

Factors Influencing Climate

Below are a series of locations. Each location is influenced by one of the four factors. It is your job to look at the information provided and determine which of the four factors **MOST** influences the climate of this location. You should then explain why the other factors play a less important role.

1. Butte, MT, USA: 45°59'56"N 112°31'27"W

Elevation: 5,538 ft (1,688 m)

Climate data for Butte, Montana (Bert Mooney Airport), 1991–2020 normals, extremes 1894–present													[hide]
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Record high °F (°C)	58 (14)	61 (16)	69 (21)	83 (28)	90 (32)	97 (36)	100 (38)	99 (37)	96 (36)	85 (29)	70 (21)	66 (19)	100 (38)
Mean maximum °F (°C)	48.0 (8.9)	50.1 (10.1)	60.1 (15.6)	70.2 (21.2)	78.9 (26.1)	86.9 (30.5)	92.2 (33.4)	91.3 (32.9)	86.1 (30.1)	74.8 (23.8)	59.2 (15.1)	47.5 (8.6)	93.1 (33.9)
Average high °F (°C)	32.1 (0.1)	34.6 (1.4)	43.7 (6.5)	51.1 (10.6)	61.0 (16.1)	70.0 (21.1)	81.3 (27.4)	79.8 (26.6)	69.1 (20.6)	54.3 (12.4)	40.2 (4.6)	30.7 (−0.7)	54.0 (12.2)
Daily mean °F (°C)	20.0 (−6.7)	22.2 (−5.4)	31.6 (−0.2)	38.7 (3.7)	47.6 (8.7)	55.5 (13.1)	63.6 (17.6)	61.8 (16.6)	52.8 (11.6)	40.6 (4.8)	27.8 (−2.3)	19.0 (−7.2)	40.1 (4.5)
Average low °F (°C)	7.9 (−13.4)	9.8 (−12.3)	19.4 (−7.0)	26.4 (−3.1)	34.3 (1.3)	41.1 (5.1)	45.9 (7.7)	43.9 (6.6)	36.5 (2.5)	26.8 (−2.9)	15.5 (−9.2)	7.2 (−13.8)	26.2 (−3.2)
Mean minimum °F (°C)	−19.6 (−28.7)	−15.7 (−26.5)	−1.3 (−18.5)	12.4 (−10.9)	21.5 (−5.8)	29.7 (−1.3)	36.3 (2.4)	33.8 (1.0)	24.1 (−4.4)	8.0 (−13.3)	−8.9 (−22.7)	−18.2 (−27.9)	−27.7 (−33.2)
Record low °F (°C)	−48 (−44)	−52 (−47)	−36 (−38)	−16 (−27)	9 (−13)	22 (−6)	28 (−2)	23 (−5)	3 (−16)	−23 (−31)	−42 (−41)	−52 (−47)	−52 (−47)
Average precipitation inches (mm)	0.42 (11)	0.43 (11)	0.64 (16)	1.33 (34)	2.02 (51)	2.45 (62)	1.20 (30)	1.28 (33)	1.07 (27)	0.84 (21)	0.60 (15)	0.48 (12)	12.76 (323)
Average snowfall inches (cm)	8.5 (22)	7.4 (19)	10.1 (26)	6.9 (18)	3.7 (9.4)	0.5 (1.3)	0.0 (0.0)	0.1 (0.25)	1.1 (2.8)	3.7 (9.4)	6.6 (17)	8.3 (21)	56.9 (146.15)
Average precipitation days (≥ 0.01 in)	6.8	7.4	8.8	11.2	13.0	13.7	8.7	7.7	6.9	8.2	7.8	7.2	107.4
Average snowy days (≥ 0.1 in)	8.0	7.5	9.1	6.0	2.7	0.4	0.0	0.1	0.8	2.8	6.7	7.8	51.9

Source 1: NOAA^[94]

Source 2: National Weather Service (average snowfall/snow days 1894–2001)^[96]

2. Vancouver, Canada: [49°15'40"N 123°06'50"W](#)

Elevation: 0 m (0 ft)

