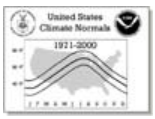
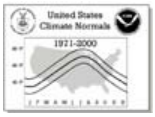




NOAA Satellite and Information Service
National Environmental Satellite, Data, and Information Service (NESDIS)

National Climatic Data Center
U.S. Department of Commerce

DOC > NOAA > NESDIS > NCDC Search Field: Search NCDC

Overview

Product Selection

NWS Inquiries

U.S. Climate Normals

Product Selection

Climate normals products currently available online (detailed information):

* NEW! FREE Climates of the States (CLIM60)
* NEW! FREE USCRN Estimated Monthly Normals 1971-2000
* FREE Dynamic Normals Products
* FREE Frost/Freeze Data 1971-2000 (CLIM20-01)
* FREE Monthly Station Climate Summaries (CLIM20)
* FREE Daily Station Normals 1971-2000 (CLIM84)
* FREE Monthly Station Normals 1971-2000 (CLIM81)
* FREE Monthly Precipitation Probabilities 1971-2000 (CLIM81-01)
* FREE Annual Degree Days to Selected Bases 1971-2000 (CLIM81-02)
* FREE Monthly Divisional Normals/Standard Deviations 1971-2000 (CLIM85)
* FREE Snow Normals 1971-2000 (CLIM20-02)
* FREE Population-Weighted State, Regional, and National Monthly Degree Days (HCS 5-1;2)
* FREE Area-Weighted State, Regional, and National Temp. and Precip. (HCS 4-1;2;3)
* FREE Maps of Annual 1961-1990 Normal Temp., Precip. and Degree Days (CLIM81-03)

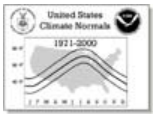
Privacy Policy FIRSTGOV Disclaimer

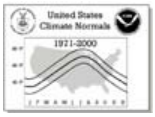
http://hurricane.ncdc.noaa.gov/cgi-bin/climatenormals/climatenormals.pl
Sat Nov 5 23:40:44 EDT 2011
Created By: douglas.p.ross@noaa.gov
Last Updated Friday, 24-Jun-2005 08:52:59 EDT by douglas.p.ross@noaa.gov
Please see the NCDC Contact Page if you have questions or comments.

NCDC (National Climatic Data Center), 2011, *Climates of the States (CLIM60): Climate of Colorado*, National Oceanic and Atmospheric Administration, Satellite and Information Service. Available at http://cdo.ncdc.noaa.gov/cgi-bin/climatenormals/climatenormals.pl. Accessed Nov. 5, 2011.

NOAA Satellite and Information Service
National Environmental Satellite, Data, and Information Service (NESDIS)

National Climatic Data Center
U.S. Department of Commerce





U.S. Climate Normals

Product Selection

Climates of the States, Climatography of the UNited States No. 60

These are a modified version of the "Climatography of the United States, #60,Climate of the States," which were first issued by National Oceanic and Atmospheric Climatologist assigned to the various states. Each document is a narrative describing the geography and climate of the state. Internet links to various state and station climate summaries and other weather data are also included in the documents.

The following individuals from the American Association of State Climatologists are acknowledged for their contributions to their respective state's narrative: Alabama - John Christy; Colorado - Nolan Doesken, Roger Pielke, Sr., and Odilia Bliss; Florida - Jim O'Brien and David Zierden; Georgia - David Stooksbury and Pam Knox; Idaho - Russ Qualls; Indiana - Dev Niyogi and Ken Scheeringa; Iowa - Harry Hillaker; Kansas - Mary Knapp; Kentucky - Stuart Foster and Glen Conner; Maine - Greg Zielinski; Maryland - Ken Pickering; Michigan - Jeff Andresen; Minnesota - Jim Zandlo and Peter Boulay; Mississippi - Charles Wax; Missouri - Adnan Akyuz and Pat Guinan; New Hampshire - David Brown and Barry Keim; New Jersey - David Robinson; New York - Mark Wysocki and Keith Eggleston; North Carolina - Sethu Raman and Ryan Boyles; North Dakota - John Enz; Ohio - Jeff Rogers; Oklahoma - Ken Crawford; Pennsylvania - Paul Knight; South Carolina - Hope Mizzell and Milt Brown; Texas - John Nielsen-Gammon; Vermont - Lesley-Ann Dupigny-Giroux; Virginia - Pat Michaels and Jerry Stanger; Wisconsin - John Young; and Wyoming - Jan Curtis.

