



A High Magnitude Midwinter Melt Event at Glaciar Pichillancahue, Volcán Villarica, Chile

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A remarkable midwinter melt event occurred at Glaciar Pichillancahue, Volcán Villarica (39° 25' 12" S, 71° 56' 27" W) between 7-10 August 2004. Mean 2 m air temperature recorded at an automatic weather station at 1890 m a.s.l. over this 4 day period was 9.7° C (compared with a winter mean of -1.6° C) leading to an estimated 160 mm of water equivalent snow melt. The event was characterised by high night-time temperatures, with a minimum of 10.1°C on 8-9th August, and extremely low relative humidity, with a mean of just 6% on 9th August. Data recorded simultaneously at permanent lower-elevation weather stations in the region and radiosonde data from Puerto Montt, 242 km to the south, demonstrate that strong temperature inversions occurred in the low-mid Troposphere, particularly during the night-time. NCEP/NCAR reanalysis data indicate the event was associated with incursion of a tropical air mass into southern Chile and Argentina and that the highest temperature anomalies occurred close to the elevation of the volcano station. Assessment of the overall significance of such winter melt events to glacier mass balance in the region is difficult since few high elevation meteorological or radiosonde data exist and low level station measurements are poor indicators of the presence of strong temperature inversions in the low to mid troposphere. While the 7-10th August 2004 event was exceptional, short periods of positive air temperatures were regular features of both the 2004 and 2005 winter seasons, when the volcano station was operational. The likelihood is that winter melt events will increase in frequency in the future, as GCM outputs predict the lower and mid-troposphere to warm faster than the surface.