



Figure S1. Map of the gauging stations and their locations used within this study. Number are referred to within the main text in *italics* to help direct the reader to the locations highlighted. The basin shapefile and river network are provided by HydroSHEDS (<https://www.hydrosheds.org/>; last access: 07 December 2020).

Table S1. Characteristics of the hydrological gauging stations throughout the Amazon basin.

Station Name (number)	River	Drainage Basin Area (Km ²)	Lat	Lon	Start	End	Mean Q (m ³ s ⁻¹)
Abuna (23)	Madeira	921000	-9.75	-65.35	01/10/1979	30/09/2015	6430.839
Acanauí (52)	Caqueta/Japura	242259	-1.85	-66.65	01/10/1979	30/09/2015	14304.51
Altamira (37)	Xingu	446203	-3.35	-52.15	01/10/1979	29/09/2014	7856.263
Apalai (42)	Paru De Este	NA	1.22	-54.66	01/10/1980	29/09/2012	142.8763
Arapari (39)	Maicuru	17072	-1.85	-54.45	01/10/1979	30/09/2013	123.8534
Boca Do Guariba (27)	Aripuana	70100	-7.75	-60.55	01/10/1979	30/09/2010	1428.181
Boca Do Inferno (40)	Curua	20803	-1.45	-54.95	01/10/1979	29/09/2009	154.9359
Bom Fim (44)	Tacutu	NA	3.38	-59.82	01/10/1984	30/09/2013	214.241
Borja (1)	Maranon	114232	-4.45	-77.55	01/10/1986	30/09/2015	4993.966
Cachimbo (31)	Branco Sul	NA	-9.82	-54.89	01/10/1979	30/09/2013	39.08
Canutama (12)	Purus	230012	-6.55	-64.45	01/10/1979	30/09/2015	6430.839
Caracarai (46)	Branco	124980	1.85	-61.05	01/10/1979	30/09/2015	2947.296
Careiro (33)	Parana Do Careiro	2583079	-3.15	-59.85	01/10/1979	30/09/2014	12507.61
Cruzeiro Do Sul (7)	Jurua	38537	-7.65	-72.65	01/10/1979	30/09/2010	925.4951
Cucui (58)	Negro	61781	1.35	-66.85	01/10/1980	30/09/2013	4984.06
Curicuriari (50)	Negro	194462	-0.15	-66.85	01/10/1979	30/09/2013	12067.93
Envira (8)	Tarauaca	48317	-7.45	-70.05	01/10/1979	30/09/2011	1234.752
Estirao Do Repouso (3)	Javari	62105	-4.35	-70.95	01/10/1981	30/09/2012	2486.017
Fazenda Vista Alegre (35)	Madeira	1310000	-3.55	-58.95	01/10/1979	30/09/2015	28015.34
Fe E Esperanca (45)	Mucajai	13658	2.85	-61.45	01/10/1979	30/09/2012	306.2561
Fontanilhas (28)	Juruena	55900	-11.45	-58.35	01/10/1980	30/09/2013	1433.657
Gaviao (10)	Jurua	162000	-4.95	-66.85	01/10/1979	30/09/2010	4619.165
Gujara-Mirim (22)	Mamore	609000	-10.75	-65.35	01/10/1979	30/09/2013	8062.95
Humaita (25)	Madeira	1090000	-7.45	-63.05	01/10/1979	30/09/2013	20334.79
Indeco (30)	Teles Pires	52200	-10.15	-55.55	01/10/1980	30/09/2013	1166.612
Itaituba (36)	Tapajos	458000	-4.25	-55.95	01/10/1979	30/09/2014	11745.5
Itapeua (11)	Solimoes	1769000	-4.05	-63.05	01/10/1979	30/09/2014	82396.76
Jatuarana (34)	Amazonas	2854286	-3.05	-59.65	01/10/1979	30/09/2012	124924.5

