Data supplement to:

El Niño Southern Oscillation (ENSO)-induced hydrological anomalies in central Chile

Renee van Dongen[1,2], Dirk Scherler[1,3], Dadiyorto Wendi[4,5], Eric Deal[6], Luca Mao[7,8], Norbert Marwan[9,10], Claudio I. Meier[11]

[1] GFZ German Research Centre for Geosciences, Earth Surface Geochemistry, Potsdam, Germany.
[2] International Centre for Water Resources and Global Change (UNESCO), German Federal Institute of Hydrology, Koblenz, Germany.
[3] Freie Universität Berlin, Institute of Geographical Sciences, Berlin, Germany.
[4] GFZ German Research Centre for Geosciences, Hydrology, Potsdam, Germany.
[5] Sunjul GmbH, Berlin, Germany
[6] ETH Zürich, Department of Earth Sciences, Zürich, Switzerland.
[7] University of Lincoln, School of Geography, Lincoln, United Kingdom.
[8] Institute of Geography, Pontificia Universidad Católica de Chile, Chile
[9] Potsdam Institute for Climate Impact Research (PIK), Member of the Leibniz Association, Potsdam, Germany.
[10] University of Potsdam, Institute of Geosciences, Potsdam, Germany
[11] University of Memphis, Department of Civil Engineering, Memphis (TN), United States of America

Supplementary Tables

Table S 1: Station information for all discharge stations used in this study: ID, station name, coordinates, draining the Andes or coastal region (class), start and end of the monitoring period, amount of daily discharge observations (n), catchment area (Area) and mean catchment elevation (Mean elevation).

ID	Station Name	Latitude	Longitude	Class	Start monitoring period	End monitoring period	n	Area	Mean elevation
		(°N)	*(°E)*					*(km^2)*	*(m)*
4302001	Río Toro antes Junta Río La Laguna	-29.971	-70.093	Andes	05/06/1985	09/03/2018	11185	467.4	467.4
4311001	Estero Derecho en Alcohuaz	-30.221	-70.493	Andes	03/11/1983	31/07/2017	12249	338.2	338.2
4313001	Río Cochiguaz en El Peñón	-30.122	-70.434	Andes	11/08/1983	08/06/2017	12252	675.3	3510.8
4314001	Río Claro en Montegrande	-30.090	-70.493	Andes	24/01/1947	31/03/1983	12673	1249.1	3328.8
4314002	Río Claro en Rivadavia	-29.978	-70.553	Andes	16/03/1914	09/03/2018	34943	1512.8	3198.9
4400001	Estero Culebrón en El Sifón	-29.979	-71.286	Coastal Region	01/03/1986	08/07/2017	11020	190.4	286.6
4501001	Río Hurtado en San Agustín	-30.462	-70.536	Andes	17/12/1962	18/02/2018	18321	672.4	3723.7
4501002	Río Hurtado en Las Breas	-30.383	-70.600	Andes	10/06/1928	30/11/1977	10721	840.2	3564.7
4502001	Río Hurtado en La Cortadera	-30.333	-70.767	Andes	16/02/1968	28/02/1983	4388	1258.0	3061.0
4503001	Río Hurtado en Angostura de Pangue	-30.439	-71.002	Andes	01/09/1918	09/03/2018	32616	1837.3	2554.2
4506002	Río Hurtado en Entrada Embalse Recoleta	-30.477	-71.069	Coastal Region	26/05/1928	31/01/1984	7585	2259.2	2265.4
4511002	Río Grande en Las Ramadas	-31.012	-70.581	Andes	18/05/1961	08/02/2018	18920	568.5	3097.6
4512001	Río Tascadero en Desembocadura	-31.012	-70.664	Andes	23/10/1962	31/07/2017	18576	241.0	2888.4
4513001	Río Grande en Cuyano	-30.924	-70.773	Andes	05/05/1959	09/03/2018	20719	1286.6	2726.1
4514001	Río Mostazal en Cuestecita	-30.813	-70.613	Andes	03/10/1969	31/07/2017	16358	393.7	3066.7
4515002	Río Mostazal en Carén	-30.842	-70.769	Andes	24/07/1972	31/07/2017	13538	640.2	2588.9
4516001	Río Grande en Coipo	-30.783	-70.822	Andes	01/12/1942	26/04/1978	9143	2134.2	2548.1
4520001	Río Los Molles en Ojos de Agua	-30.744	-70.439	Andes	22/05/1970	31/07/2017	16041	155.3	3677.9
4522001	Río Rapel en Paloma	-30.733	-70.617	Andes	02/10/1941	23/03/1983	4702	510.5	3221.4
4522002	Río Rapel en Junta	-30.708	-70.873	Andes	01/04/1959	31/07/2017	18595	820.6	2661.3
4523001	Río Grande en Agua Chica	-30.702	-70.900	Andes	15/09/1946	28/02/1983	12390	3015.8	2544.0

4523002	Río Grande en Puntilla San Juan	-30.705	-70.924	Andes	01/03/1942	09/03/2018	25038	3529.4	2483.6
4530001	Río Cogotí en Fraguita	-31.112	-70.885	Andes	14/09/1971	09/03/2018	14957	490.5	2601.4
4531001	Río Cogotí en Cogotí 18	-31.083	-70.956	Andes	01/01/1942	31/03/1983	9880	530.9	2500.9
4531002	Río Cogotí Entrada Embalse Cogotí	-31.033	-71.040	Andes	10/01/1953	25/02/2018	18232	753.1	2123.7
4533002	Río Pama en Valle Hermoso	-31.266	-70.991	Andes	27/10/1987	31/07/2017	10022	155.7	2289.8
4703001	Río Choapa sobre el Río Valle	-31.983	-70.567	Andes	07/12/1965	03/12/1982	4366	1091.6	3188.7
4703002	Río Choapa en Cuncumén	-31.967	-70.594	Andes	14/10/1965	09/03/2018	17941	1131.6	3142.3
4711001	Río Choapa en Salamanca	-31.812	-70.930	Andes	01/06/1931	09/03/2018	20875	2211.9	2634.9
4712001	Río Chalinga en La Palmilla	-31.696	-70.716	Andes	29/10/1991	24/01/2018	9330	243.9	3037.6
5100001	Río Sobrante en Piadero	-32.225	-70.712	Andes	06/08/1928	09/03/2018	19263	241.1	2609.6
5101001	Río Pedernal en Tejada	-32.071	-70.756	Andes	22/12/1962	31/07/2017	14260	56.1	1624.6
5200001	Río Alicahue en Colliguay	-32.330	-70.738	Andes	30/11/1963	09/03/2018	17991	348.0	2402.6
5401003	Río Juncal en Juncal	-32.863	-70.168	Andes	15/02/1913	09/03/2018	20985	343.1	3661.9
5411001	Estero Pocuro en El Sifón	-32.916	-70.540	Andes	19/12/1930	31/07/2017	26261	181.0	2006.1
5411002	Estero Pocuro antes Junta Río Aconcagua	-32.764	-70.725	Andes	01/11/1929	01/08/1983	7779	488.8	1393.2
5420002	Estero de los Campos antes Junta Río Aconcagua	-32.802	-70.929	Coastal Region	12/07/1962	08/07/1983	7348	105.7	713.8
5422001	Estero Las Vegas en Desembocadura	-32.835	-70.998	Coastal Region	01/07/1962	04/06/2002	12562	328.4	840.5
5423004	Estero Romeral antes Junta Río Aconcagua	-32.833	-71.083	Coastal Region	20/07/1962	30/06/1984	5333	37.0	804.8
5423006	Estero Rabuco en Fundo Rabuco	-32.867	-71.133	Coastal Region	01/01/1969	07/09/1983	5012	124.4	801.2
5702001	Río Volcón en Queltehues	-33.806	-70.209	Andes	26/10/1914	09/03/2018	29614	523.4	3366.8
5705001	Río Colorado antes Junta Río Olivares	-33.490	-70.134	Andes	30/03/1977	09/03/2018	11834	783.4	3737.2
5706001	Río Olivares antes Junta Río Colorado	-33.488	-70.137	Andes	09/02/1977	09/03/2018	13787	541.6	3690.0
5707002	Río Colorado antes Junta Río Maipo	-33.588	-70.367	Andes	25/07/1940	09/03/2018	25235	1662.8	3418.7
5715001	Río Paine en Longitudinal	-33.833	-70.750	Coastal Region	04/12/1962	07/12/1983	6602	317.6	773.3
5721001	Estero Yerba Loca antes Junta San Francisco	-33.341	-70.364	Andes	03/11/1986	09/03/2018	11372	110.0	3424.3
5730008	Quebrada Ramón en Recinto EMOS	-33.433	-70.514	Andes	13/02/1991	31/01/2016	8456	35.6	1982.6
5741001	Estero Puangue en Boquerón	-33.167	-71.131	Coastal Region	26/06/1929	31/07/2017	22212	144.2	1136.5
6000003	Río Las Leas antes Junta Río Cachapoal	-34.363	-70.306	Andes	26/11/2006	09/03/2018	3699	172.8	2949.8
6002001	Río Cortaderal antes Junta Río Cachapoal	-34.367	-70.326	Andes	06/09/1985	09/03/2018	5575	425.7	2961.1
6003001	Río Cachapoal 5 Km. aguas abajo Junta Cortaderal	-34.346	-70.376	Andes	27/06/1989	09/03/2018	8421	964.7	2930.0
6006001	Río Pangal en Pangal	-34.247	-70.328	Andes	08/11/1985	09/03/2018	10515	519.9	3071.2