Select a State :

Click State Name
Alabama
Alaska
Arizona
Arkansas
California

http://hurricane.ncdc.noaa.gov/cgi-bin/climatenormals/climatenormals.pl
Sat Nov 5 23:41:06 EDT 2011
Created By: douglas.p.ross@noaa.gov
Last Updated Friday, 24-Jun-2005 08:52:59 EDT by douglas.p.ross@noaa.gov
Please see the NCDC Contact Page if you have questions or comments.

Climate of Colorado

Introduction

This publication consists of a narrative that describes some of the principal climatic features and a number of climatological summaries for stations in various geographic regions of the State. The detailed information presented should be sufficient for general use; however, some users may require additional information.

The National Climatic Data Center (NCDC) located in Asheville, North Carolina is authorized to perform special services for other government agencies and for private clients at the expense of the requester. The amount charged in all cases is intended to solely defray the expenses incurred by the government in satisfying such specific requests to the best of its ability. It is essential that requesters furnish the NCDC with a precise statement describing the problem so that a mutual understanding of the specifications is reached.

Unpublished climatological summaries have been prepared for a wide variety of users to fit specific applications. These include wind and temperature studies at airports, heating and cooling degree day information for energy studies, and many others. Tabulations produced as by-products of major products often contain information useful for unrelated special problems.

The Means and Extremes of meteorological variables in the Climatography of the U.S. No.20 series are recorded by observers in the cooperative network. The Normals, Means and Extremes in the Local Climatological Data, annuals are computed from observations taken primarily at airports.

The editor of this publication expresses his thanks to those State Climatologists, who, over the years, have made significant and lasting contributions toward the development of this very useful series.

State and Station Normals are available at:
http://cdo.ncdc.noaa.gov/cgi-bin/climatenormals/climatenormals.pl

Visit our Web Site for other weather data: www.ncdc.noaa.gov

Non-Subscription Request:
Climate Services Branch
National Climatic Data Center
151 Patton Avenue
Asheville, North Carolina 28801-5001
Telephone: 828-271-4800
Facsimile: 828-271-4876
E-mail: **ncdc.orders@noaa.gov**
TDD: 828-271-4010

Hard Copy Subscription Request:
NCDC Subscripting Service Center
310 State Route 956
Building 300
Rocket Center, West Virginia 26726
Toll-Free Telephone:
866-742-3322

Climate of Colorado

Topographic Features- Colorado lies astride the highest mountains of the Continental Divide. Nearly rectangular, its north and south boundaries are the 41° and 37° North latitude parallels, respectively. The east and west boundaries are the 102° and 109° West meridians. It is eighth in size among the 50 states, with an area of over 104,000 square miles. Although known for its mountains, nearly 40 percent of its area is taken up by the eastern high plains.

Of particular importance to the climate are Colorado's interior continental location in the middle latitudes, the high elevation of the entire region, and the mountains and ranges extending north and south approximately through the middle of the State. With an average altitude of about 6,800 feet above sea level, Colorado is the highest contiguous State in the Union. Roughly three-quarters of the 48 contiguous states' land above 10,000 feet altitude lies within its borders. The State has 59 mountains in excess of 14,000 feet and about 830 mountains between 11,000 and 14,000 feet in elevation.

Gradually emerging from the plains of Kansas and Nebraska, the high plains of Colorado gently slope upward for a distance of some 200 miles from the eastern border to the base of the foothills of the Rocky Mountains. The eastern portion of the State is generally level to rolling prairie broken by occasional hills and bluffs. Although subtle when compared to the high mountains of the Rockies, there are also important topographic features across eastern Colorado. Two major river valleys dissect eastern Colorado, the South Platte River in northeastern Colorado and the Arkansas River in the southeast. Higher ground extends eastward from the Rockies between the river valleys. High ground also extends eastward along the New Mexico border to the south and along the Wyoming and Nebraska borders to the north. These features have an impact on temperatures, wind patterns and storm tracks in all seasons.

