

The movement of the migrant pressure systems within the zone of the westerlies is a most significant climatic control over Canada. In winter, frontal activity is generally more complex and intensive, producing more periods of bad weather and extremely variable temperatures. Low pressure areas move eastward or northeastward over southeastern Canada and off the Continent every two or three days, while along the Pacific Coast the effects of successive frontal systems are felt equally as often. The Alberta area in the lee of the mountain ranges collectively known as the Western Cordillera is frequently the breeding ground for new storms which then move eastward across the country. Winter in the Arctic and the northern interior portions of Canada is usually not as stormy as it is in the coastal and more southerly sections. Large high pressure areas consisting of very cold dry air tend to build up and then surge down over interior and eastern Canada to the rear of low pressure areas.

While in the winter season the cold high pressure areas dominate the interior of the Continent, in summer the large semi-permanent high pressure areas over the north Pacific and Atlantic Oceans become the dominating features of the general circulation in this part of the world. The paths of the migrant low pressure areas over the Continent are then farther north and the storms are usually less intense than in winter. Along the Pacific Coast the frontal systems strike the coast farther north and less often while in eastern Canada the frequency of the stormy frontal systems is greatly reduced. Over the central interior and eastern Canada much of the cloud and precipitation of this season is of convective origin as the land heats under the summer sun.

Although the general circulation of the atmosphere is the controlling factor over the Canadian climate, it should be understood that the physical geography of North America contributes greatly to the general pattern. If the shape of the continental land mass were different the general patterns of air flow would similarly be different than they are. Also, the physical geography of the Continent greatly modifies the effect of the general circulation and produces a variety of climates in Canada that would not be expected from the general circulation alone.

The presence of the Western Cordillera has a great effect on the climate of western Canada. These mountains limit the humid and mild air from the Pacific to a narrow band along the coast, despite the general westerly circulation. As the air is forced aloft over the successive mountain ranges, it is compelled to give up its moisture, becoming relatively dry and warm by the time it flows over the prairies. Were it not for the Cordillera, a humid, moderate temperature type of climate would extend for hundreds of miles into western Canada. On the other hand, the mountains physically block the occasional westward-moving outbreaks of cold Arctic air which would otherwise reach the coast from the north and east.

East of the Cordillera and extending from the Arctic Ocean across Canada and the United States to the Gulf of Mexico lies a broad, relatively flat corridor. Consisting of Arctic barrens and boreal forests in the north and agricultural lands in the south, this corridor presents no obstacle of importance to the movement of large air masses from either the north or south. Warm moist air from the Gulf of Mexico is able to flow northward providing the ample precipitation of southeastern Canada while massive cold air outbreaks from northwestern Canada are able to plunge southward and eastward without encountering any physical barrier. It is this north-south corridor open to rapid air flow from either direction that makes interior Canada so vulnerable to sudden and drastic weather changes.

On the other hand, the large water surfaces of central and eastern Canada produce a considerable modification in the climate. In summer Hudson Bay provides a refrigerating effect to areas on the lee side, and its effect is also quite pronounced in autumn and early winter before the Bay freezes over, when the east shore is much warmer and snowier than it would be otherwise. Since a large percentage of Canada's population lives in the region of the Great Lakes the effect of these lakes on the climate of southern Ontario is, perhaps, more apparent. Winters are milder with more snow in southwestern Ontario, while in summer the cooling effect of the lakes is well illustrated by the number of resorts along their shores. To a lesser degree the smaller lakes in interior Canada modify the climate but only of the adjacent shores.