

**Suppl. Table 1.** Tree-ring chronologies considered for this study. Chronologies with factor loadings < 0.6 in the corresponding component for the period 1800-1950 (shown in red), were not included in the composite chronologies for each species.

Species / Site	Code	Latitude / Longitude	Elev. (m)	Period	No. of series	Comp. / Factor load.	Source
<i>Araucaria araucana</i>							
Caramávida	CAR	37°40'S/ 73°10'W	900	1474-1975	21	AR4 / 0.77	LaMarche et al. (1979)
Copahue	COP	37°48'S/ 71°04'W	1720	1640-1974	10	AR2 / 0.64	LaMarche et al. (1979)
Piedra del Águila	PIE	37°49'S/ 73°01'W	1300	1239-1975	26	AR1 / 0.49	LaMarche et al. (1979)
Caviahue LaMarche	CVV	37°50'S/ 71°01'W	1674	1444-1974	22	AR1 / 0.55	LaMarche et al. (1979)
Caviahue SA	CAV	37°51'S/ 71°04'W	1695	1550-2003	37	AR1 / 0.62	LaMarche et al. (1979), Mundo et al. (2011)
Ralco	RAL1	37°55'S/ 71°22'W	1280	1592-2006	26	AR5 / 0.75	Lab. de Dendrocronología-UACH
Vizcacha	VIZ	37°57'S/ 71°17'W	1440	1673-2006	17	AR4 / 0.59	Lab. de Dendrocronología-UACH
Chenque Pehuén	CHP	38°06'S/ 70°51'W	1616	1246-1974	44	AR1 / 0.85	LaMarche et al. (1979)
Nalcas	NAL	38°19'S/ 71°20'W	1420	1375-1975	27	AR2 / 0.68	LaMarche et al. (1979)
Volcan Lonquimay	LOQ	38°22'S/ 71°34'W	1510	1664-1975	52	AR1 / 0.43	LaMarche et al. (1979)
Coloradito	COI	38°25'S/ 71°35'W	1300	1675-2006	26	AR6 / 0.79	Lab. de Dendrocronología-UACH
Colorado	COL	38°25'S/ 71°32'W	1400	1645-2006	14	AR5 / 0.80	Lab. de Dendrocronología-UACH
Pino Hachado	HAC2	38°40'S/ 70°50'W	1622	1424-2006	64	AR1 / 0.66	LaMarche et al. (1979), Mundo et al. (2011)
Paso del Arco	PAR	38°49'S/ 71°04'W	1697	1264-2006	36	AR2 / 0.86	Mundo et al. (2011)
P. Pinos Aluminé	PRP	38°52'S/ 70°37'W	1620	1140-1974	30	AR1 / 0.67	LaMarche et al. (1979)
