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Supplement of

**Characterising spatio-temporal variability in seasonal
snow cover at a regional scale from MODIS data:
the Clutha Catchment, New Zealand**

Todd A. N. Redpath et al.

Correspondence to: Todd A. N. Redpath (todd.redpath@otago.ac.nz)

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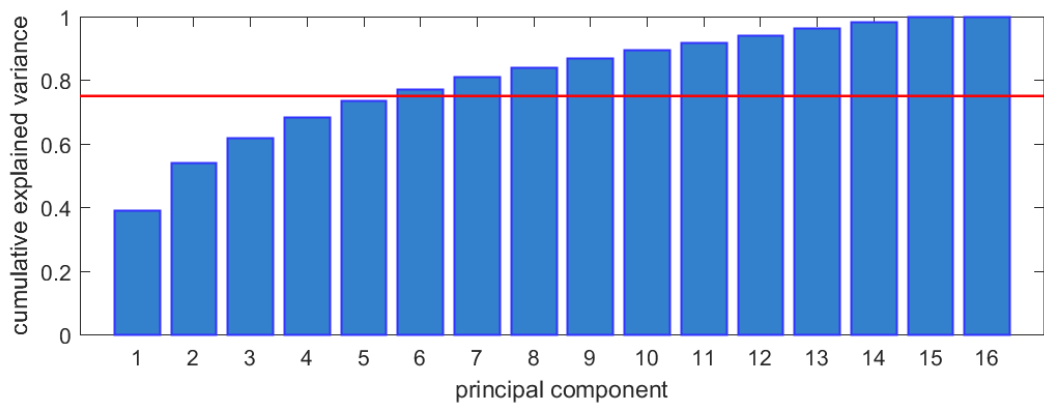


Figure S1. Cumulative explained variance for 16 principal components of SCD anomaly. The red line indicates 75% of explained variance.

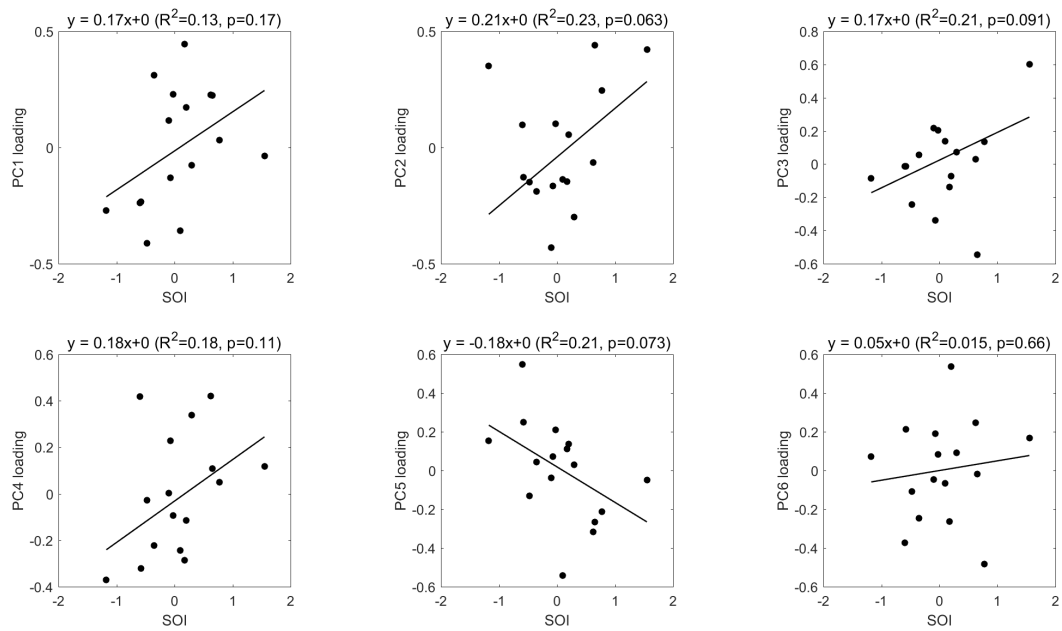


Figure S2. Scatter plots with linear regression between average winter SOI phase and annualised loadings for principal components 1-6.

Table S1. Landcover classes above 1000 m in the Clutha Catchment, data from the New Zealand Landcover Database v4.1 (Landcare Research, 2015).

Class	Area (km ²)	Class %
All other classes	108.8	1.7
Permanent Snow and Ice	144.6	2.2
Indigenous Forest	185.0	2.8
Low Producing Grassland	225.0	3.4
Alpine Grass/Herbfield	269.6	4.1
Sub Alpine Shrubland	320.4	4.9
Gravel or Rock	811.5	12.3
Tall Tussock Grassland	4537.7	68.7
Total	6602.4	100.0

Table S2. Parameters for robust (bi-square) linear regressions between snow cover anomaly and winter temperature/precipitation anomalies for individual ranges and all ranges together. Ranges are listed in the table by their proximity to the main divide.