6011001	Estero de la Cadena antes Junta Río Cachapoal	-34.184	-70.844	Coastal Region	10/05/1983	09/03/2018	11355	598.9	706.0
6018001	Estero Zamorano en Puente El Niche	-34.431	-71.168	Coastal Region	16/10/1985	30/06/2017	9833	1022.6	672.3
6025001	Río Tinguiririca aguas abajo Junta Río Azufre	-34.816	-70.564	Andes	08/05/1970	22/04/1993	5519	970.4	2841.5
6027001	Río Claro en El Valle	-34.687	-70.874	Andes	01/05/1970	09/03/2018	16057	349.4	1604.5
6028001	Río Tinguiririca bajo Los Briones	-34.719	-70.827	Andes	01/11/1921	09/03/2018	26634	1438.3	2549.8
7103001	Río Claro en Los Queñes	-34.998	-70.809	Andes	01/05/1929	30/06/2017	31614	354.4	1856.6
7104001	Estero El Manzano antes Junta Río Teno	-34.965	-70.942	Andes	01/08/1959	30/10/1984	8408	133.7	1276.1
7112001	Río Colorado en Junta con Palos	-35.278	-71.003	Andes	11/11/1917	30/06/2017	21702	877.9	2288.2
7115001	Río Palos en Junta con Colorado	-35.274	-71.016	Andes	01/05/1947	09/03/2018	18048	490.0	1973.4
7116001	Estero Upeo en Upeo	-35.173	-71.091	Andes	15/02/1963	30/06/2017	17984	367.2	1197.1
7317003	Río Melado en Zona De Presa	-35.754	-71.086	Andes	20/12/2002	09/03/2018	5559	2269.4	1921.4
7317005	Río Melado en El Salto	-35.884	-71.019	Andes	01/01/2003	09/03/2018	5375	2127.6	1964.3
7320003	Río Claro en San Carlos	-35.699	-71.068	Andes	01/01/2000	09/03/2018	5574	401.2	1932.8
7330001	Río Perquilauquén en San Manuel	-36.376	-71.623	Andes	02/09/1930	09/03/2018	27100	502.4	1100.3
7340001	Estero Cardo Verde en Lo Ubaldo	-35.883	-72.017	Coastal Region	19/08/1968	31/12/1984	3776	158.6	122.8
7350003	Río Longaví en El Castillo	-36.256	-71.338	Andes	21/05/1964	15/06/2017	16410	466.9	1563.6
7354001	Río Achibueno en Los Peñascos	-35.964	-71.488	Andes	22/03/1947	30/09/1986	12580	974.2	1263.9
7354002	Río Achibueno en La Recova	-36.003	-71.442	Andes	01/11/1986	09/03/2018	11069	894.3	1328.9
7355003	Río Ancoa antes Tunel Canal Melado	-35.867	-71.117	Andes	30/11/1961	16/04/1995	6672	84.5	1682.7
7358001	Río Putagán en Yerbas Buenas	-35.772	-71.585	Coastal Region	14/04/1946	31/01/2016	22857	390.5	471.5
7372001	Río Claro en Camarico	-35.178	-71.385	Andes	01/03/1936	30/03/2017	23490	703.0	969.3
7374001	Río Lircay en Puente Las Rastras	-35.486	-71.293	Andes	18/12/1961	30/06/2017	17973	382.3	1052.0
7381001	Estero Los Puercos en Puente Los Puercos	-35.374	-71.829	Coastal Region	20/02/1986	30/06/2017	10936	558.8	205.5
7400001	Río Loanco en Desembocadura	-35.569	-72.583	Coastal Region	03/07/1987	30/09/2010	7535	222.7	350.9
8104001	Río Sauces antes Junta con Ñuble	-36.665	-71.274	Andes	31/10/1966	30/06/2017	16326	606.7	1682.9
8112001	Río Niblinto antes Canal Alimentador Embalse Coihueco	-36.655	-71.756	Andes	02/02/1971	30/06/2017	10374	162.0	1157.1
8117001	Río Chillán en Longitudinal	-36.633	-72.217	Coastal Region	14/02/1958	12/05/1983	6036	730.8	542.4
8117004	Río Chillán en Esperanza	-36.787	-71.749	Andes	03/03/1939	03/09/1994	19878	206.0	1295.3
8117005	Río Chillán en Camino a Confluencia	-36.617	-72.317	Coastal Region	29/09/1956	30/06/2017	15908	798.3	502.2
8117006	Río Chillán en Esperanza N 2	-36.800	-71.661	Andes	27/11/2003	09/03/2018	4702	167.4	1411.6

8117008	Río Quilmo en Camino a Yungay (Ca)	-36.667	-72.150	Coastal Region	19/07/1957	17/04/1995	9591	129.0	281.7
8118001	Río Changaral Camino a Portezuelo	-36.550	-72.283	Coastal Region	01/10/1956	31/07/2004	13309	1131.9	165.8
8123001	Río Itata en Cholguán	-37.150	-72.067	Coastal Region	22/01/1924	30/06/2017	30629	859.6	833.7
8124001	Río Itata en General Cruz	-36.933	-72.350	Coastal Region	05/01/1956	30/06/2017	18576	1661.5	612.8
8124002	Río Itata en Trilaleo	-37.067	-72.183	Coastal Region	11/11/1957	30/06/2017	17585	1147.7	752.0
8130002	Río Diguillín en San Lorenzo (Atacalco)	-36.924	-71.576	Andes	23/05/1946	09/03/2018	25113	204.4	1510.9
8132001	Río Diguillín en Longitudinal	-36.867	-72.333	Coastal Region	21/09/1956	30/06/2017	17388	1299.8	785.0
8133001	Río Itata en Cerro Negro	-36.850	-72.383	Coastal Region	14/09/1956	31/08/1984	9816	3187.4	649.4
8134003	Río Larqui en Santa Cruz de Cuca	-36.700	-72.383	Coastal Region	16/01/1985	30/06/2017	10823	636.3	150.0
8135002	Río Itata en Balsa Nueva Aldea	-36.650	-72.450	Coastal Region	12/09/1956	09/03/2018	20611	4510.1	503.6
8144001	Río Lonquén en Trehuaco	-36.425	-72.667	Coastal Region	08/10/1985	12/11/2014	6105	1161.1	173.7
8220001	Río Andalién Camino a Penco	-36.817	-73.033	Coastal Region	01/11/1960	09/03/2018	18247	751.7	210.0
8304001	Río Lonquimay antes Junta Río Biobío	-38.433	-71.233	Andes	28/03/1985	31/05/2016	10989	466.7	1359.2
8307002	Río Biobío en Llanquén	-38.201	-71.299	Andes	01/01/2000	09/03/2018	5471	3355.6	1459.7
8312000	Río Biobío en Angostura Ralco 1	-38.037	-71.478	Andes	01/01/2000	09/03/2018	5106	5127.5	1453.3
8312001	Río Biobíoantes Junta Huiri Huiri	-37.990	-71.520	Andes	07/12/2002	30/06/2017	5045	5233.1	1451.8
8313000	Río Pangue en Captación	-37.899	-71.581	Andes	19/11/2002	09/03/2018	5254	135.6	1515.2
8317001	Río Biobío en Rucalhue	-37.711	-71.902	Andes	01/06/1937	09/03/2018	27455	7252.5	1383.1
8317002	Río Lirquén en Cerro El Padre	-37.776	-71.863	Andes	10/12/1942	30/06/2017	26750	103.4	668.1
8319001	Río Biobío en Longitudinal	-37.602	-72.278	Andes	05/04/1965	03/04/2017	4685	7860.0	1307.2
8323001	Río Duqueco en Cerrillos	-37.542	-72.312	Coastal Region	01/07/1962	09/03/2018	17547	1338.9	741.0
8323002	Río Duqueco en Villucura	-37.550	-72.033	Coastal Region	01/01/1941	30/06/2017	26218	817.0	1022.8
8330001	Río Mulchén en Mulchén	-37.717	-72.250	Coastal Region	23/03/1937	09/03/2018	24450	428.2	462.2
8332001	Río Bureo en Mulchén	-37.717	-72.233	Coastal Region	12/05/1929	31/03/2009	25167	540.8	663.2
8334001	Río Biobío en Coihue	-37.550	-72.590	Coastal Region	23/11/1928	09/03/2018	11910	11136.9	1078.6
8342001	Río Renaico en Longitudinal	-37.850	-72.383	Coastal Region	18/06/1982	30/06/2017	11795	688.1	833.3
8343001	Río Mininco en Longitudinal	-37.864	-72.394	Coastal Region	01/06/1963	30/06/2017	18805	440.4	449.6
8350001	Río Malleco en La Laguna	-38.214	-71.828	Andes	01/06/1960	10/03/1984	5646	46.1	1254.9
8351001	Río Malleco en Collipulli	-37.965	-72.436	Coastal Region	19/02/1920	09/03/2018	23205	415.1	800.9
8356001	Río Rahue en Quebrada Culén	-37.943	-72.809	Coastal Region	01/07/1997	30/06/2017	6938	671.6	214.1
8362001	Río Nicodahue en Pichún	-37.462	-72.753	Coastal Region	01/04/1988	28/05/2015	8681	741.1	584.7

