1952 is a rust fungus species.

See also

- List of mountain peaks of North America
 - List of mountain peaks of the United States

- List of mountain peaks of Alaska
- List of U.S. states by elevation
- List of the highest major summits of the United States
- List of the most prominent summits of the United States
- List of the most isolated major summits of the United States

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