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Appendix DR1. Methods and supplementary chronologic data

Methods

The Lake Vera palaeovegetation index

The Lake Vera palaeovegetation index (LV-PI) is based on the percentage abundance of the palynomorphs *Nothofagus cunninghamii*/*Atherosperma moschatum* +1 divided by the combined abundance of *Phyllocladus aspleniifolius* +1 in the Lake Vera pollen record (Macphail, 1979). The resulting values were normalised following conversion to the logarithmic scale *sensu* Moreno (Moreno, 2004). The rationale behind this index lies in the segregation of these taxa along precipitation and temperature gradients in Tasmania and southeast Australia (Read and Busby, 1990) and that long term compositional trends in western Tasmanian rainforest will reflect changes in these climatic parameters. Positive (negative) LV-PI values indicate changes in rainforest composition indicative of increased (decreased) relative moisture.

The Lago Condorito palaeovegetation index

The Lago Condorito palaeovegetation index (LC-PI) is based on the percent abundance of the palynomorphs *Eucryphia*/*Caldcluvia* +1 divided by the combined abundance of the pollen types *Podocarpus nubigena* and *Saxegothea conspicua* +1. The resulting values were normalised following conversion to the logarithmic scale (Moreno, 2004). The rationale behind this index lies in the segregation of these taxa along geographic and climatic gradients in the modern flora and effectively tracks the relative dominance of Valdivian versus North Patagonian rainforest taxa. Positive (negative) values in the LC-PI indicate changes in rainforest composition indicative of decreased (increased) relative moisture (Moreno, 2004).

The Lago Guanaco palaeovegetation index

The Lago Guanaco palaeovegetation index (LG-PI) is based on the percent abundance of the palynomorphs *Nothofagus* +1 divided by the abundance of Poaceae (grass) pollen types +1 (Moreno et al., 2010). The resulting values were normalised following conversion to the logarithmic scale. The rationale behind this index lies in the segregation of these taxa across the moisture determined forest – steppe ecotone in Southern Patagonia. Positive (negative) LG-PI values indicate an increase in forest (grass) taxa indicative of increased (decreased) relative moisture (Moreno et al., 2010).

The western Tasmanian charcoal curve

The western Tasmanian charcoal curve of Fletcher and Thomas (2010) was based on actual data and digitised charcoal data from all western Tasmanian pollen records. The chronology is based on linear interpolations between ^{14}C dates calibrated using Calib 6.0.1 (Stuiver et al., 2010). Z-scores were calculated for each record based on a whole post-glacial mean (restricted to 14 ka in this analysis) for each site, or, when a record was younger than 14 ka, the entire record. The data were smoothed to 1 ka time slices by averaging within site z-scores and a regional curve was produced by averaging across site z-scores for each 1 ka time slice (Fletcher and Thomas, 2010).

Chronology

All age models employed in this paper are based on existing published chronologies cited in the text. Radiocarbon (^{14}C), Optically Stimulated Lumiescence (OSL) and tephrochronology ages are presented in Table DR1 in this data repository. All dates were calibrated using CALIB 6.0.1 (Stuiver et al., 2010). The weighted mean radiocarbon age was calculated whenever necessary, after determining that the replicate dates were statistically identical at 95% confidence level. Radiocarbon dates were converted to calendar years before present (cal yr BP) using the Southern Hemisphere calibration curve and the INTCAL04 calibration dataset for terrestrial samples included in the CALIB 6.01 program (Stuiver et al., 2010).

Table DR1. Radiocarbon dates from sites discussed throughout the text. The median probability ages were obtained using the CALIB 6.01 program (Stuiver et al., 2010).