Climate data for Richmond (Vancouver International Airport) [hide]													
Climate ID: 1108447; coordinates 49°11'42"N 123°10'55"W ; elevation: 4.3 m (14 ft); 1981-2010 normals, extremes 1898–present ^[a]													
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Record high humidex	17.2	18.0	20.3	23.9	33.7	38.4	38.3	35.9	33.0	27.2	21.1	16.1	38.4
Record high °C (°F)	15.3 (59.5)	18.4 (65.1)	20.0 (68.0)	26.1 (79.0)	30.4 (86.7)	33.3 (91.9)	34.4 (93.9)	33.3 (91.9)	30.0 (86.0)	25.0 (77.0)	23.3 (73.9)	15.0 (59.0)	34.4 (93.9)
Average high °C (°F)	6.9 (44.4)	8.2 (46.8)	10.3 (50.5)	13.2 (55.8)	16.7 (62.1)	19.6 (67.3)	22.2 (72.0)	22.2 (72.0)	18.9 (66.0)	13.5 (56.3)	9.2 (48.6)	6.3 (43.3)	13.9 (57.0)
Daily mean °C (°F)	4.1 (39.4)	4.9 (40.8)	6.9 (44.4)	9.4 (48.9)	12.8 (55.0)	15.7 (60.3)	18.0 (64.4)	18.0 (64.4)	14.9 (58.8)	10.3 (50.5)	6.3 (43.3)	3.6 (38.5)	10.4 (50.7)
Average low °C (°F)	1.4 (34.5)	1.6 (34.9)	3.4 (38.1)	5.6 (42.1)	8.8 (47.8)	11.7 (53.1)	13.7 (56.7)	13.8 (56.8)	10.8 (51.4)	7.0 (44.6)	3.5 (38.3)	0.8 (33.4)	6.8 (44.2)
Record low °C (°F)	−17.8 (0.0)	−16.1 (3.0)	−9.4 (15.1)	−3.3 (26.1)	0.6 (33.1)	3.9 (39.0)	6.1 (43.0)	3.9 (39.0)	−1.1 (30.0)	−6.1 (21.0)	−14.3 (6.3)	−17.8 (0.0)	−17.8 (0.0)
Record low wind chill	−22.6	−21.2	−14.5	−5.4	0.0	0.0	0.0	0.0	0.0	−11.4	−21.3	−27.8	−27.8
Average precipitation mm (inches)	168.4 (6.63)	104.6 (4.12)	113.9 (4.48)	88.5 (3.48)	65.0 (2.56)	53.8 (2.12)	35.6 (1.40)	36.7 (1.44)	50.9 (2.00)	120.8 (4.76)	188.9 (7.44)	161.9 (6.37)	1,189 (46.81)
Average rainfall mm (inches)	157.5 (6.20)	98.9 (3.89)	111.8 (4.40)	88.1 (3.47)	65.0 (2.56)	53.8 (2.12)	35.6 (1.40)	36.7 (1.44)	50.9 (2.00)	120.7 (4.75)	185.8 (7.31)	148.3 (5.84)	1,153.1 (45.38)
Average snowfall cm (inches)	11.1 (4.4)	6.3 (2.5)	2.3 (0.9)	0.3 (0.1)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.1 (0.0)	3.2 (1.3)	14.8 (5.8)	38.1 (15.0)
Average precipitation days (≥ 0.2 mm)	19.5	15.4	17.7	14.8	13.2	11.5	6.3	6.7	8.3	15.4	20.4	19.7	168.9
Average rainy days (≥ 0.2 mm)	18.4	14.7	17.5	14.8	13.2	11.5	6.3	6.8	8.3	15.4	19.9	18.4	165.2
Average snowy days (≥ 0.2 cm)	2.6	1.4	0.9	0.2	0.0	0.0	0.0	0.0	0.0	0.03	0.8	2.8	8.73
Average relative humidity (%)	81.2	74.5	70.1	65.4	63.5	62.2	61.4	61.8	67.2	75.6	79.5	80.9	70.3
Mean monthly sunshine hours	60.2	91.0	134.8	185.0	222.5	226.9	289.8	277.1	212.8	120.7	60.4	56.5	1,937.5
Percent possible sunshine	22.3	31.8	36.6	45.0	46.9	46.8	59.3	62.1	56.1	36.0	21.9	22.0	40.6
Average ultraviolet index	1	1	3	4	6	6	7	6	4	2	1	1	4