Elevations along the eastern border of Colorado range from 3,350 feet at the lowest point in the State where the Arkansas River crosses into Kansas to near 4,000 feet. Elevations increase towards the west to between 5,000 and 6,500 feet where the plains meet the Front Range of the Rocky Mountain chain. Here elevations rise abruptly to 7,000 to 9,000 feet. Backing the foothills are the mountain ranges above 9,000 feet with the higher peaks over 14,000 feet. The most dramatic feature is Pike's Peak near Colorado Springs where elevations rise abruptly from 4,662 feet at Pueblo, in the Arkansas valley, to 14,110 feet at the mountain summit. During the summer months, this topographic feature becomes a "thunderstorm machine" as thunderstorms develop almost any day that humidity is sufficiently high.

West of these "front ranges" are additional ranges, generally extending north/south, but with many spurs and extensions in other directions. These ranges enclose numerous high mountain parks and valleys. Farther westward, the mountains give way to rugged plateau country in the form of high mesas (some more than 10,000 feet in elevation) which extends to the western

border of the State. This land is often cut by rugged canyons, the work of the many steams fed by accumulations of winter snow.

Colorado is a headwater state. All rivers in Colorado rise within its borders and flow outward, with the exception of the Green River, which flows diagonally across the extreme northwestern corner of the State. Four of the Nation's major rivers have their source in Colorado, the: Colorado, Rio Grande, Arkansas and Platte.

Most of Colorado has a climate commonly thought of as a mountain climate. Generally, the Colorado climate is cool and comfortable. The humidity is low and temperatures are moderated by the altitude. The thin atmosphere allows for a greater penetration of solar radiation and results in pleasant temperatures even during the winter months. This accounts for the general lack of heavy clothing being worn by some skiers.

The mountains are the most significant moderators of Colorado's climate. They have an effect on all aspects of weather passing through the State. Huge variations in weather can be felt in relatively short distances. For example, the difference in annual mean temperature between Pikes Peak and Las Animas is equal to that of Iceland and Florida. This is a large range when you take into account the 100 miles between Pikes Peak and Las Animas versus the several thousand miles between Florida and Iceland. Similar effects on precipitation can be observed. The general patterns of mountainous climate can be further modified by the orientation of the mountain slopes with the prevailing winds in creating local air movements.

As a result of the State's distance from major sources of moisture, precipitation is usually light in the lower elevations. Prevailing air currents reach Colorado from westerly directions. Storms that have their origin in the Pacific Ocean lose much of their moisture as they pass over the mountains. The Eastern slopes of the State's mountains receive very little rain, especially in the heart of winter.

Storms moving from the north usually carry little moisture. The frequency of such storms increases during the fall and winter, and then decreases rapidly in the spring. The accompanying outbreaks of polar air are responsible for the sudden drops in temperature often experienced in the plains sections of the State. Occasionally these outbreaks are attended by strong northerly winds which come in contact with moist air from the south; the interaction of these air masses can cause a heavy fall of snow and the most severe of all weather conditions of the high plains, the blizzard. This cold air is frequently too shallow to cross the mountains to the western portion of the State so while the plains are in the grip of a very severe storm, the weather in the mountains and western valleys may be mild.

Occasionally, when the plains are covered with a shallow layer of cold air strong, westerly winds aloft work their way to the surface. Warmed by rapid descent from higher levels, these winds bring large and sudden temperature rises. This phenomenon is the "Chinook" of the high plains. Temperature rises of 25 to 35 degrees Fahrenheit (° F) within a short time are not uncommon. Chinook winds greatly moderate average winter temperatures in areas near enough to the mountains to experience them frequently. Due to these wind patterns, some locations in the eastern foothills are warmer than adjacent areas on the eastern plains on many days during the

winter.

Warm, moist air from the south moves into Colorado infrequently, but most often in the spring, summer and early autumn. As this air is carried northward and westward to higher elevations, the heaviest and most general rainfalls (and sometimes wet snows) occur over the eastern portions of the State from April through early September. For southern and western Colorado, the intrusions of moist air are most common from mid-July into September associated with wind patterns sometimes called the "Southwest Monsoon". Frequent showers and thunderstorms continue through the summer. At times during the summer, winds shift to the southwest and bring hot, dry air from the desert Southwest over the State. Such hot spells are usually of short duration.

