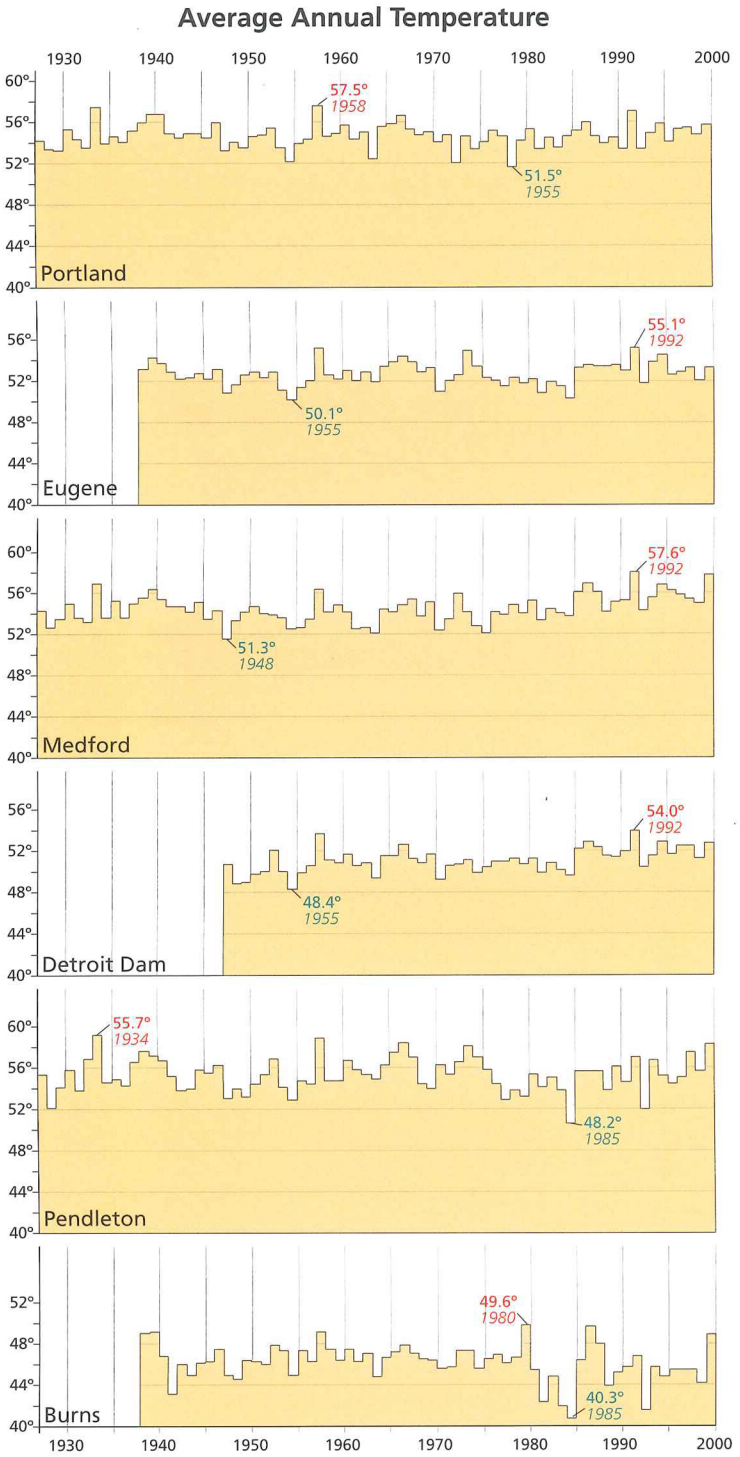

In the time series plotted above, the years with the highest and lowest annual totals are identified. Below, the spatial pattern of temperatures is shown. The overall range of temperature across the state each month is indicated by the open box on each scale.

Monthly Temperatures

The year-round pattern of temperature across Oregon (small maps below) reflects the influence of four major factors: (1) the seasonal cycle of solar radiation, (2) the Cascade Range, which forms a barrier that generally confines mild Pacific air masses west of the crest and cold continental polar air masses to the east, (3) the moderating influence of the Pacific Ocean and (4) elevation in general, with upland areas being colder than lowland areas.

During the winter, days are short, the sun never rises very high in the sky, and the total amount of solar radiation received is low. In the summer, days are longer, the sun is higher in the sky, and the total amount of energy received is at its maximum. Because summer is the dry season, the amount of water that can be evaporated is low; more of the energy from solar radiation heats the land surface. Consequently, summers are hotter than they would be if Oregon had a wet summer climate. This same mechanism helps to explain why late July and August are the warmest months despite the occurrence of the solar radiation maximum in June, and why late afternoons and early evenings are often the warmest time of the day, despite the sun being highest in the sky around noon.

Throughout the year, the Cascade Range forms a barrier to the flow of air. This effect is particularly important in winter, when comparatively mild and moist Pacific air seldom reaches Eastern Oregon, and cold continental air masses are generally confined to the east. Only occasionally does cold polar air move into Western Oregon. When atmospheric circulation patterns permit, cold polar air, which is denser than warm air, flows through the Columbia River Gorge, cooling the Willamette Valley from its northern end southward toward Eugene.

The Pacific Ocean, like oceans in general, heats up and cools down more slowly than the land surface. As a result, the Pacific does not reach its coolest and warmest points until February and August. West of the Cascades this is a mediating influence, helping to keep winters warmer and summers cooler than they would be otherwise. Comparison of the January and July maps shows that the moderation is more important in winter than in summer.

Because the earth's atmosphere is heated from its base, temperatures generally decrease with increasing elevation (about 4° Fahrenheit per 1,000 feet). This effect, present at all times of the year, is why mountains and valleys are so strongly expressed in the patterns on the temperature maps shown here.

The cold season in Oregon runs from November through March, with the coldest time of the year in January. The hottest months are July and August. Comparison of the spring (April through June) and autumn (September and October) maps show why springtime seems to go on for months while winter rolls in so quickly. As is the case for precipitation, there has been a slight increase in annual-average temperatures over Oregon and the Western U.S. in the past century, a trend consistent with global warming.