8372002	Río Polcura en Cuatro Juntas	-37.107	-71.242	Andes	19/11/2002	09/03/2018	5169	235.4	1995.7
8376001	Río Rucúe en Camino a Antuco	-37.340	-71.794	Andes	18/11/1983	16/10/2016	9615	210.9	1213.8
8385001	Río Claro en Camino Yumbel-Estación	-37.118	-72.545	Coastal Region	09/01/1985	31/08/2000	5342	531.1	137.3
8430001	Río Laraquete en El Cajón	-37.167	-73.167	Coastal Region	01/03/1985	31/12/1996	3972	35.4	395.5
8530001	Río Carampangue en Carampangue	-37.250	-73.267	Coastal Region	15/12/1970	31/12/1983	3806	912.8	394.0
8720001	Río Lebu en Las Corrientes (en Los Alamos)	-37.683	-73.350	Coastal Region	17/05/1963	11/05/2015	5974	667.7	372.2
8821001	Río Cayucupil en Cayucupil	-37.817	-73.250	Coastal Region	10/08/1950	31/12/1983	11325	170.3	779.3
8821002	Río Butamalal en Butamalal	-37.817	-73.250	Coastal Region	10/08/1950	10/05/2017	19164	123.4	778.9
8822002	Río Elicura en Puente Elicura	-37.933	-73.217	Coastal Region	01/08/1987	31/01/2003	5206	68.6	564.2
8910001	Río Lleu-Lleu en Desagüe Lago Lleu-Lleu	-38.117	-73.400	Coastal Region	01/04/1972	30/06/2017	15617	581.9	295.4
9101002	Río Purén en Purén	-38.013	-73.043	Coastal Region	01/09/1994	30/04/2009	5148	289.7	564.3
9102001	Río Lumaco en Lumaco	-38.150	-72.900	Coastal Region	18/10/1947	09/03/2018	24170	855.0	340.8
9104001	Río Traiguén en Victoria	-38.217	-72.317	Coastal Region	24/10/1950	30/06/2017	22983	93.8	513.0
9104002	Río Dumo en Santa Ana	-38.150	-72.300	Coastal Region	01/01/1987	28/02/2017	10741	393.3	484.8
9107001	Estero Chufquén en Chufquén	-38.300	-72.667	Coastal Region	25/08/1987	28/02/2017	9751	854.2	428.9
9107002	Estero Chanco Camino Curacautín	-38.267	-72.250	Coastal Region	01/09/1969	30/04/1983	3897	38.6	476.7
9111001	Río Quillén en Longitudinal	-38.450	-72.433	Coastal Region	18/08/1959	30/04/1983	8093	148.2	456.9
9113001	Río Quillén en Galvarino	-38.400	-72.783	Coastal Region	29/09/1959	06/09/2016	20037	710.7	284.5
9116001	Río Cholchol en Cholchol	-38.608	-72.848	Coastal Region	01/03/1929	09/03/2018	22722	5055.8	342.1
9122002	Río Blanco en Curacautín	-38.451	-71.866	Coastal Region	22/10/1986	28/10/2015	10048	170.9	1296.6
9123001	Río Cautín en Rari-Ruca	-38.430	-72.011	Andes	01/03/1929	09/03/2018	31264	1305.3	1124.6
9126001	Río Collín en Codahue	-38.578	-72.186	Coastal Region	27/07/1996	29/09/2015	5930	254.6	688.3
9127001	Río Muco en Puente Muco	-38.617	-72.417	Coastal Region	07/03/1950	30/06/2017	22372	650.4	536.7
9129002	Río Cautín en Cajón	-38.687	-72.503	Coastal Region	03/03/1949	09/03/2018	23763	2755.4	762.7
9131001	Río Quepe en Vilcún	-38.683	-72.233	Coastal Region	23/03/1946	30/04/2015	21841	378.9	931.2
9134001	Río Huichahue en Faja 24000	-38.850	-72.333	Coastal Region	17/01/1985	31/01/2017	11050	348.1	605.2
9135001	Río Quepe en Quepe	-38.850	-72.617	Coastal Region	13/12/1929	29/02/2016	19166	1666.1	506.0
9140001	Río Cautín en Almagro	-38.780	-72.947	Coastal Region	16/05/1965	30/06/2017	17778	5549.4	552.7
9402001	Río Allipén en Melipeuco	-38.865	-71.734	Andes	17/01/1985	26/10/2016	11104	829.6	1292.6
9404001	Río Allipén en Los Laureles	-38.983	-72.233	Andes	18/03/1946	09/03/2018	24896	1674.1	1020.6
9412001	Río Trancura en Curarrehue	-39.360	-71.581	Andes	01/09/1968	09/03/2018	17286	356.9	1195.3

9414001	Río Trancura antes Río Llafenco	-39.333	-71.767	Andes	01/10/1970	30/06/2017	16287	1379.4	1146.7
9416001	Río Liucura en Liucura	-39.256	-71.824	Andes	01/10/1971	30/06/2017	14372	349.0	1038.1
9420001	Río Toltén en Villarica	-39.267	-72.233	Andes	05/03/1929	09/03/2018	30759	2931.8	964.4
9423001	Río Toltén en Coipué	-39.100	-72.383	Andes	16/12/1929	09/03/2018	11064	3488.0	879.5
9433001	Río Puyehue en Quitratué	-39.150	-72.667	Coastal Region	07/10/1947	10/04/2017	23672	153.7	200.3
9434001	Río Donguil en Gorbea	-39.100	-72.683	Coastal Region	06/10/1947	10/04/2017	18343	770.6	206.2
9436001	Río Mahuidanche en Santa Ana	-39.083	-72.933	Coastal Region	17/03/1987	30/06/2017	10508	384.6	189.0
9437002	Río Toltén en Teodoro Schmidt	-39.014	-73.083	Coastal Region	12/02/1991	09/03/2018	9735	6622.6	611.8
10100002	Río Fui en Desagüe Lago Pirihueico	-39.875	-71.890	Andes	01/03/1926	20/03/2017	11231	1498.5	1171.1
10100006	Río Huahum en la Frontera	-40.097	-71.676	Andes	16/04/2002	31/03/2017	5107	1029.1	1194.8
10102001	Río Liquiñe en Liquiñe	-39.727	-71.850	Andes	22/07/1986	24/04/2016	9780	367.9	1122.3
10111001	Río San Pedro en Desagüe Lago Riñihue	-39.767	-72.475	Andes	01/01/1929	30/06/2017	13047	4384.5	873.6
10121001	Río Collileufú en Los Lagos	-39.858	-72.825	Coastal Region	01/02/1987	30/04/2017	10405	627.5	196.7
10122001	Río Calle Calle en Balsa San Javier	-39.775	-72.983	Coastal Region	01/02/1987	30/05/2008	7663	6621.2	684.2
10122003	Río Calle Calle en Pupunahue	-39.804	-72.903	Coastal Region	08/03/2007	09/03/2018	4005	6497.1	693.9
10134001	Río Cruces en Rucaco	-39.550	-72.900	Coastal Region	01/05/1969	09/03/2018	17553	1804.8	281.9
10137001	Río Iñaque en Máfil	-39.668	-72.950	Coastal Region	20/02/1928	30/04/2017	12615	539.8	203.8
10140001	Río Santo Domingo en Rinconada de Piedra	-39.383	-73.133	Coastal Region	01/03/1992	31/10/2016	8790	107.8	335.1
10142003	Río Futa en Tres Chiflones	-39.972	-73.147	Coastal Region	23/05/2002	30/06/2017	5054	518.4	316.9
10304001	Río Calcurrupe en Desembocadura	-40.250	-72.267	Andes	01/07/1986	30/04/2017	10749	1725.6	935.8
10305001	Río Caunahue Camino a Llifén	-40.152	-72.251	Andes	01/01/1997	31/03/2017	6902	355.7	951.5
10306001	Río Nilahue en Mayay	-40.267	-72.233	Andes	01/08/1987	09/03/2018	11123	376.0	815.9
10327001	Río Chirre antes Junta Río Pilmaiquén	-40.433	-72.917	Coastal Region	30/07/2001	31/05/2017	4949	777.2	388.0
10328001	Río Pilmaiquén en San Pablo	-40.384	-73.002	Coastal Region	23/03/1929	30/06/2017	20410	2475.4	561.6
10343001	Río Coihueco antes Junta Pichicope	-40.933	-72.700	Andes	01/08/1987	31/03/2017	10318	313.7	607.6
10351001	Río Toro en Tegualda	-41.050	-73.383	Coastal Region	30/05/2000	30/04/2017	5796	340.4	162.0
10356001	Río Negro en Chahuilco	-40.714	-73.228	Coastal Region	01/03/1986	09/03/2018	10835	2285.7	151.9
10362001	Río Damas en Tacamo	-40.618	-73.059	Coastal Region	01/02/1986	31/03/2017	10916	467.6	132.1
10363002	Río Forrahue en Aromos	-40.886	-73.133	Coastal Region	04/12/1991	30/04/2017	8455	169.4	134.6
10364001	Río Rahue en Forrahue	-40.517	-73.283	Coastal Region	27/02/1986	31/07/2017	10587	5614.2	234.4
10401001	Río Tranallaguín en Carrico	-40.583	-73.600	Coastal Region	09/06/2000	30/04/2017	4198	413.5	279.0

10405002	Río Hueyusca en Camarones	-41.017	-73.617	Coastal Region	30/08/2001	30/04/2017	5468	218.5	360.9
10411002	Río Negro en Las Lomas	-41.383	-73.067	Coastal Region	25/04/1989	30/04/2017	8899	253.7	118.1
10431000	Río Blanco antes Junta Río Chamiza	-41.428	-72.593	Andes	17/10/2002	23/04/2015	3871	30.5	528.7
10432003	Río Chico antes Río Chamiza	-41.439	-72.818	Andes	14/03/2003	09/03/2018	4552	136.9	298.5
10503001	Río Manso antes Junta Río Puelo	-41.722	-72.014	Andes	27/05/2001	30/04/2017	5225	3589.5	1184.1
10514001	Río Puelo antes Junta con Manso	-41.757	-72.053	Andes	24/07/2001	23/08/2016	5041	4784.3	1012.7
10520001	Río Puelo en Desagüe Lago Tagua Tagua	-41.639	-72.169	Andes	30/05/2002	22/11/2016	4616	8640.9	1073.7
10523002	Río Puelo en Carrera Basilio	-41.604	-72.206	Andes	01/01/2003	09/03/2018	5361	8851.6	1071.7

Table S 2: The proportion of catchments (in percentage) which show increasing (+) or decreasing (-) values for mean monthly temperature (MMT), mean monthly precipitation (MMP), and mean monthly specific discharge (MMQsp) during El Niño, as compared to the non-ENSO phase. The data are presented for different seasons: autumn (MAM), winter (JJA), spring (SON), summer (DJF), for catchments located in the Andes and the coastal region (CR), and for different climate zones: semi-arid (SA), mediterranean (Med) and humid-temperate (HT).