Source 1: Environment and Climate Change Canada^{[a][b][c][d][e][f][g][h][i][j][k][l][m][n][o][p][q][r][s][t][u][v][w][x][y][z]}

Source 2: Weather Atlas(UV)^[97]

3. **Cusco, Peru:** 13°31'30"S 71°58'20"W

Elevation: 3,399 m (11,152 ft)

Climate data for Cusco (Alejandro Velasco Astete International Airport) 1961-1990, extremes 1931-present													[hide]
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Record high °C (°F)	27.8 (82.0)	26.7 (80.1)	25.3 (77.5)	26.9 (80.4)	27.0 (80.6)	24.2 (75.6)	24.2 (75.6)	25.8 (78.4)	25.9 (78.6)	27.2 (81.0)	26.6 (79.9)	29.9 (85.8)	29.9 (85.8)
Average high °C (°F)	18.8 (65.8)	18.8 (65.8)	19.1 (66.4)	19.7 (67.5)	19.7 (67.5)	19.4 (66.9)	19.2 (66.6)	19.9 (67.8)	20.1 (68.2)	20.9 (69.6)	20.6 (69.1)	20.8 (69.4)	19.8 (67.6)
Daily mean °C (°F)	12.9 (55.2)	12.7 (54.9)	12.8 (55.0)	12.7 (54.9)	12.0 (53.6)	11.4 (52.5)	10.8 (51.4)	11.5 (52.7)	12.7 (54.9)	13.6 (56.5)	13.6 (56.5)	13.2 (55.8)	12.5 (54.5)
Average low °C (°F)	6.6 (43.9)	6.6 (43.9)	6.3 (43.3)	5.1 (41.2)	2.7 (36.9)	0.5 (32.9)	0.2 (32.4)	1.7 (35.1)	4.0 (39.2)	5.5 (41.9)	6.0 (42.8)	6.5 (43.7)	4.3 (39.7)
Record low °C (°F)	0.0 (32.0)	0.0 (32.0)	0.0 (32.0)	−2.0 (28.4)	−7.0 (19.4)	−4.5 (23.9)	−7.0 (19.4)	−6.0 (21.2)	−6.0 (21.2)	0.0 (32.0)	0.0 (32.0)	0.5 (32.9)	−7.0 (19.4)
Average rainfall mm (inches)	160.0 (6.30)	132.9 (5.23)	108.4 (4.27)	44.4 (1.75)	8.6 (0.34)	2.4 (0.09)	3.9 (0.15)	8.0 (0.31)	22.4 (0.88)	47.3 (1.86)	78.6 (3.09)	120.1 (4.73)	737 (29)
Average rainy days (≥ 1.0 mm)	19	15	13	9	2	1	1	2	5	9	13	16	105
Average relative humidity (%)	66	67	66	63	59	55	54	54	56	56	58	62	60
Mean monthly sunshine hours	143	121	170	210	239	228	257	236	195	198	195	158	2,350
Source 1: NOAA, ^[32] Meteo Climat (record highs and lows) ^[33]													
Source 2: Deutscher Wetterdienst (mean temperatures 1961-1990, precipitation days 1970-1990 and humidity 1954-1993) ^[34] Danish Meteorological Institute (sun 1931-1960) ^[35]													

4. **Ben Nevis, Scotland:** 56°47'49"N 5°00'13"W

Elevation: 1,345 m (4,413 ft)

Climate data for Aonach Mòr, elevation 1,130 m (3,710 ft), 1991–2020 normals													[hide]
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Average high °C (°F)	0.3 (32.5)	−0.2 (31.6)	0.9 (33.6)	3.2 (37.8)	6.2 (43.2)	8.3 (46.9)	10.3 (50.5)	10.0 (50.0)	8.3 (46.9)	4.8 (40.6)	2.1 (35.8)	0.8 (33.4)	4.6 (40.3)
Daily mean °C (°F)	−0.7 (30.7)	−1.8 (28.8)	−1.2 (29.8)	0.8 (33.4)	4.0 (39.2)	6.7 (44.1)	7.9 (46.2)	7.9 (46.2)	7.2 (45.0)	3.3 (37.9)	1.3 (34.3)	−1.4 (29.5)	2.9 (37.2)
Average low °C (°F)	−1.7 (28.9)	−3.4 (25.9)	−3.3 (26.1)	−1.5 (29.3)	1.9 (35.4)	5.1 (41.2)	5.5 (41.9)	5.8 (42.4)	6.1 (43.0)	1.8 (35.2)	0.5 (32.9)	−3.6 (25.5)	1.1 (34.0)
Source: Met Office ^[22]													