Lonco Luan	LOL	38°59'S/ 71°03'W	1164	1306-1974	39	AR1 / 0.74	LaMarche et al. (1979)
Remeco	REM	39°05'S/ 71°19'W	1217	1450-2006	40	AR3 / 0.69	Mundo et al. (2011)
Ñorquinco	NOR	39°09'S/ 71°14'W	1142	1676-2006	45	AR4 / 0.53	Mundo et al. (2011)
Ea. Pulmarí	PUL	39°09'S/ 71°13'W	1181	1589-1989	28	AR1 / 0.76	Villalba et al (1989)
Lago Rucachoroi	RUC	39°13'S/ 71°09'W	1317	1377-2006	128	AR1 / 0.80	Mundo et al. (2011)
Pinalada Redonda - Arroyo Malalco	PIN	39°18'S/ 71°17'W	1119	1606-2006	41	AR3 / 0.82	Mundo et al. (2011)
Rahue	RAH	39°23'S/ 70°47'W	1455	1591-2006	51	AR1 / 0.51	LaMarche et al. (1979), Mundo et al. (2011)
Ea. Nahuel Mapi	MAP	39°32'S/ 71°02'W	1531	1525-2006	44	AR1 / 0.66	Mundo et al. (2011)
Paso Tromen	PTR	39°36'S/ 71°25'W	1222	1385-1983	22	AR1 / 0.68	Villalba et al (1989)
Lago Tromen	TRO	39°37'S/ 71°20'W	965	1617-1976	55	AR1 / 0.77	LaMarche et al. (1979)
Volcán Lanín	LAN	39°36'S/ 71°26'W	1565	1291-2006	48	AR1 / 0.72	Mundo et al. (2011)
Ea. Mamuil-Malal	MAM	39°40'S/ 71°13'W	890	1689-1976	26	AR1 / 0.56	LaMarche et al. (1979)
<i>Austrocedrus chilensis</i>							
El Asiento	ELA	32°39'S/ 70°49'W	1800	955-2000	114	AU4 / 0.72	LaMarche et al. (1979), Le Quesne et al. (2006)
San Gabriel	CH007	33°47'S/ 70°15'W	1600	1131-1975	63	AU4 / 0.77	LaMarche et al. (1979)
Rio Clarillo	RCL	33°49'S/ 70°25'W	1900	1204-2002	76	AU4 / 0.80	Le Quesne et al. (2009)
El Baule	ELB	34°29'S/ 70°26'W	1850	1146-2001	47	AU4 / 0.83	Le Quesne et al. (2009)
Agua de la Muerte	AMU	34°31'S/ 70°25'W	1850	1072-2001	108	AU4 / 0.85	Le Quesne et al. (2009)
Santa Isabel	CH013	34°47'S/ 70°45'W	850	1613-1975	64	AU5 / 0.62	LaMarche et al. (1979)
Melado	CAC	35°52'S/ 71°00'W	1435	1270-2005	108	AU6 / 0.67	Christie et al. (2010)