	MMT		MMP		MMQ	
	+ (%)	- (%)	+ (%)	- (%)	+ (%)	- (%)
Year	70.54	29.46	98.00	2.00	96.00	4.00
MAM	89.51	10.49	69.33	30.67	90.67	9.33
JJA	68.97	31.03	88.00	12.00	89.33	10.67
SON	57.93	42.07	92.67	7.33	92.00	8.00
DJF	60.69	39.31	41.33	58.67	93.33	6.67
Andes	78.21	21.79	97.44	2.56	96.15	3.85
CR	100.00	0.00	98.61	1.39	95.83	4.17
SA	64.29	35.71	100.00	0.00	96.55	3.45
Med	80.56	19.44	97.30	2.70	91.89	8.11
HT	100.00	0.00	97.62	2.38	97.62	2.38

Table S 3: Percent differences in mean monthly temperature (MMT), precipitation (MMP), and specific discharge (MMQsp) for El Niño events relative to non-ENSO conditions. Data are reported for each season, spatial class: Andes, coastal region (CR), and climate zone: semi-arid (SA), mediterranean (Med), and humid-temperate (HT), and are presented as percentiles (X_x) and the interquantile range (IQR) between X_{25} and X_{75}.

	Temperature						Precipitation						Specific discharge					
	T_5	T_{25}	T_{50}	T_{75}	T_{95}	IQR	P_5	P_{25}	P_{50}	P_{75}	P_{95}	IQR	Q_5	Q_{25}	Q_{50}	Q_{75}	Q_{95}	IQR
Year	-47.93	2.71	3.87	7.07	34.24	4.37	5.84	9.77	16.03	28.83	62.03	19.06	3.48	19.65	30.93	59.10	141.77	39.46
MAM	-91.12	4.94	8.37	14.75	122.88	9.82	-49.31	-4.98	8.44	26.45	87.67	31.43	-17.37	15.96	45.22	92.63	302.95	76.67
JJA	-44.31	-3.19	8.46	18.13	74.32	21.33	-5.01	4.45	16.58	34.58	95.18	30.14	-10.67	10.83	24.25	52.81	154.93	41.98
SON	-28.16	-1.60	0.89	3.31	24.11	4.91	-11.38	30.35	38.05	55.91	125.10	25.57	-2.62	14.63	24.95	41.82	96.80	27.19
DJF	-3.27	-0.48	0.48	2.32	17.56	2.79	-34.96	-19.23	-6.18	11.07	113.07	30.30	-6.57	31.86	56.49	119.49	451.92	87.64
Andes	-81.10	2.42	5.19	10.76	113.98	8.33	4.20	13.40	23.08	35.00	67.70	21.60	8.68	22.59	45.46	89.37	246.39	66.77
CR	0.59	2.78	3.59	4.19	7.07	1.41	5.85	8.50	11.83	18.99	50.53	10.49	1.92	17.42	26.61	33.79	69.65	16.37
SA	-104.00	-16.92	8.42	34.43	253.24	51.34	13.22	25.26	32.32	45.87	99.73	20.61	9.39	71.86	104.41	146.90	396.51	75.04
Med	-82.83	0.97	3.42	8.39	19.62	7.42	3.37	22.72	28.42	46.81	90.81	24.09	-0.95	22.21	40.11	69.21	104.49	47.01
HT	1.56	3.11	3.83	4.99	8.29	1.87	3.57	8.39	10.77	14.53	22.64	6.14	7.23	18.36	23.91	32.61	45.55	14.26

Table S 4: The proportion of catchments (in percentage) which show increasing (+) or decreasing (-) values for mean monthly temperature (MMT), mean monthly precipitation (MMP), and mean monthly specific discharge (MMQsp) during La Niña, as compared to the non-ENSO phase. The data are presented for different seasons: autumn (MAM), winter (JJA), spring (SON), summer (DJF), for catchments located in the Andes and the coastal region (CR) and for different climate zones: semi-arid (SA), mediterranean (Med) and humid-temperate (HT).

	MMT		MMP		MMQ	
	+ (%)	- (%)	+ (%)	- (%)	+ (%)	- (%)
Year	70.54	29.46	4.51	95.49	10.53	89.47
MAM	73.10	26.90	0.67	99.33	10.00	90.00
JJA	59.69	40.31	27.82	72.18	18.80	81.20
SON	68.97	31.03	14.00	86.00	8.67	91.33
DJF	37.93	62.07	35.33	64.67	28.00	72.00
Andes	58.57	41.43	2.86	97.14	4.29	95.71
CR	84.75	15.25	6.35	93.65	17.46	82.54
SA	25.93	74.07	7.41	92.59	7.41	92.59
Med	50.00	50.00	3.13	96.88	21.88	78.13
HT	97.14	2.86	4.05	95.95	6.76	93.24

Table S 5: Percent differences in mean monthly temperature (MMT), precipitation (MMP), and specific discharge (MMQsp) for La Niña events relative to non-ENSO conditions. Data are reported for each season, spatial class: Andes, coastal region (CR), and climate zone: semi-arid (SA), mediterranean (Med), and humid-temperate (HT), and are presented as percentiles (X_x) and the interquantile range (IQR) between X_{25} and X_{75}.

	Temperature						Precipitation						Specific discharge					
	T_5	T_{25}	T_{50}	T_{75}	T_{95}	IQR	P_5	P_{25}	P_{50}	P_{75}	P_{95}	IQR	Q_5	Q_{25}	Q_{50}	Q_{75}	Q_{95}	IQR
Year	-110.88	-5.86	2.40	4.30	53.39	10.16	-46.30	-33.06	-25.26	-16.07	-0.52	16.99	-68.09	-38.89	-22.60	-13.11	21.47	25.78
MAM	-46.17	-1.35	5.22	8.37	31.23	9.72	-70.54	-58.01	-46.96	-40.55	-17.72	17.46	-77.60	-52.47	-36.42	-21.73	37.17	30.74
JJA	-57.39	-8.31	1.3	11.21	127.07	19.52	-49.52	-26.54	-15.28	3.00	46.70	29.55	-62.92	-35.50	-21.23	-7.10	44.69	28.39
SON	-135.38	-4.82	4.78	12.50	49.50	17.33	-57.63	-43.54	-34.83	-19.01	24.08	24.52	-78.94	-50.09	-30.45	-15.51	8.49	34.59
DJF	-21.74	-2.03	-0.53	0.60	5.83	2.62	-32.67	-17.93	-6.39	11.56	70.03	29.49	-77.09	-34.33	-15.17	2.19	60.17	36.52
Andes	-179.21	-16.62	2.30	8.20	67.73	24.83	-46.99	-34.48	-28.14	-15.88	-4.69	18.60	-71.94	-50.03	-24.27	-13.54	-2.56	36.49
CR	-8.28	1.43	2.47	3.66	5.88	2.22	-40.54	-30.36	-24.52	-16,60	8.78	13.76	-44.02	-32.31	-20.58	-12.79	29.71	19.52
SA	-382.63	-83.34	-25.88	1.02	69.81	84.36	-55.95	-40.63	-33.22	-16.57	19.33	24.06	-82.40	-67.24	-55.67	-38.89	13.40	28.35
Med	-25.54	-10.50	-0.83	4.36	97.51	14.86	-45.15	-36.57	-30.98	-19.20	-2.78	17.37	-45.37	-33.58	-19.33	-7.41	47.06	26.17
HT	0.34	2.16	3.18	4.29	9.44	2.13	-34.57	-28.70	-22.19	-15.52	-1.25	13.18	-40.49	-29.59	-20.54	-15.73	5.22	13.86

Supplementary Figures

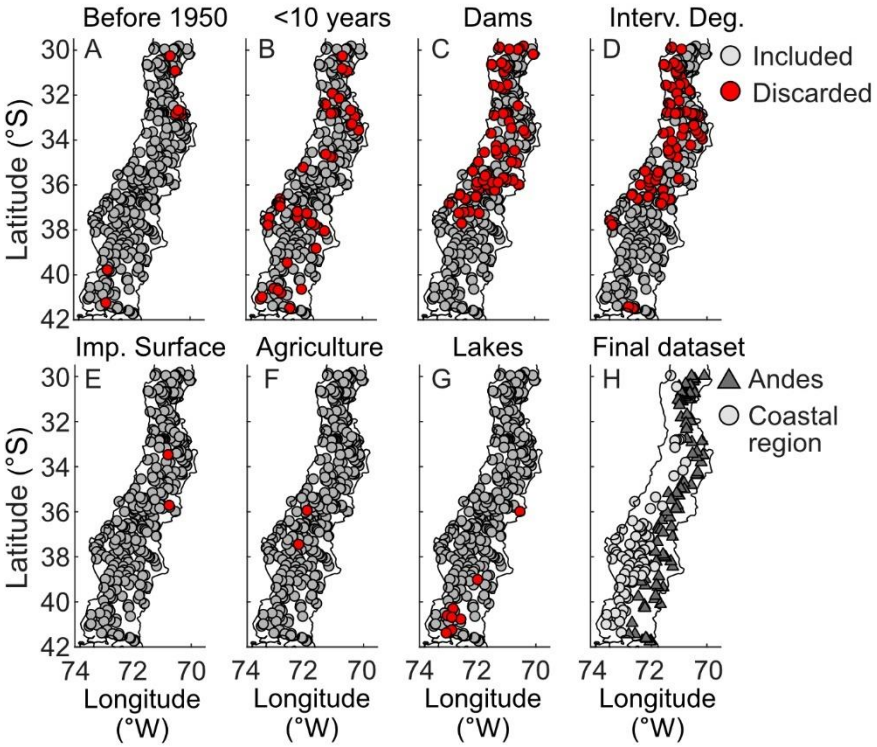

Figure S 1: The excluded catchments (red dots) from the original CAMELS-CL dataset based on different criteria. A) Excluded stations with data availability only before 1950, B) excluded stations with <10 years of data. C) excluded stations with large dams in their basin), D) excluded stations with a human intervention degree of >10%, E) excluded stations with >5% of the basin area covered with impermeable surfaces, F) excluded stations with >50% of the basin area with agricultural land-use, G) excluded stations located downstream of large lakes (>10% of basin area). H) The final dataset used in this study, with 178 gaging stations categorized in basins that drain the Andes and catchments that drain the coastal region.