5. Topeka, KS, USA: [39°03'21"N 95°41'22"W](#)

Elevation: 948 ft (289 m)

Climate data for Topeka, Kansas (Philip Billard Municipal Airport), 1981–2010 normals, extremes 1887–present ^[a]														[hide]
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	
Record high °F (°C)	78 (26)	84 (29)	93 (34)	97 (36)	103 (39)	109 (43)	114 (46)	113 (45)	110 (43)	97 (36)	85 (29)	77 (25)	114 (46)	
Mean maximum °F (°C)	63.0 (17.2)	69.4 (20.8)	78.7 (25.9)	86.1 (30.1)	90.2 (32.3)	94.8 (34.9)	99.7 (37.6)	100.0 (37.8)	93.7 (34.3)	86.8 (30.4)	74.5 (23.6)	63.7 (17.6)	101.8 (38.8)	
Average high °F (°C)	39.9 (4.4)	45.0 (7.2)	56.4 (13.6)	66.7 (19.3)	75.9 (24.4)	84.7 (29.3)	89.5 (31.9)	88.6 (31.4)	80.4 (26.9)	68.4 (20.2)	54.6 (12.6)	41.7 (5.4)	66.1 (18.9)	
Daily mean °F (°C)	29.7 (−1.3)	34.4 (1.3)	44.8 (7.1)	55.1 (12.8)	65.0 (18.3)	74.2 (23.4)	79.0 (26.1)	77.4 (25.2)	68.4 (20.2)	56.6 (13.7)	43.8 (6.6)	32.0 (0.0)	55.0 (12.8)	
Average low °F (°C)	19.6 (−6.9)	23.8 (−4.6)	33.3 (0.7)	43.5 (6.4)	54.2 (12.3)	63.7 (17.6)	68.4 (20.2)	66.2 (19.0)	56.3 (13.5)	44.7 (7.1)	33.0 (0.6)	22.3 (−5.4)	44.2 (6.8)	
Mean minimum °F (°C)	0.2 (−17.7)	3.2 (−16.0)	15.7 (−9.1)	27.1 (−2.7)	38.8 (3.8)	50.4 (10.2)	56.6 (13.7)	53.4 (11.9)	38.8 (3.8)	27.9 (−2.3)	16.7 (−8.5)	3.1 (−16.1)	−6.3 (−21.3)	
Record low °F (°C)	−23 (−31)	−25 (−32)	−7 (−22)	10 (−12)	26 (−3)	36 (2)	43 (6)	40 (4)	29 (−2)	16 (−9)	−5 (−21)	−26 (−32)	−26 (−32)	
Average precipitation inches (mm)	0.86 (22)	1.32 (34)	2.49 (63)	3.53 (90)	4.91 (125)	5.40 (137)	3.82 (97)	4.24 (108)	3.66 (93)	3.03 (77)	1.85 (47)	1.35 (34)	36.46 (926)	
Average snowfall inches (cm)	4.9 (12)	4.5 (11)	1.6 (4.1)	0.3 (0.76)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.3 (0.76)	1.0 (2.5)	5.2 (13)	17.8 (45)	
Average precipitation days (≥ 0.01 in)	5.5	6.3	9.0	9.7	11.6	11.5	8.7	8.6	7.8	8.1	6.8	6.0	99.6	
Average snowy days (≥ 0.1 in)	3.6	2.9	1.3	0.3	0	0	0	0	0	0	1.2	3.4	12.7	
Average relative humidity (%)	69.7	69.2	65.8	64.1	68.5	71.2	69.9	70.8	72.4	68.0	70.8	72.3	69.4	
Mean monthly sunshine hours	177.4	168.8	212.6	231.7	268.5	293.0	326.9	291.7	233.4	212.4	157.8	150.5	2,724.7	
Percent possible sunshine	59	56	57	58	60	66	72	69	63	61	52	51	61	

Source: NOAA (relative humidity and sun 1961–1990)^{[32][33][34]}