Increased downwind drift of snowflakes relative to raindrops can lead to increased precipitation catches in areas lee of mountains. A warming climate will reduce this effect. The importance of the drift effect relative to other temperature impacts on precipitation is unknown. Aoraki/Mt Cook National park is a high precipitation region in the lee of the Southern Alps of New Zealand and is of national significance as a water source for hydro electricity generation. As an initial assessment of the drift effect, hourly precipitation data at Aoraki/Mt Cook Village under similar wind conditions were classed according to temperature, and compared. For the hours that westerly winds were greater than 5 ms\(^{-1}\) and temperatures were 8-11°C, precipitation was observed on the leeward side of the mountains over 70 percent of the time. Of the similar number of hours that the temperatures were greater then 16°C (under the same wind conditions) precipitation occurred less than 20 percent of the time. The rain intensity during rain hours was similar for both temperature classes. 8-11°C equates to a freezing point below the orographic divide, while 16°C equates to a freezing above it, indicating that the change in precipitation occurrence is related to snow/rain drift differences. This preliminary result indicates that precipitation under similar, strong westerly conditions, in the Aoraki/Mt Cook region of New Zealand is more than double when the cross mountain flow is sub-zero. This has serious implications for global warming scenarios and for palaeo-climate reconstructions in the region.