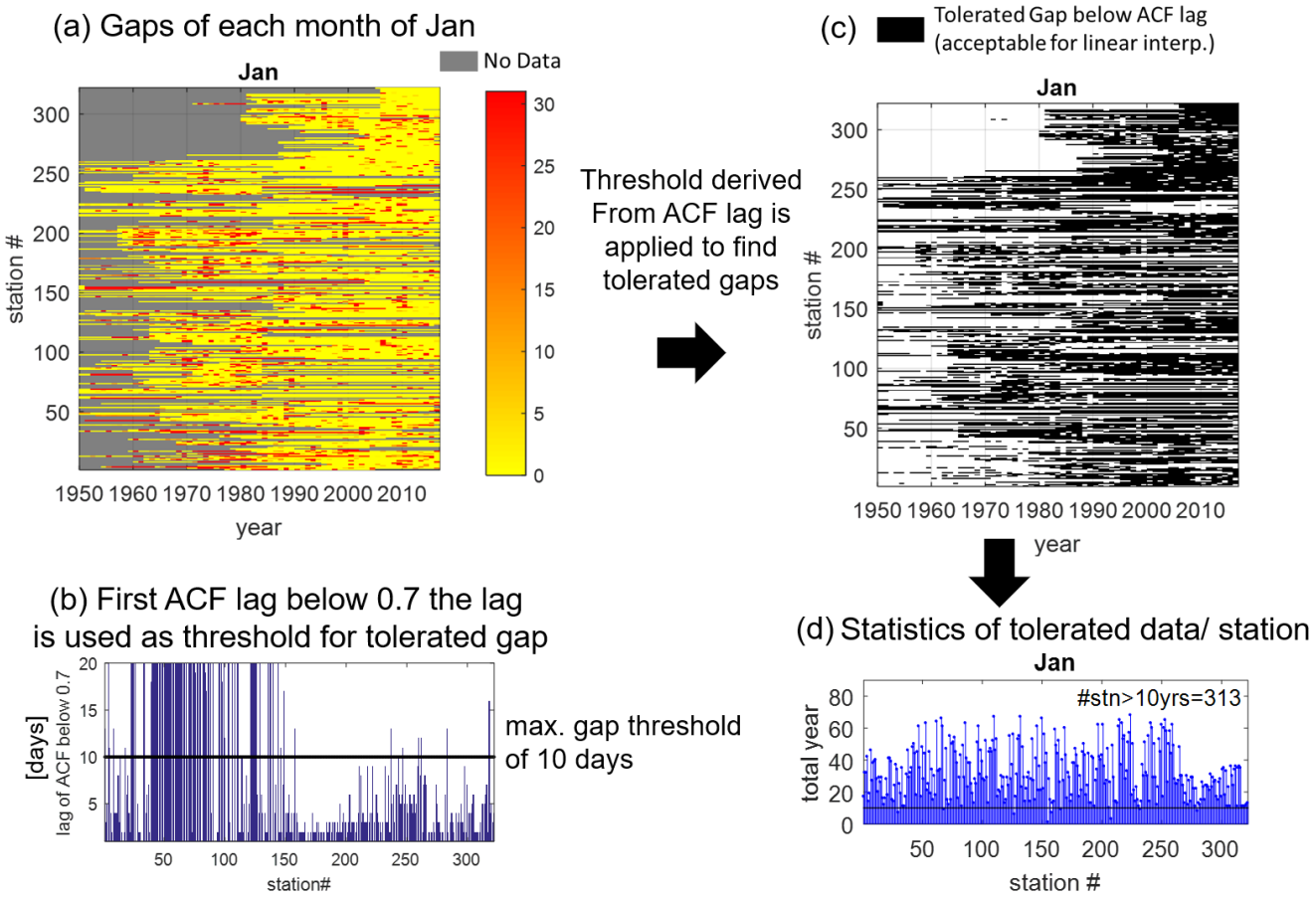

Figure S 2: Illustration of data gaps interpolation method, based on an example for January. A) Gaps statistics per month and per station are first calculated, and all months with gap lengths above 10 days are first removed. B) A specific tolerated gap length per station is decided upon calculating its discharge series lag autocorrelation (ACF). C) Lag that results in ACF below 0.7 is now our specific threshold of tolerated gap length of the month. This assumes that the remaining minimal gaps can now be linearly interpolated to result in full month of continuous daily data. D) Overview of the resulting data length per station after the interpolation method.

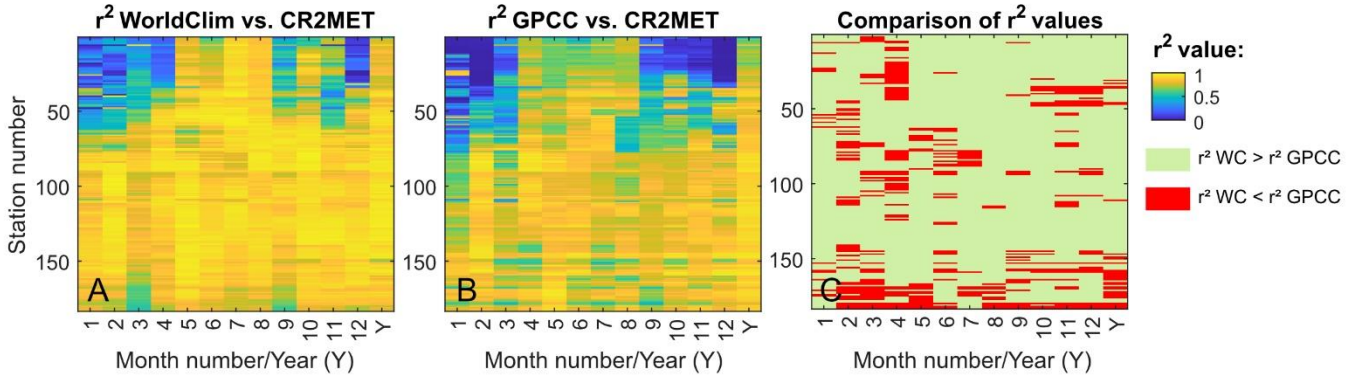

Figure S 3: Quality check of monthly precipitation products for the time period 1979-2009. A) r^2 of WorldClim V2.1 (WC) precipitation data vs. CR2MET precipitation data. B) r^2 of GPCC precipitation data vs. CR2MET precipitation data. C) Overview of which precipitation dataset performs better, green= r^2 WorldClim V2.1 > r^2 GPCC, red= r^2 WorldClim V2.1 < r^2 GPCC.

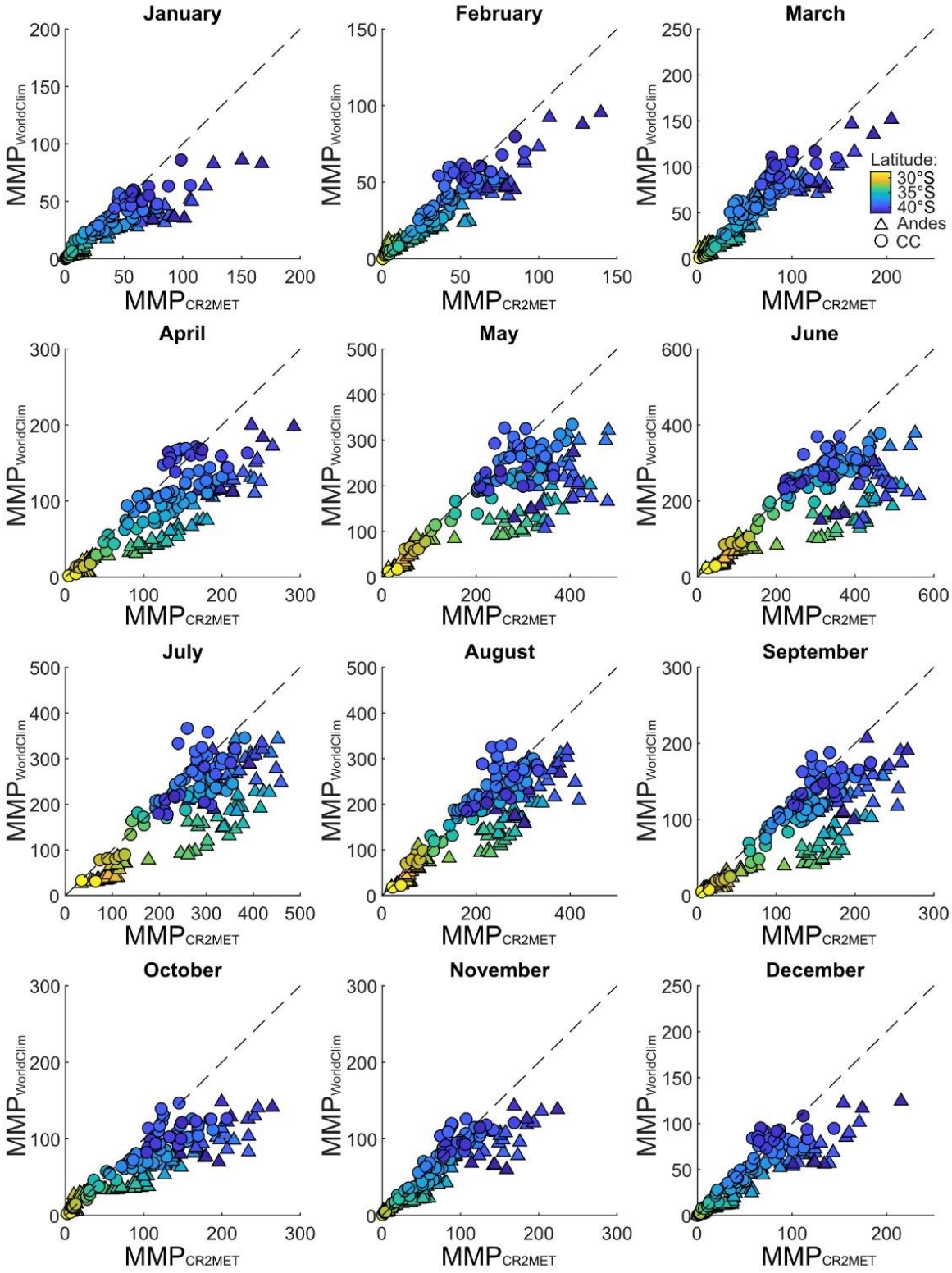

Figure S 4: A monthly comparison between the mean monthly precipitation (MMP) values based on the precipitation dataset from the Centre for Climate and Resilience Research (CR2MET; Boisier et al., 2018b) and the WorldClim V2.1 (Harris et al., 2014, Fick and Hijmans, 2017). Each datapoint represents a station, comparing the long-term averaged MMP values over the time period 1979-2009.

