

Annual Solar Radiation of Alberta, 1971 to 2000

Description

This map illustrates the annual solar radiation in Alberta over the 30-year period from 1971 to 2000. A 30-year period is used to describe the present climate since it is enough time to filter out short-term fluctuations but is not dominated by any long-term trend in the climate.

Daily total incoming solar radiation is measured in megajoules per square metre (MJ/m²). The amount of solar radiation received at the earth's surface varies with two factors that depend on latitude: the angle of the sun's rays and the hours of daylight. The distance from the equator, and therefore the intensity of the sun's radiation has the greatest effect on climate. Canada's position in the northern portion of the earth's northern hemisphere means that it receives less solar radiation compared to countries nearer the equator. The northward decrease in solar radiation is also noticeable within Alberta. Temperatures are generally higher in southern Alberta in comparison to northern Alberta because the south receives more solar radiation.

The annual solar radiation is measured in MJ/m² and was mapped in the following classes: less than 4200, 4200 to 4400, 4400 to 4600, 4600 to 4800 and greater than 4800.

Data sources

Annual Solar Radiation of Alberta, 1971 to 2000, is found in the *Agroclimatic Atlas of Alberta, 1971 to 2000* (Chetner and the Agroclimatic Atlas Working Group, 2003). This map was based on 1971 to 2000 data from Environment Canada, Alberta Environment and the United States National Climate Data Center. These agencies collect temperature and precipitation data from climate and weather stations in Alberta, neighboring provinces, territories and states. Environment Canada receives the majority of the data from the federal and provincial networks and performs quality control on the data. Data from the United States stations is provided by the U.S. National Climate Data Center.

The synoptic weather stations, which collect weather data over a broad area at a single given time, collect data to measure solar radiation. These stations report near real-time (hourly, 6-hourly and daily) automated weather information used to prepare weather forecasts and in calculating climatic information. Few Alberta stations measure solar radiation, therefore, calculation of the likely values between the points (stations) where measurements are taken is done by interpolation. Solar radiation was calculated for each township of Alberta using an interpolation process. In order to avoid the blocky appearance of townships on the map, a township generalization was produced using smoothing procedures of computer graphics software for final presentation on the map.

Potential uses

Southern Alberta receives the greatest amount of annual global solar radiation with the amount gradually decreasing as you move farther north. However, cropping is successful in the northern (Peace River) area of Alberta because the longer summer day length helps compensate for the less intense solar radiation. Cloud cover in the mountains will reduce the amount of solar radiation received there.

Producers use climate information, including solar radiation, as a long-term planning tool. For example, in selecting a location for a farm or planning a cropping program, this information is important. Knowing that southern Alberta receives more solar radiation, making temperatures generally higher there, will affect the cropping choices and management options available. By combining knowledge of the agricultural operation with knowledge of what is likely to happen (climate), the producer can then decide on the acceptable level of risk due to adverse conditions.