Name	Temperature					Precipitation				
	β (d °C ⁻¹)	<i>c</i>	R ²	<i>p</i>	RMSE	β (d mm ⁻¹)	<i>c</i>	R ²	<i>p</i>	RMSE
HUMBOLDT MOUNTAINS	-52.54	2.52	0.52	0.00	13.91	0.01	0.02	0.09	0.25	19.33
MAIN DIVIDE SOUTHERN ALPS	-43.88	2.06	0.66	0.00	9.85	0.01	-0.14	0.06	0.35	16.58
YOUNG RANGE	-42.02	0.77	0.47	0.00	14.90	0.02	-0.14	0.11	0.20	19.17
AILS A MOUNTAINS	-53.59	1.18	0.41	0.01	15.68	0.01	0.16	0.10	0.24	19.44
FORBES MOUNTAINS	-36.72	0.72	0.39	0.01	13.53	0.01	-0.17	0.08	0.30	16.76
ALFRED	-34.37	-0.30	0.44	0.01	10.87	0.01	-0.02	0.06	0.36	14.01
LIVINGSTONE	-53.72	0.42	0.42	0.01	15.34	0.01	-0.01	0.08	0.30	19.40
HUXLEY RANGE	-39.46	0.03	0.42	0.01	15.58	0.02	-0.64	0.15	0.14	19.24
MINARETS	-43.48	3.82	0.74	0.00	9.19	0.04	-0.24	0.38	0.01	15.86
BUCHANAN PEAKS	-28.80	0.88	0.25	0.05	16.97	0.05	-0.32	0.51	0.00	14.02
McKERROW RANGE	-32.98	0.40	0.39	0.01	14.17	0.05	-0.36	0.31	0.02	15.05
RICHARDSON MOUNTAINS	-46.98	3.23	0.55	0.00	12.42	0.03	-0.25	0.23	0.06	15.48
HARRIS MOUNTAINS	-34.25	1.66	0.30	0.03	16.04	0.06	0.00	0.48	0.00	13.46
THOMSON MOUNTAINS	-46.21	0.06	0.26	0.04	18.49	0.07	0.47	0.22	0.07	20.03
TWENTY FIVE MILE RANGE	-38.50	-0.27	0.30	0.03	14.54	0.07	0.05	0.25	0.05	15.37
ISTHMUS	-32.68	-0.53	0.48	0.00	12.33	0.08	-0.24	0.41	0.01	13.60
MAUNGATIKA	-32.57	-0.86	0.35	0.02	15.96	0.08	-0.35	0.29	0.03	16.49
BEN LOMOND	-35.53	0.57	0.22	0.07	16.96	0.07	0.10	0.15	0.13	18.48
CORONET	-26.59	0.03	0.15	0.13	16.22	0.09	0.08	0.34	0.02	14.06
UPPER LINDIS	-29.32	-0.95	0.30	0.03	16.64	0.10	-0.08	0.32	0.02	16.32
CROWN RANGE	-25.91	-0.23	0.18	0.10	16.16	0.07	-0.20	0.21	0.08	15.61
EYRE MOUNTAINS	-32.26	-0.25	0.18	0.10	17.25	0.11	-0.15	0.37	0.01	15.83
CRIFFEL RANGE	-25.85	-0.27	0.15	0.14	19.62	0.10	-0.25	0.23	0.06	17.97
THE REMARKABLES	-18.81	0.37	0.09	0.26	16.35	0.08	0.04	0.20	0.08	15.38
PISA RANGE	-13.28	0.26	0.06	0.38	17.53	0.10	-0.08	0.32	0.02	14.74
DUNSTAN RANGE	-13.41	-0.67	0.07	0.34	18.34	0.10	-0.81	0.30	0.03	15.03
SOUTH CRIFFEL	-12.44	-0.98	0.03	0.52	21.11	0.09	-0.41	0.30	0.03	16.60
HECTOR MOUNTAINS	-14.37	-0.07	0.06	0.35	16.90	0.07	0.01	0.18	0.10	15.58
ST BATHANS RANGE	-17.36	-0.22	0.08	0.29	20.45	0.10	-0.45	0.25	0.05	16.71
CARRICK RANGE	-16.59	0.02	0.07	0.33	21.34	0.06	0.48	0.08	0.28	20.44
GARVIE MOUNTAINS	-9.86	-0.36	0.04	0.45	17.33	0.05	-0.08	0.14	0.15	16.19
DUNSTAN MOUNTAINS	-5.63	0.35	0.01	0.78	24.06	0.13	-0.33	0.18	0.10	20.76
HAWKDUN RANGE	-13.01	-0.08	0.04	0.45	20.56	0.06	-0.22	0.21	0.07	18.38
OLD WOMAN RANGE	-8.20	-0.31	0.03	0.50	17.27	0.04	-0.50	0.24	0.05	14.08
OLD MAN RANGE/KOPUWAI	-11.66	-0.38	0.08	0.30	17.19	0.05	-0.83	0.08	0.30	17.64
WHITECOOMB RANGE	-11.96	0.08	0.06	0.35	19.26	0.02	0.45	0.02	0.60	19.35
All	-25.50	-0.07	0.19	0.00	15.91	0.02	0.07	0.11	0.00	16.76

References

Landcare Research: LCDB v4.1 - Land Cover Database version 4.1, Mainland New Zealand, <https://iris.scinfo.org.nz/layer/48423-lcdb-v41-land-cover-database-version-41-mainland-new-zealand/>, 2015.