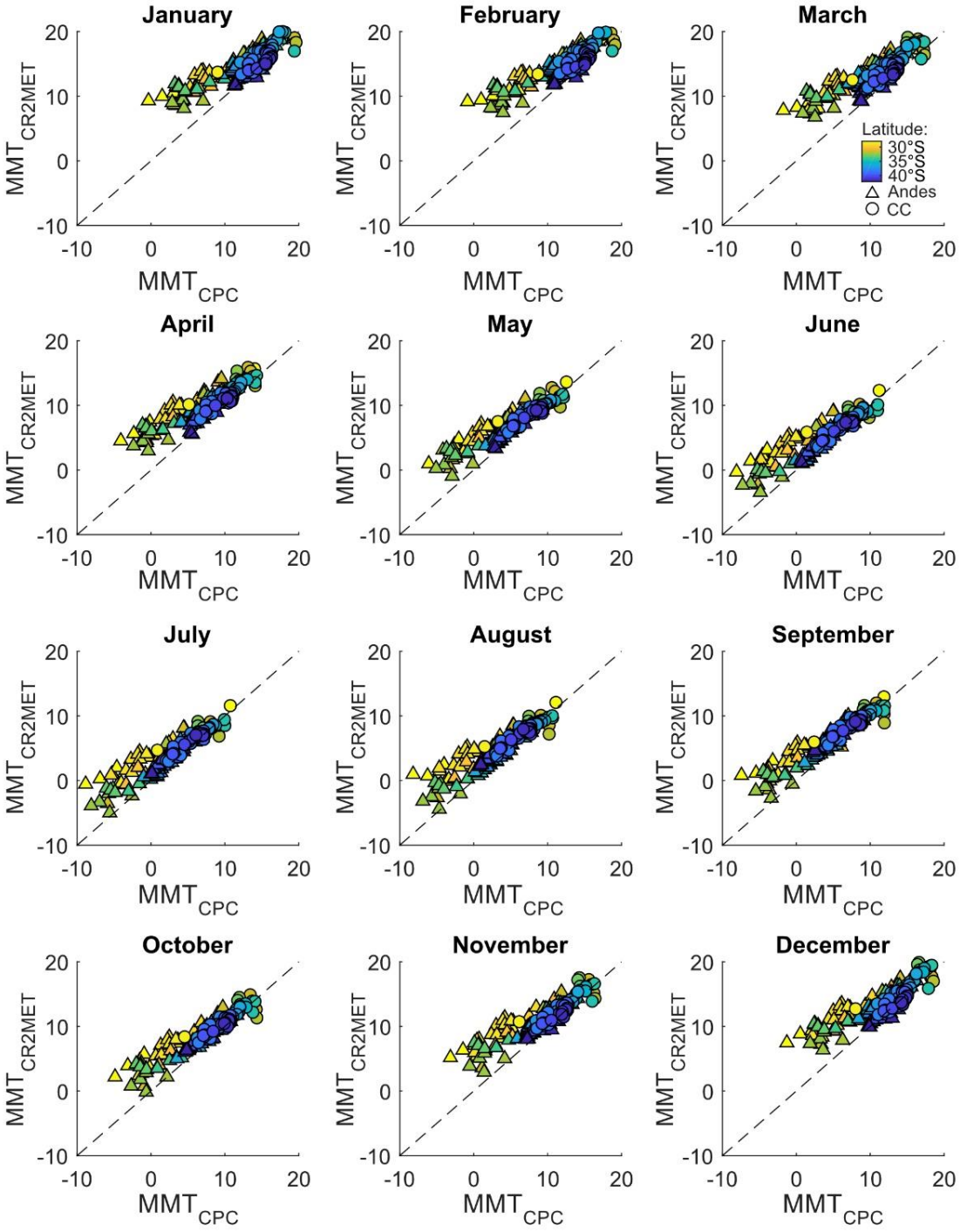

Figure S 5: A monthly comparison between the mean monthly temperature (MMT) values based on the temperature dataset from the Center for Climate and Resilience Research (CR2MET; Boisier et al., 2018b) and the Climate Prediction Center (CPC; Fan and van den Dool, 2008). Each datapoint represents a station, comparing the long-term averaged MMT values over the time period 1979-2009.

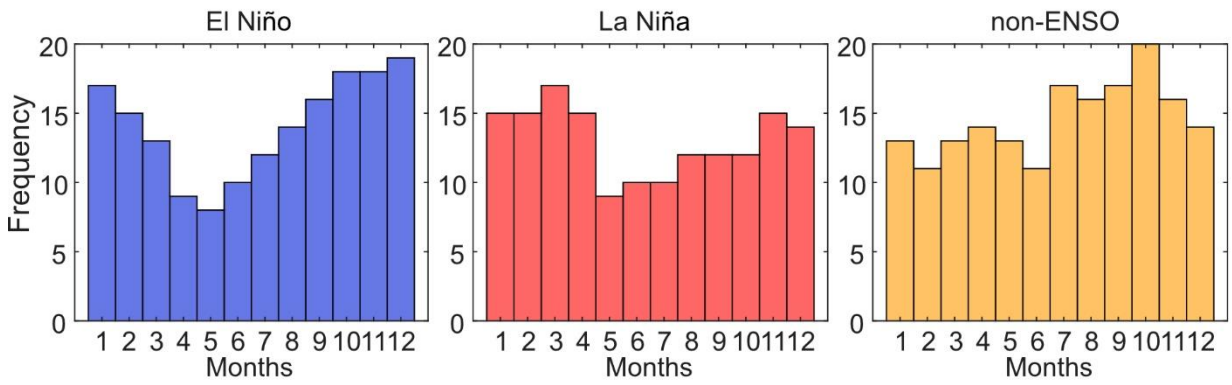

Figure S 6: Frequency of months classified as El Niño, La Niña and non-ENSO phases in the time period 1950-2009.

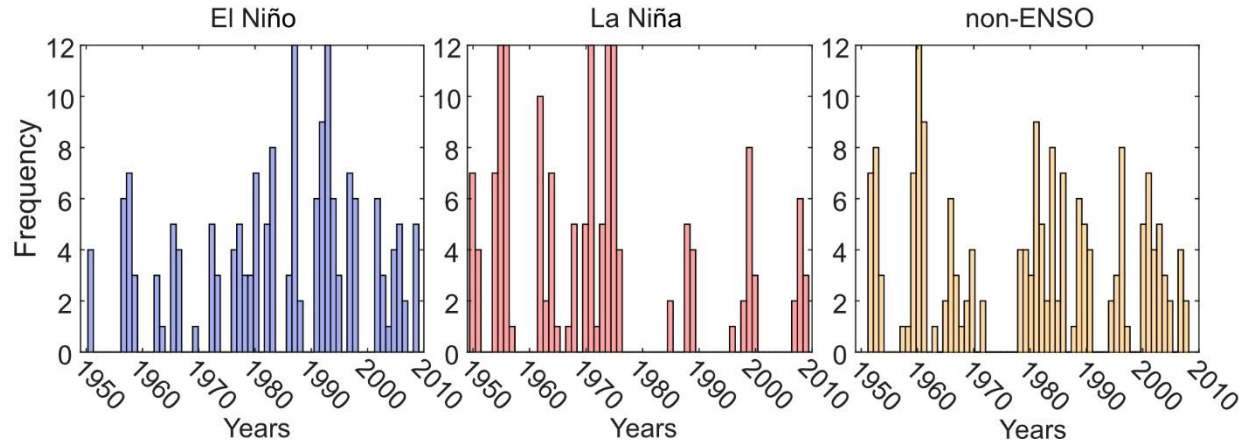

Figure S 7: Frequency of months during each year that are classified as El Niño, La Niña and non-ENSO phases in the time period 1950-2009.