Limitations

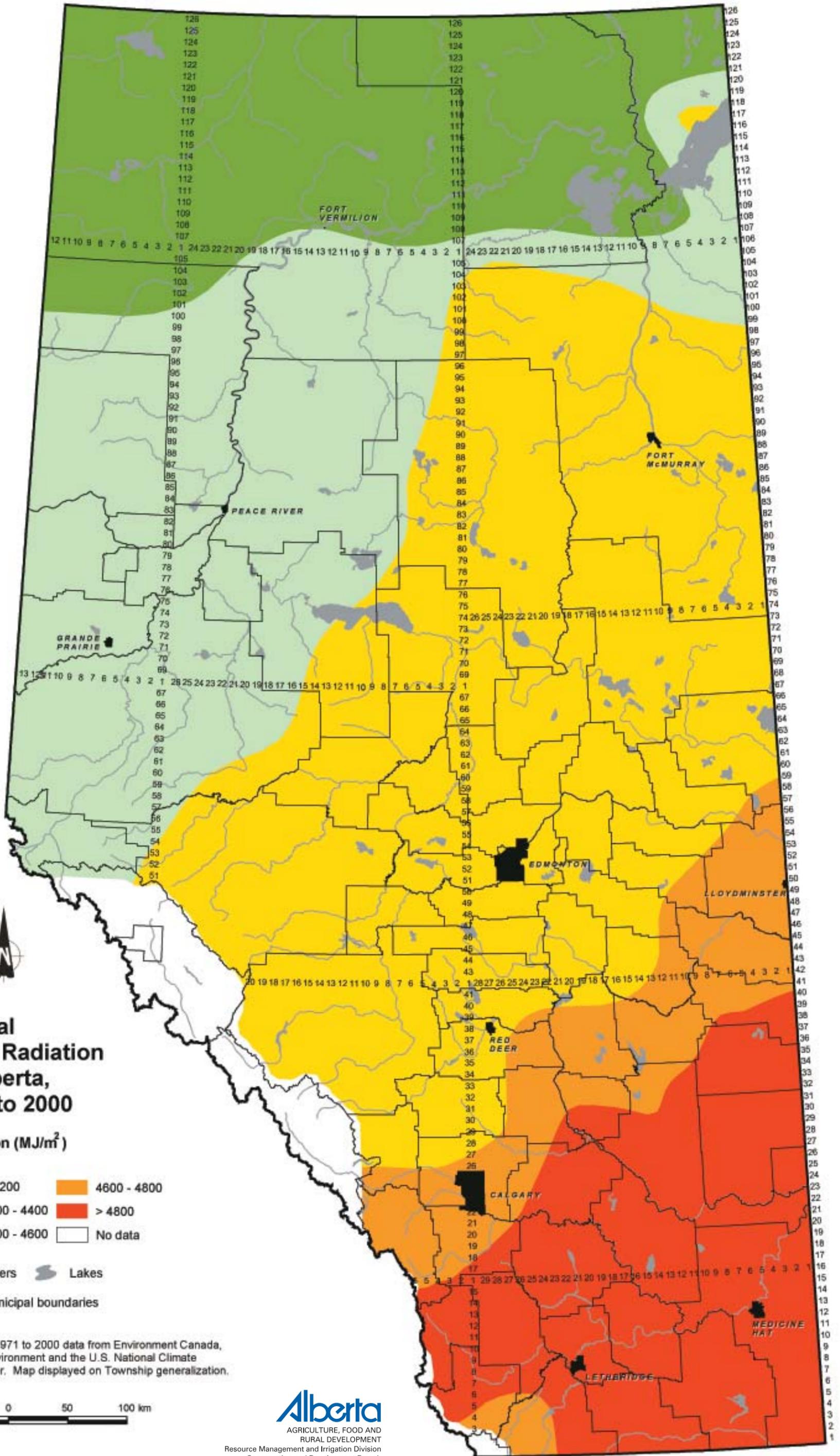
The number of weather stations in Alberta that collect solar radiation data is very limited. This makes the interpolated pattern less reliable than if data was received from more locations in the province.

Further information

The *Agroclimatic Atlas of Alberta, 1971 to 2000*, is available online at the Alberta Agriculture, Food and Rural Development (AAFRD) website by using the topic bar at the left and following *Weather & Climate* and then *Agroclimatic Atlas*. Paper copies (Agdex 071-1) are available from the AAFRD Publications office in Edmonton by calling (780) 427-0391, or 1-800-292-5697 toll-free in Canada. www.agric.gov.ab.ca

Chetner, S. and the Agroclimatic Atlas Working Group. 2003. *Agroclimatic Atlas of Alberta, 1971 to 2000*. AAFRD. Agdex 071-1. Edmonton, Alberta.

Scroll down to view map



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Radiation (MJ/m²)

- < 4200
- 4200 - 4400
- 4400 - 4600
- 4600 - 4800
- > 4800
- No data

Rivers Lakes

Municipal boundaries

Based on 1971 to 2000 data from Environment Canada, Alberta Environment and the U.S. National Climate Data Center. Map displayed on Township generalization.