	Dating Method	Laboratory Code	Material dated	Depth (cm)	^{14}C yr BP	± 1 σ	Calibrated Age cal yr B.P.	Source
Lago Guanaco	^{14}C	CAMS-107059	Mollusks	1	modern		-54	Moreno et al 2010
	^{14}C	CAMS-115750	Gyttja	35	600	30	552	Moreno et al 2010
	^{14}C	CAMS-131734	Mollusks	40	775	40	675	Moreno et al 2010
	^{14}C	CAMS-131735	Mollusks	56	1080	35	943	Moreno et al 2010
	^{14}C	CAMS-133251	Gyttja	77	1185	45	1035	Moreno et al 2010
	^{14}C	CAMS-131264	Gyttja	111	1910	35	1789	Moreno et al 2010
	^{14}C	CAMS-115803	Gyttja	113	2015	30	1962	Moreno et al 2010
	^{14}C	CAMS-115748	Gyttja	159	2765	35	2856	Moreno et al 2010
	^{14}C	CAMS-115751	Gyttja	198	3070	35	3293	Moreno et al 2010
	^{14}C	CAMS-107056	Gyttja	264	4545	50	5169	Moreno et al 2010
	^{14}C	CAMS-115752	Gyttja	299	5200	35	5953	Moreno et al 2010
	^{14}C	CAMS-115753	Gyttja	366	7040	40	7879	Moreno et al 2010
	^{14}C	CAMS-133254	Gyttja	385	7545	40	8311	Moreno et al 2010
	^{14}C	CAMS-133255	Gyttja	431	8675	45	9585	Moreno et al 2010
	^{14}C	CAMS-133252	Gyttja	469	9990	40	11454	Moreno et al 2010
	^{14}C	CAMS-131265 (*)	Gyttja	476	10245	45	11995	Moreno et al 2010
	^{14}C	CAMS-107057 (*)	Gyttja	476	10320	35	12124	Moreno et al 2010
	^{14}C	Weighted mean*	-	476	10300	30	12070	Moreno et al 2010
	^{14}C	CAMS-133253	Gyttja	520	10535	30	12545	Moreno et al 2010
	^{14}C	CAMS-131267	Gyttja	534	11690	35	13538	Moreno et al 2010
	^{14}C	CAMS-107058	Gyttja	-	12605	40	14860	Moreno et al 2010
Lake Vera	^{14}C	SUA-270	Gyttja	150-159	4950	175	5634	Macphail 1979
	^{14}C	I-9557	Gyttja	208-213	6950	175	7747	Macphail 1979
	^{14}C	I-7683	Gyttja	270-280	11530	240	13409	Macphail 1979
Okarito Bog	^{14}C	NZA 10085	Wood	281-282	10267	70	12034	Vandergoes et al 2007
	^{14}C	NZA 10991	Bulk organics	283	9692	65	11102	Vandergoes et al 2007
	^{14}C	NZA 11103	Bulk organics	283	9758	70	11182	Vandergoes et al 2007
	^{14}C	NZA 11605	Leaf	283	9553	60	10916	Vandergoes et al 2007
	^{14}C	NZA 11606	Leaf	283	9591	60	10940	Vandergoes et al 2007
	^{14}C	NZA 11633	Organic residue	283	9565	60	10927	Vandergoes et al 2007
	^{14}C	NZA 11634	Organic residue	283	9627	60	10957	Vandergoes et al 2007
	^{14}C	NZA 11635	Pollen	283	9903	65	11325	Vandergoes et al 2007
		Pooled weighted mean	-	283	9640	27	11025	Vandergoes et al 2007
	^{14}C	NZA 11200	Organic residue	300-301	11215	65	13120	Vandergoes et al 2007
	^{14}C	NZA 11076	Pollen	300-301	11975	65	13834	Vandergoes et al 2007
	^{14}C	NZA 11075	Pollen	300-301	11802	65	13650	Vandergoes et al 2007
		Pooled weighted mean	-	300-301	11888	46	13748	Vandergoes et al 2007
Lago Condorito	^{14}C	NSRL-10724	Wood	68-68.5	90	35	77	Moreno 2004
	^{14}C	NSRL-10723	Wood	109-111	1680	80	1520	Moreno 2004
	^{14}C	NSRL-10722	Bulk	180-	2750	45	2805	Moreno 2004

				180.5				
	^{14}C	NSRL-11076	Bulk	230-231	3710	90	3984	Moreno 2004
	^{14}C	NSRL-11077	Bulk	305-306	4370	50	4897	Moreno 2004
	^{14}C	NSRL-11078	Bulk	370-371	5190	50	5874	Moreno 2004
	^{14}C	NSRL-11079	Bulk	410-411	5570	50	6316	Moreno 2004
	^{14}C	NSRL-10725	Leaf	437-439	6020	45	6797	Moreno 2004
	^{14}C	NSRL-11080	Bulk	510-511	7620	130	8367	Moreno 2004
	^{14}C	NSRL-10721	Bulk	575-578	8570	45	9509	Moreno 2004
	^{14}C	A-8587	Bulk	613-615	9110	45	10374	Moreno 2004
	^{14}C	A-8070	Bulk	685-688	9680	85	11029	Moreno 2004
	^{14}C	A-8069	Bulk	710-713	10060	60	11598	Moreno 2004
	^{14}C	A-8068	Bulk	821-824	11265	65	13170	Moreno 2004
	^{14}C	A-8067	Bulk	848-852	11435	80	13301	Moreno 2004
	^{14}C	Beta-60352	Bulk	863-873	12230	140	14186	Moreno 2004
	^{14}C	A-8066	Bulk	873-886	12170	90	14029	Moreno 2004
	^{14}C	A-6661	Bulk	928-930	12330	130	14391	Moreno 2004
Lago Cardiel	NAVZ Tephra	-	-	-	-	-	3230	Aritztegui et al 2008
	Hudson Tephra	-	-	-	-	-	7570	Aritztegui et al 2008
		-	Chara	5300	9480	95	10779	Stine and Stine 1990
		-	Marl	5200	9780	80	11200	Stine and Stine 1990
		-	-	-8300	-	-	12320	Aritztegui et al 2008
		-		-8300	11220	170	13118	Gilli et al 2001
Otago	OSL	-	-	300	2540	550	2540	Prebble and Shulmeister 2002
	OSL	-	-	1050	3940	1600	3940	Prebble and Shulmeister 2002
	^{14}C	-	-	1380	5980	70	2559	Prebble and Shulmeister 2002
	OSL	-	-	1650	7290	1600	7290	Prebble and Shulmeister 2002
	^{14}C	-	-	1900	8538	70	9487	Prebble and Shulmeister 2002
	OSL	-	-	1960	8760	1830	8760	Prebble and Shulmeister 2002
	OSL	-	-	2130	11300	1300	11300	Prebble and Shulmeister 2002

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