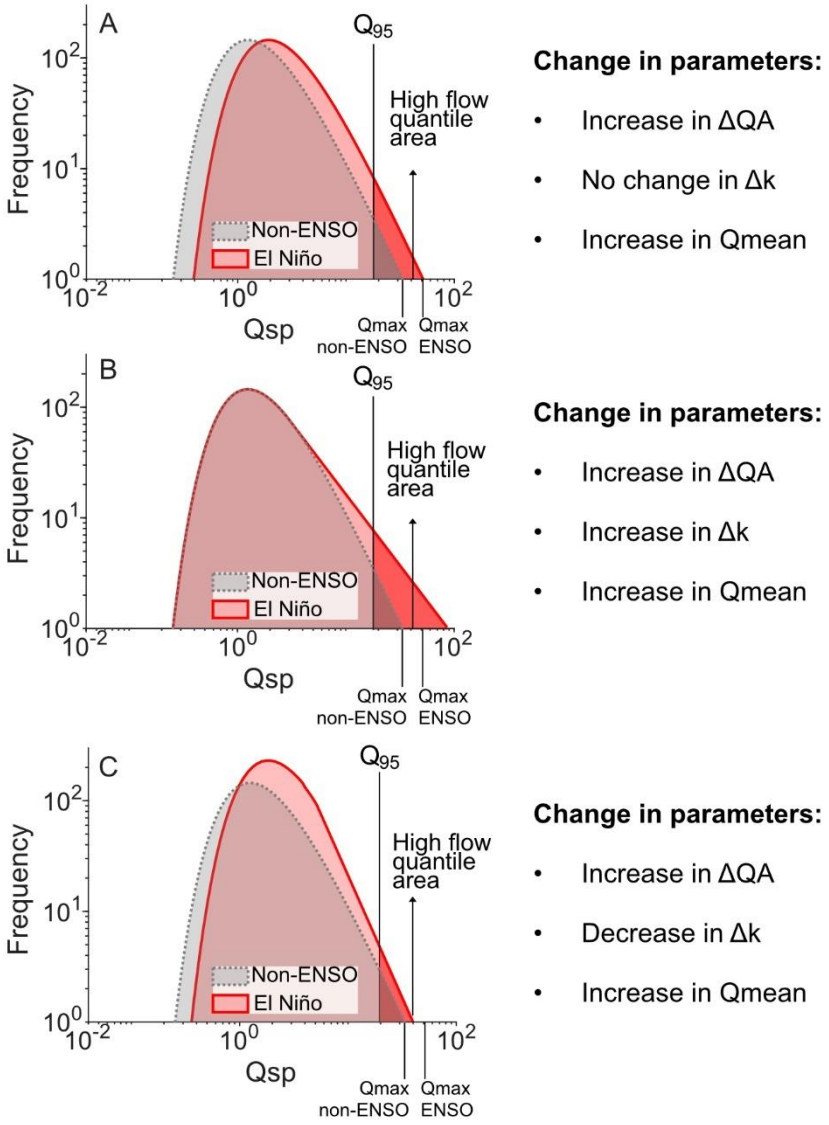

Figure S 8: Examples of empirical distributions of the daily specific discharge (Qsp). All of the distributions show and increase in the quantile area for high flows (ΔQA_{95}), however, the reasons for this increase are different, which can be revealed by the values of ΔQA, Δk and ΔQmean. A) An increase in ΔQA_{95} induced by a shift of the entire empirical frequency distribution towards higher specific discharge magnitudes, the shape of the distribution remains the same. This results in an increased Qmean, but a simar k-value. B) An increase in ΔQA_{95} induced by an increase in higher magnitude events only, the distribution for lower discharge magnitudes remains the same, and the increase in ΔQA_{95} is only result of a heavier right tail. In this case, the increase in ΔQA_{95} coincides with an increase in both Qmean and Δk. C) An increase in ΔQA_{95} induced by an increase in the magnitude of small and intermediate events mostly. For this case the increase in ΔQA_{95} results from an increase in Qmean, but the value of the k-parameter is decreasing because the right tail is becoming lighter compared to the non-ENSO empirical distribution.

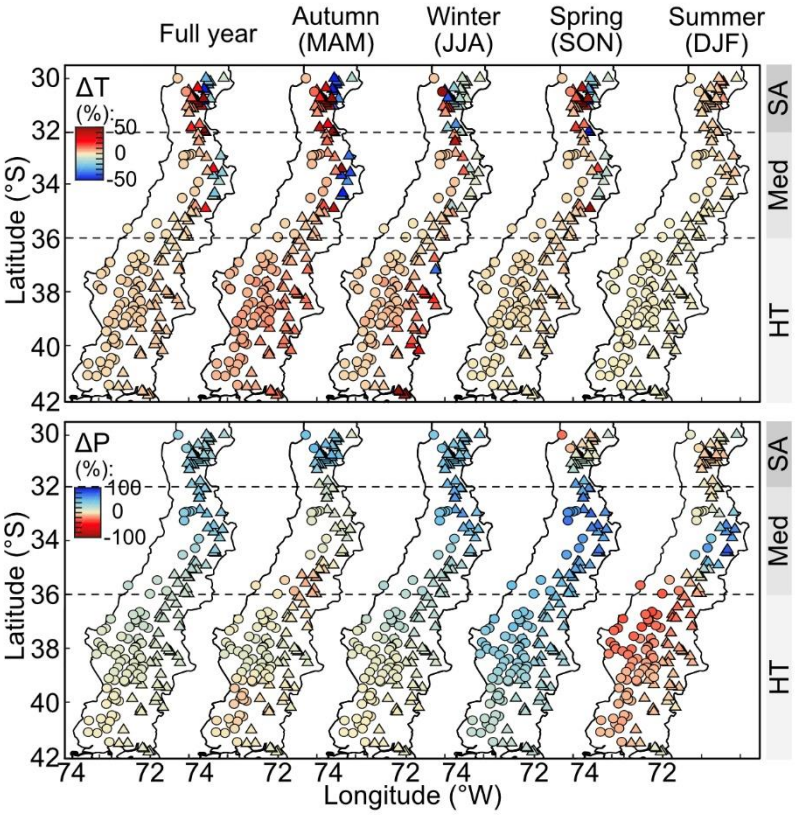

Figure S 9: Changes (in %) in precipitation (P) and temperature (T) during El Niño events, as compared to non-ENSO conditions. This figure presents the full data coverage between 1961-2009. The temporal and spatial patterns in ΔT and ΔP are generally similar to the patterns in Figure 4, which presents the P and T differences based only on the time period for which specific discharge data are available at each station.

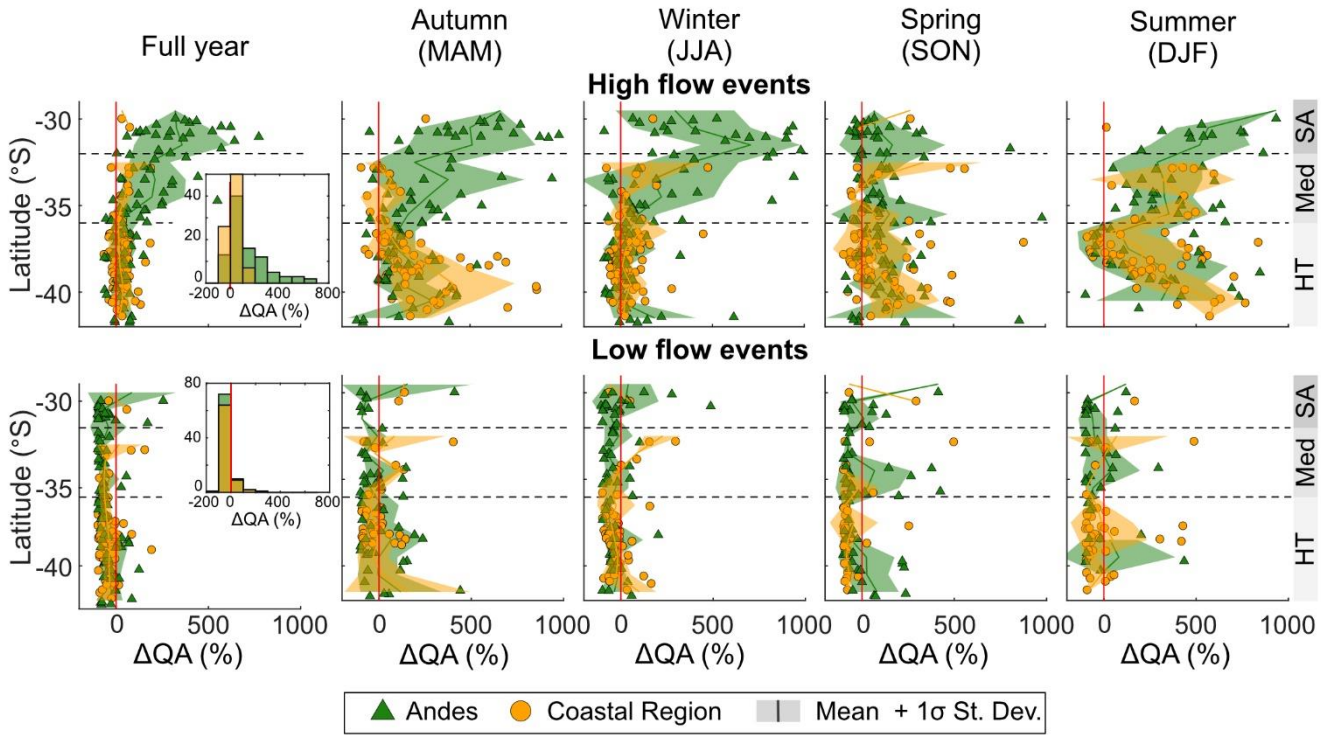

Figure S 10: Differences in the magnitude-frequency distribution of high flows (top row) and low flows (bottom row) between El Niño and non-ENSO phases. The method to create this figure is described in Figure 3. The markers represent the result of each individual station in the Andes (green triangles) and the coastal region (orange dots). On the background are shown the mean value (solid line) and the 1σ standard deviation (shaded background) for a 1° latitude moving window, for both the Andean region (green) and the coastal region (orange). The dotted lines indicate the boundaries between the climatic zones: semi-arid (SA), mediterranean (Med) and humid-temperate (HT). The histogram insets reveal the frequency of quantile area differences (%) during the full year for the Andes (green) and the coastal region (orange).