Polcura	POL	37°04'S/ 71°24'W	1205	1144-2004	154	AU2 / 0.88	Christie et al. (2010)
Huinganco	HUM	37°07'S/ 70°36'W	1450	190-2000	194	AU6 / 0.64	LaMarche et al (1979), Morales et al. (2000)
Laja	LAJ	37°19'S/ 71°32'W	740	1418-2005	105	AU2 / 0.68	Christie et al (2010)
El Chacay	CH011	37°21'S/ 71°03'W	925	1641-1975	16	AU5 / 0.71	LaMarche et al. (1979)
Abanico	CH010	37°21'S/ 71°35'W	820	1733-1975	22	AU2 / 0.51	LaMarche et al. (1979)
Nitrao	NIT	37°41'S/ 71°17'W	1220	1339-2005	116	AU2 / 0.90	Christie et al. (2010)
Ralco-Lepoy	RAL	38°03'S/ 71°18'W	1080	1585-2005	86	AU2 / 0.85	Christie et al. (2010)
Ñorquinco	NOR	39°07'S/ 71°07'W	1150	1562-2003	102	AU1 / 0.60	Villalba and Veblen (1997), updated
Rucachoroi	RUC	39°15'S/ 71°10'W	1300	1572-2003	50	AU1 / 0.63	LaMarche et al (1979), updated
Quillén	QUI	39°17'S/ 71°16'W	1100	1676-1989	19	AU2 / 0.43	Villalba and Veblen (1997)
Collun-co Alto	COL	39°56'S/ 71°08'W	870	1596-1989	17	AU1 / 0.50	Villalba and Veblen (1997)
Cerro La Homigua	HOR	40°03'S/ 71°17'W	920	1508-2003	61	AU1 / 0.59	Villalba and Veblen (1997)
Cerro Los Pinos	PIN	40°04'S/ 71°02'W	1100	1508-2003	67	AU1 / 0.61	Villalba and Veblen (1997), updated
C. Castillo	CAS	40°30'S/ 71°09'W	850	1576-2003	32	AU1 / 0.68	Lab. de Dendrocronología-UACH
El Mirador	MIR	40°39'S/ 71°24'W	1050	1484-2003	52	AU1 / 0.69	Villalba and Veblen (1997)
Piedra del Viento	VIE	40°42'S/ 71°08'W	910	1679-1991	14	AU1 / 0.73	Villalba and Veblen (1997)
Arroyo Minero	MIN	40°42'S/ 71°16'W	1050	1589-1991	16	AU1 / 0.64	Villalba and Veblen (1997)
Confluencia Traful	CF2	40°42'S/ 71°09'W	1075	1723-1989	24	AU1 / 0.77	Villalba and Veblen (1997)
Cuyín Manzano	CUY	40°43'S/ 71°08'W	900	1543-2003	39	AU1 / 0.90	LaMarche et al (1979), updated
El Centinela	CEN	40°44'S/ 71°06'W	1050	1489-2002	43	AU1 / 0.91	Villalba and Veblen (1997), updated
Dedo de Dios	DDD	40°44'S/ 71°06'W	900	1461-1989	37	AU1 / 0.89	Villalba and Veblen (1997)
C. El Guanaco	GUA	41°02'S/ 70°59'W	1150	1497-2002	36	AU1 / 0.83	Villalba and Veblen (1997)
San Ramón	RAM	41°03'S/ 70°59'W	1100	1650-1991	17	AU1 / 0.75	Villalba and Veblen (1997)
C. Los Leones	LEO	41°05'S/ 71°09'W	1020	1539-2003	73	AU1 / 0.87	LaMarche et al. (1979), Villalba and Veblen (1997), updated
Pilcaniyeu	PIL	41°11'S/ 70°45'W	1100	1733-1991	14	AU1 / 0.65	Villalba and Veblen (1997)
P. del Toro	PAM	41°32'S/ 71°29'W	1160	1741-1991	15	AU1 / 0.54	Villalba and Veblen (1997)
La Fragua	FRA	41°06'S/ 70°54'W	1180	1690-2002	23	AU1 / 0.64	Lab. de Dendrocronología-UACH
El Maitén	MAI	41°59'S/ 71°15'W	710	1690-1974	13	AU3 / 0.45	LaMarche et al. (1979)
Est. Teresa	TER	42°57'S/ 71°14'W	820	1540-2002	39	AU3 / 0.84	LaMarche et al. (1979), Villalba and Veblen (1997), updated
Nahuel-Pan	NAU	42°58'S/ 71°13'W	850	1567-2002	84	AU3 / 0.80	Villalba and Veblen (1997), updated
L. Terraplén	RRA	43°01'S/ 71°34'W	650	1700-1974	23	AU3 / 0.72	La Marche et al. (1979)
Futaleufú	FUT	43°11'S/ 71°42'W	470	1700-1992	16	AU3 / 0.62	Villalba and Veblen (1997)