Temperature- Colorado's topography plays such a large role in dictating the State's temperatures. It is not uncommon for temperatures to differ by 10 to 15° F within a 50 mile radius. Elevation is the main reason for this observed difference. The effect of elevation on temperature is what makes it difficult to summarize Colorado climate. In the winter, much of the State below 5,000 feet has maximum temperatures of 40 to 48° F. Above 5,000 feet, a cooling with altitude is noticed. The average maximum mean temperatures for the higher elevations of Colorado range from 28 to 40° F throughout the winter. The mean maximum temperature for January at stations at 5,000 feet elevation is about 40° F, while stations at elevations of 7,000 feet have temperatures near 32° F, and stations at elevations of 8,000 feet have temperatures around 25. Colorado's topography has the effect of making temperatures consistent day-to-day. It requires a relatively deep wedge of cold air to make the temperatures of the mountains to drop significantly below normal. However, the normal low temperatures for many of the stations are very cold with mean winter lows in the 14 to 17° F range. Some of the higher elevations even have mean winter lows that are subzero. Occasionally, an unusually cold air mass remains over the State. Several stations have recorded temperatures as low as -30° F, while other stations have reported extreme lows as being in the -20 range. On February 1, 1985, Maybell, elevation 5,920 feet, posted Colorado's lowest temperature on record at -61° F.

Temperatures warm rapidly from March to May but still maintain a chilly feel. Many of the observing stations record mean temperatures in March and April not exceeding 40° F. This is significant because much of the State experiences maximum temperatures in March and April between 45 and 61° F. This means that for most of March and April nighttime temperatures are at freezing or below. This is one factor that makes snow skiing such a successful industry in Colorado.

The summer months have temperature trends that are similar to that of the winter. The higher you are the cooler you will be. Many of the stations have peak summer mean maximum temperatures from 80 in the mountains to 90° F in the eastern high plains. The position of Colorado with in the North American continent makes for a very comfortable summer. It is rare to see a humid air mass encompass the entire State. So the heat of summer is not quite as oppressive as that felt in the eastern United States. Colorado summers are not free from excessive heat. Several stations report extreme high temperatures well above 100° F. The State's highest recorded temperature was 118° F at Bennett, elevation 5,484 on July 11, 1888.

Precipitation- An important feature of the precipitation in the plains is the seasonal cycle. A very large proportion (70 to 80 percent of the annual total) falls during the growing season from April through September. Cool season precipitation can be important for soil moisture recharge, but mid-winter precipitation is light and infrequent. More often, winter brings dry air and strong winds contributing to the aridity of the area. From early March through early June, periodic widespread storms bring soaking beneficial moisture that helps crops and grasslands. Summer precipitation over the plains comes largely from thunderstorm activity and is sometimes extremely heavy. Localized rains in excess of four inches sometimes fall in just a few hours contributing to local flooding. In late May 1935, nearly two feet of rain fell along the Republican River in eastern Colorado causing one of the worst floods in the State's history. June flash floods in 1965 were also devastating. The weather station at Holly, in southeastern Colorado, measured 18.82" of rainfall in that extraordinarily wet month. It is more common, however, to be too dry. Annual average precipitation ranges from less than 12 inches in the Arkansas Valley between Pueblo and Las Animas to almost 18 inches in extreme northeastern and southeastern corners of the State. Many years are drier than average, and some years receive less than half the long-term average. The region seems almost always in or on the verge of drought. Multi-year drought is common to the area such as the decade-long drought of the 1930s, the severe drought of the mid 1950s and 1970s and the recent intense widespread drought of the early 2000s.

Precipitation west of the Continental Divide is more evenly distributed throughout the year than in the eastern plains. For most of western Colorado, the greatest monthly precipitation occurs in the winter months, while June is the driest month. Near the Utah border, late summer and early autumn can be the wettest time of year. While precipitation only averages from eight to 14 inches in these western valleys, localized flood-producing storms are still possible. Occasionally, moisture from a decayed Pacific hurricane has fueled widespread heavy rains. Extensive flooding occurred in October 1970 following one of these storm systems.