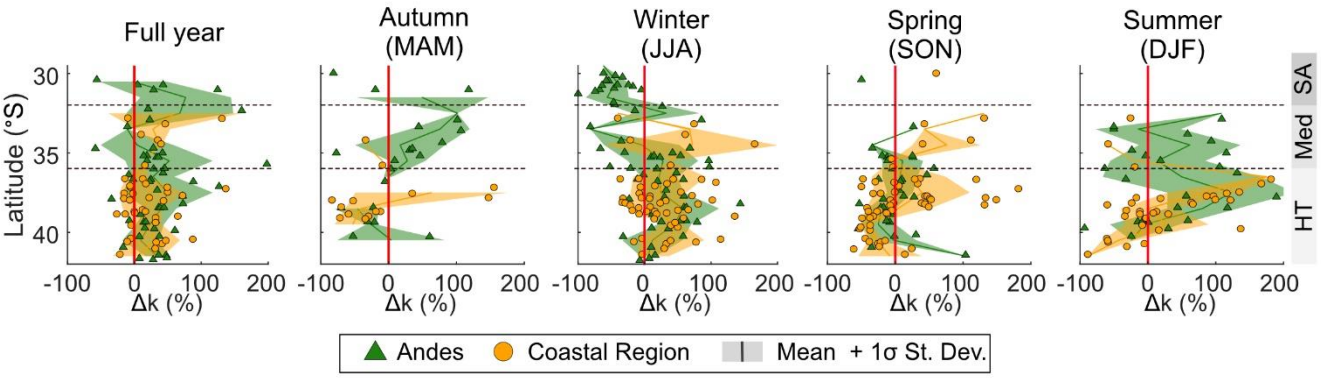

Figure S 11: Differences in the inverse gamma k-parameter between El Niño and non-ENSO conditions. The method to create this figure is described in Figure 3. The scatter represents the result of each individual station in the Andes (green triangles) and the coastal region (orange dots). On the background are shown the mean value (solid line) and the 1σ standard deviation for a 1° latitude moving window (shaded background), for both the Andean region (green) and the coastal region (orange). The dotted lines indicate the boundaries between the climatic zones: semi-arid (SA), mediterranean (Med) and humid-temperate (HT).

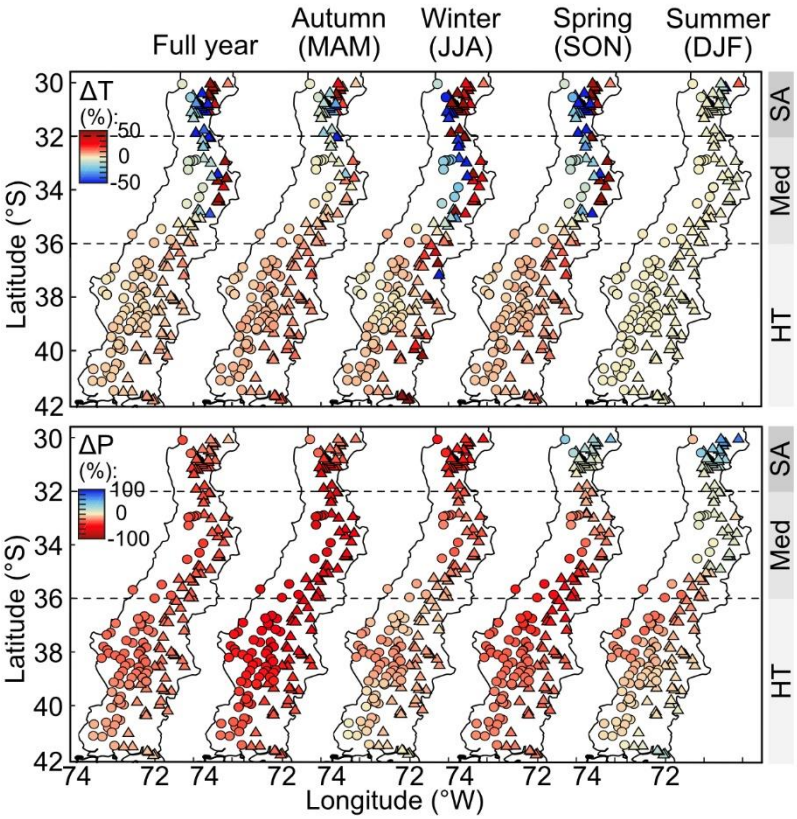

Figure S 12: Changes (in %) in precipitation (P) and temperature (T) during La Niña events, as compared to non-ENSO conditions. This figure presents the full data coverage between 1961-2009. The temporal and spatial patterns in ΔT and ΔP are generally similar to the patterns in Figure 6, which presents the P and T differences based only on the time period for which specific discharge data are available at each station.

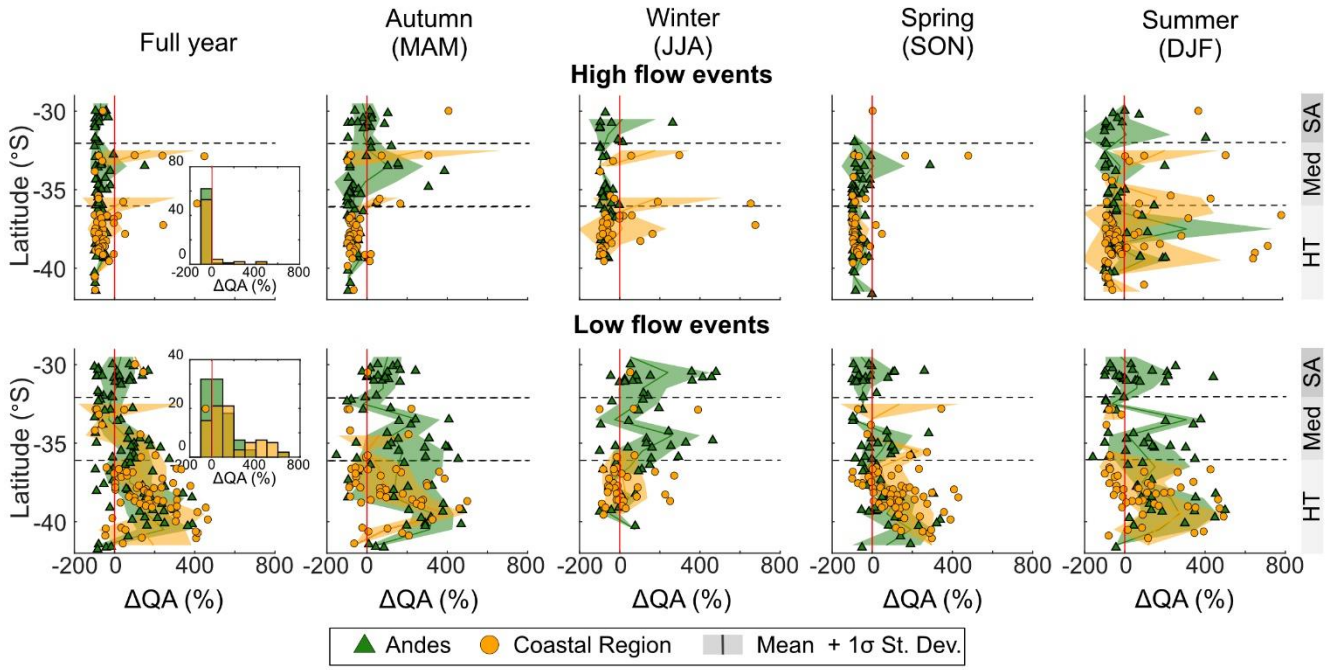

Figure S 13: Differences in the magnitude-frequency distribution of high flows (top row) and low flows (bottom row) between La Niña and non-ENSO phases. The method to create this figure is described in Figure 3. The markers represent the result of each individual station in the Andes (green triangles) and the coastal region (orange dots). On the background are shown the mean value (solid line) and the 1σ standard deviation (shaded background) for a 1° latitude moving window, for both the Andean region (green) and the coastal region (orange). The dotted lines indicate the boundaries between the climatic zones: semi-arid (SA), mediterranean (Med) and humid-temperate (HT). The histogram insets reveal the frequency of quantile area differences (%) during the full year for the Andes (green) and the coastal region (orange).

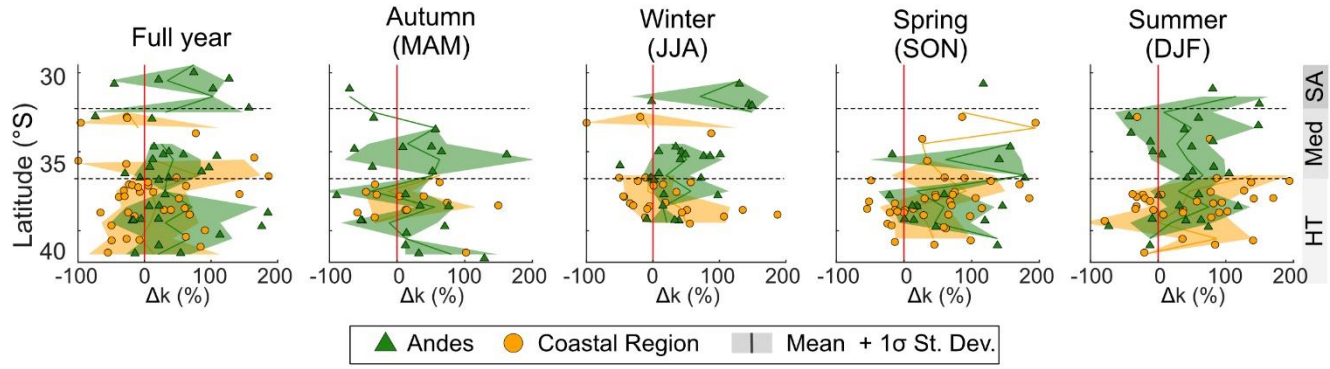

Figure S 14: Differences in the inverse gamma k-parameter between La Niña and non-ENSO conditions. The method to create this figure is described in Figure 3. The scatter represents the result of each individual station in the Andes (green triangles) and the coastal region (orange dots). On the background are shown the mean value (solid line) and the 1σ standard deviation for a 1° latitude moving window (shaded background), for both the Andean region (green) and the coastal region (orange). The dotted lines indicate the boundaries between the climatic zones: semi-arid (SA), mediterranean (Med), and humid-temperate (HT).