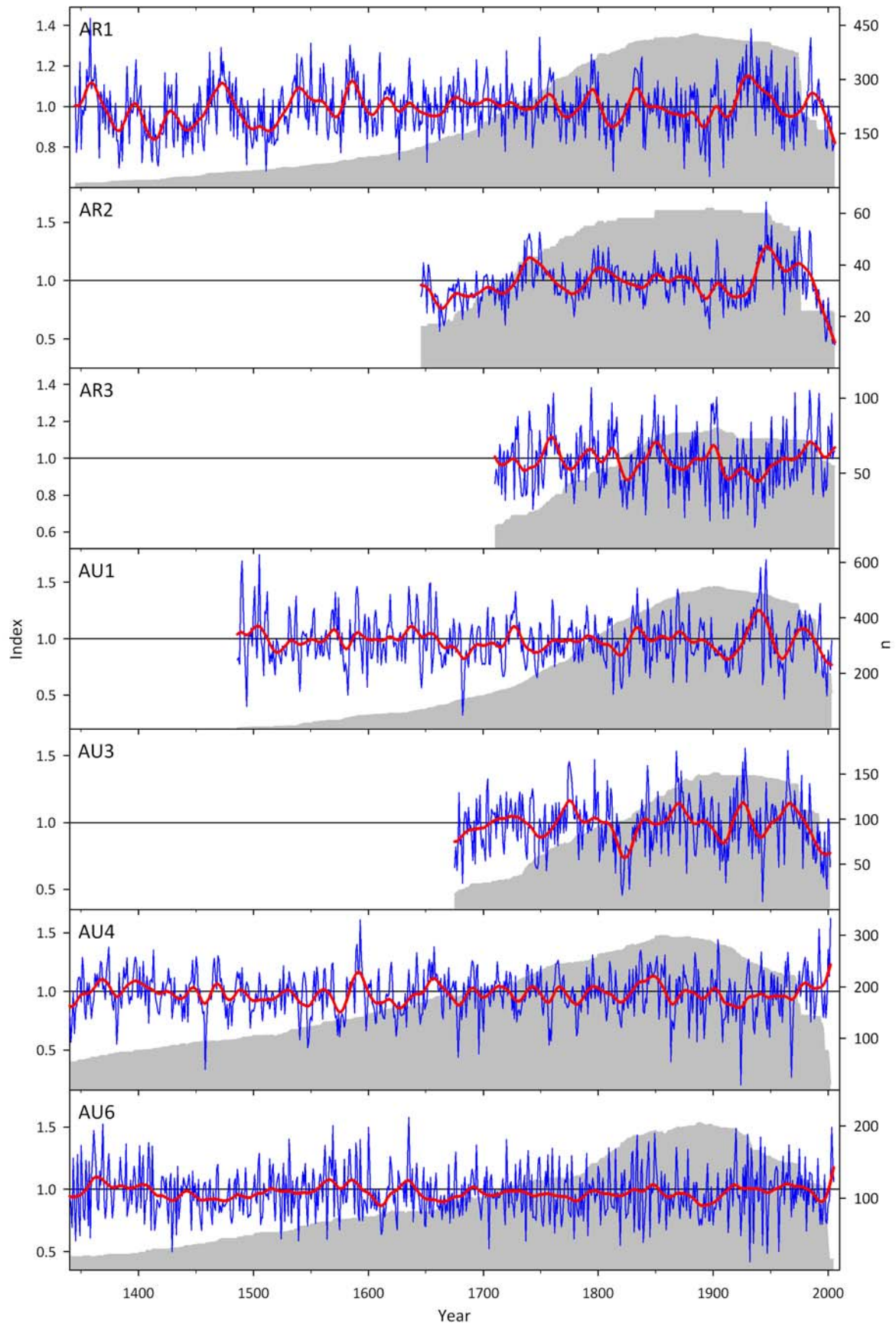
Elev., elevation; Comp. / Factor load., Composite chronology and PC factor loading of individual chronology

## Supplementary figures captions

**Suppl. Fig. 1.** ARSTAN tree-ring composite chronologies for *Araucaria araucana* and *Austrocedrus chilensis* for the 1340-2006 interval. Only the composite chronologies significantly correlated with October-June Neuquén River streamflow over the overlapping period 1903-2002 are presented. A 25-yr, 50% cutoff cubic spline is also shown to emphasize the long-term variations (Cook and Peters, 1981). Sample size is shown as a shaded area behind each chronology, representing the total number of tree-ring series per year. Only the years with  $EPS > 0.85$  are shown (see Suppl. Fig. 2).

**Suppl. Fig. 2.** Expressed Population Signal (EPS), moving mean correlation coefficient (RBAR) and statistics for the composite chronologies using a 50-year window with 25-year overlap. As in Suppl. Fig. 1, only the composite chronologies significantly correlated with streamflow are shown here. Dotted lines are the EPS threshold of 0.85 indicating reasonable signal strength in the chronologies (Wigley et al., 1984). For the RBAR values, the vertical bars represent the Standard Error (SE) limits.

Suppl. Fig. 1.



Suppl. Fig. 2.