Precipitation patterns are largely controlled by mountain ranges and elevation. Precipitation increases with elevation both winter and summer but the elevation effect is greatest in mid-winter when winds at mountain top level are typically strongest. High peaks and mountain ranges generally receive the majority of their precipitation during the winter months. Snow accumulates without melting in shaded or level areas at elevations above about 8,000 feet. When it melts in the spring, this snow is the primary source of water for much of the population of the State and provides water for extensive irrigation. Considerable effort is made every year to measure the accumulating snow pack so that water providers and resource managers can plan ahead for the coming summer. Most of the mountain snow melts during May and June causing rivers to reach their yearly peak.

In summer, mountain peaks and ranges are effective thunderstorm generators whenever the air mass is sufficiently moist. In some years, local thunderstorms form nearly every afternoon in and near the mountains. Mid-July through much of August are particularly prone to mountain thunderstorms while June is often a much drier month in the high country. Snow and soft hail are possible from mountain storms even in July and August. Hikers and participants in other outdoor activities in the mountains during the summer months must be careful to avoid exposed

ridges during stormy periods, as lightning poses a very serious threat throughout the summer. Lightning also triggers forest fires.

Thunderstorms are quite prevalent on the eastern plains and along the eastern slopes of the mountains during the spring and summer. These often become quite severe, and the frequency of hail damage to crops in northeastern Colorado is quite high. With an average frequency of six or more hail days per year, some counties of eastern Colorado are among the most hail prone areas in the entire country.

Tornadoes, once thought to be only a small threat to the residents of eastern Colorado, have been found to be quite common with the improvement in severe storm detection in recent decades. Tornadoes are relatively rare in the mountains and western valleys but do occur. Annually, 25 tornadoes are reported across the State, on average. Most of these tornadoes are small and short lived, usually classified in intensity as F0 or F1. However, occasional strong tornadoes have been reported. The number of tornado fatalities remains very low for Colorado, but much of this is due to the low population density of some of the most tornado-prone areas of eastern Colorado.

Lightning has emerged as one of the greatest weather hazards in Colorado. Each year there are typically several fatalities and injuries. Unlike tornadoes that are most common in selected areas of the State, lightning can and does occur everywhere. Lightning strike statistics indicate that the most lightning prone areas of Colorado are the high ground above tree line between Denver and Colorado Springs and the Raton Plateau south and southeast of Trinidad near the New Mexico border.

Fall, winter and spring blizzards on the eastern high plains are another weather hazard deserving attention. While Colorado blizzards are less frequent and drop less snow than in areas further east and north, they can still be devastating. In 1997, several fatalities were directly attributable to an October blizzard which caught many travelers unprepared.

Heavy snows in the high mountains are much more common. Each year several lives are lost due to avalanches. Avalanches pose a serious problem to residents, road maintenance crews and back country travelers. Considerable effort is made each year to predict and manage avalanches.

A spring flood potential results from the melting of the snow pack at the higher elevations. In a year of near-normal snow accumulations in the mountains and normal spring temperatures, river stages become high, but there is no general flooding. In years when snow cover is heavy, or when there is widespread lower elevation snow accumulation and a sudden warming in the spring, there may be extensive flooding.

The greatest threat of flooding in Colorado is not snowmelt, however. It is flash flooding from localized intense thunderstorms. The most flash-flood prone regions of Colorado are found along the base of the lower foothills east of the mountains. Several extreme floods such as the infamous Big Thompson Canyon flood of July 31, 1976 have occurred in this vulnerable area. Flash floods occur on the western slopes as well, but with somewhat lower frequency and intensity due to a reduced supply of low level moisture to fuel such storms.

Climate and the Economy- For the most part, Colorado has a semi-arid climate. This means that water is the limiting factor for agriculture. The areas in Colorado that are farmed get very little water in the form of direct rainfall. Instead, they receive most of there water from irrigation systems that have tapped reservoirs formed from snowmelt. This snowmelt is sufficient for farmers to develop a variety of crops. Water accessibility coupled with the different climates of Colorado permit a very diverse agriculture. Some areas produce grains while areas around the mountains produce fruits.

Tourism is one of the largest industries in Colorado. The comfortable weather and the recreational activities offered are all thanks to the Rocky Mountains. The rugged landscapes lend themselves to hikers and campers. The rivers and cold water streams are excellent places to fish and kayak. The scenery can be breath-taking.

One industry that owes everything to weather is the skiing industry. The amount of snowfall and the length of the freezing season, make Colorado one of the most visited places among skiers. Many resorts are open from November until late April.