



*Supplement of*

## **Observations and simulations of the seasonal evolution of snowpack cold content and its relation to snowmelt and the snowpack energy budget**

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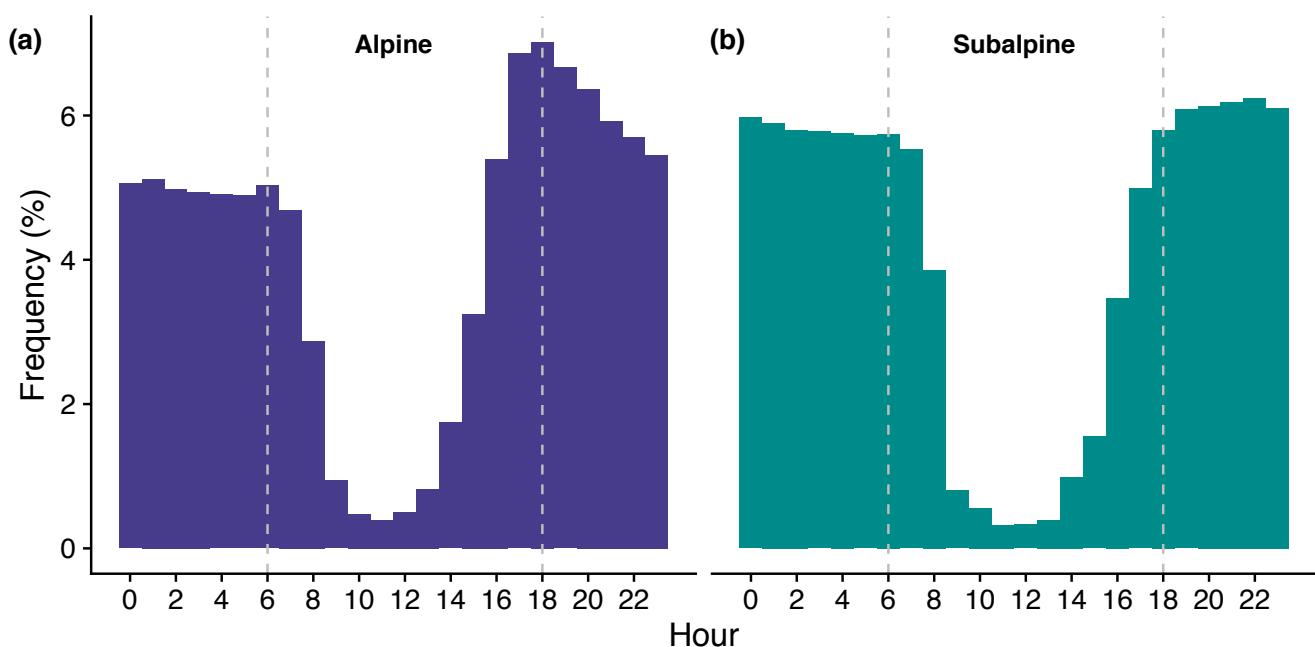
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**Table S1. Information on the time range and number of snow pit observations per water year at the alpine and subalpine sites in the Niwot Ridge LTER.**

Site	Water year	Start	End	Total
Alpine	1995	1995-01-24	1995-07-05	21
	1996	1996-01-19	1996-06-21	20
	1997	1997-01-24	1997-06-30	20
	1998	1998-01-20	1998-06-22	18
	1999	1999-01-20	1999-06-22	15
	2000	2000-01-14	2000-06-06	17
	2001	2001-01-16	2001-06-05	15
	2002	2001-12-10	2002-03-25	10
	2003	2002-11-13	2003-06-18	15
	2004	2003-12-12	2004-06-07	18
	2005	2005-02-01	2005-06-21	12
	2006	2006-01-24	2006-06-06	11
	2007	2007-02-09	2007-05-10	4
Subalpine	2008	2008-02-22	2008-06-17	7
	2009	2008-12-31	2009-06-25	18
	2010	2010-01-11	2010-06-09	21
	2011	2010-12-07	2011-07-06	21
	2012	2012-01-24	2012-05-23	16
	2013	2013-01-03	2013-06-10	13
	2007	2007-02-07	2007-05-23	15
	2008	2007-12-20	2008-05-27	18
	2009	2008-12-22	2009-05-07	17
	2010	2009-10-28	2010-06-02	25
	2011	2010-12-15	2011-06-21	28
	2012	2011-11-15	2012-04-25	21
	2013	2012-12-13	2013-05-29	23

**Table S2. Calibrated SNOWPACK canopy module parameters for the subalpine site.**

	LAI	Vegetation height (m)	Canopy direct throughfall	Wind scaling factor
Parameter value	3.7	7.3	0.25	0.44



**Figure S1.** Histograms showing the timing of simulated cold content gains without snowfall in the alpine (a) and subalpine (b). The vertical dashed lines demarcate day (0600–1800 h) and night (1900–0500 h) at the two sites. Cold content gains occurred primarily at night, while daytime gains were concentrated in the early morning and evening hours. Less than 5.0% of simulated cold content gains occurred between 0900 and 1400 h at both sites.