Station Name (number)	River	Drainage Basin Area (Km ²)	Lat	Lon	Start	End	Mean Q (m ³ s ⁻¹)
Ji-Parana (21)	Jiparana	32800	-10.85	-61.95	01/10/1979	30/09/2012	692.7674
Jusante Da Cachoeira Do Caju (51)	Jusante	10228	-0.25	-67.05	01/10/1982	30/09/2013	942.8736
Manacapuru (32)	Solimoes	2147736	-3.35	-60.65	01/10/1979	30/09/2015	103025.6
Manicore (26)	Madeira	1150000	-5.85	-61.35	01/10/1979	30/09/2013	27077.35
Missao Icana (56)	Icana	22282	1.15	-67.65	01/10/1980	30/09/2013	1877.793
Obidos (38)	Amazon	4680000	-1.95	-55.55	01/10/1979	30/09/2015	174057.4
Pimenta Bueno (20)	Apedia	NA	-11.63	-61.19	01/10/1980	29/09/2013	203.5903
Pontes E Lacerda (19)	Guapore	NA	-15.22	-59.35	01/10/1979	30/09/2013	54.46617
Porto Dos Gauchos (29)	Arinos	37100	-11.55	-57.45	01/10/1979	30/09/2011	712.8329
Porto Velho (24)	Madeira	976000	-8.75	-63.95	01/10/1979	30/09/2015	19137.55
Posto Ajuricaba (47)	Demeni	14756	0.95	-62.65	01/10/1982	30/09/2013	508.2344
Puerto Siles (18)	Mamore	227000	-13.05	-65.05	01/10/1983	30/09/2012	4710.79
Rio Branco (16)	Acre	NA	-9.98	-67.80	01/10/1979	30/09/2015	316.8874
Rurrenabaque (17)	Beni	70000	-14.55	-67.55	01/10/1979	30/09/2015	2066.844
Santo Antonio Do Ica (5)	Solimoes	1134540	-3.15	-67.95	01/10/1979	30/09/2013	54591.62
Santos Dumont (9)	Solimoes	142234	-6.55	-68.35	01/10/1981	30/09/2015	4301.033
Sao Felipe (57)	Jurua	110862	0.45	-67.35	01/10/1979	30/09/2013	8065.875
Sao Francisco (41)	Jari	51343	-0.55	-52.55	01/10/1979	30/09/2013	1057.156
Seringal Da Caridade (15)	Purus	63166	-9.05	-68.55	01/10/1979	30/09/2012	1320.563
Seringal Fortaleza (13)	Purus	153016	-7.75	-66.95	01/10/1979	30/09/2015	3829.863
Serrinha (49)	Negro	279945	-0.45	-64.95	01/10/1979	30/09/2015	16541.23
Sucunduri (48)	Negro	NA	-0.48	-64.83	01/10/1979	29/09/2013	376.7507
Tabatinga (4)	Solimoes	874000	-4.25	-69.95	01/10/1982	21/09/2015	36225.36
Tamshiyacu (2)	Solimoes	721521	-4.05	-73.15	02/10/1985	30/09/2015	30419.4
Taraqua (55)	Vaupes _ Uaupes	44732	0.15	-68.55	01/10/1979	30/09/2012	2718.3
Thaumaturgo (6)	Jurua	16581	-8.93	-72.79	01/10/1981	30/09/2011	393.6696
Tirios (43)	Cumina	NA	2.22	-55.96	01/10/1979	30/09/2012	19.51056
Uaracu (54)	Uaupes	40506	0.45	-69.15	01/10/1979	30/09/2011	2409.46

Station Name (number)	River	Drainage Basin Area (Km²)	Lat	Lon	Start	End	Mean Q (m³s⁻¹)
Valparaiso – Montante (14)	Purus	103285	-8.65	-67.35	01/10/1981	30/09/2015	2158.127
Vila Bittencourt (53)	Caqueta/Japura	197136	-1.35	-69.45	01/10/1980	30/09/2015	13749.5

Table S2. EN3.4 positive, neutral, and negative years. Calculated based on the average SST anomaly between August to February preceding flood peaks in the Amazon basin.

Positive	Neutral	Negative
1979-1980	1980-1981	1983-1984
1982-1983	1981-1982	1984-1985
1986-1987	1985-1986	1988-1989
1987-1988	1989-1990	1995-1996
1991-1992	1990-1991	1998-1999
1994-1995	1992-1993	1999-2000
1997-1998	1993-1994	2000-2001
2002-2003	1996-1997	2005-2006
2004-2005	2001-2002	2007-2008
2006-2007	2003-2004	2008-2009
2009-2010	2012-2013	2010-2011
2014-2015	2013-2014	2011-2012

Table S3. MEI positive, neutral, and negative years. Calculated based on the average SST anomaly between August to February preceding flood peaks in the Amazon basin.

Positive	Neutral	Negative
1982-1983	1979-1980	1983-1984
1986-1987	1980-1981	1988-1989
1987-1988	1981-1982	1995-1996
1991-1992	1984-1985	1996-1997
1992-1993	1985-1986	1998-1999
1993-1994	1989-1990	1999-2000
1994-1995	1990-1991	2000-2001
1997-1998	2001-2002	2005-2006
2002-2003	2003-2004	2007-2008
2004-2005	2012-2013	2008-2009
2006-2007	2013-2014	2010-2011
2009-2010	2014-2015	2011-2012

Table S4. CP positive, neutral, and negative years. Calculated based on the average SST anomaly between August to February preceding flood peaks in the Amazon basin.

Positive	Neutral	Negative
1982-1983	1979-1980	1983-1984
1986-1987	1980-1981	1984-1985
1987-1988	1981-1982	1985-1986
1990-1991	1989-1990	1988-1989
1991-1992	1992-1993	1995-1996
1994-1995	1993-1994	1998-1999
1997-1998	1996-1997	1999-2000
2002-2003	2001-2002	2000-2001
2004-2005	2003-2004	2007-2008
2006-2007	2005-2006	2008-2009
2009-2010	2012-2013	2010-2011
2014-2015	2013-2014	2011-2012

Table S5. EP positive, neutral, and negative years. Calculated based on the average SST anomaly between August to February preceding flood peaks in the Amazon basin.

Positive	Neutral	Negative
1982-1983	1979-1980	1980-1981
1983-1984	1981-1982	1985-1986
1986-1987	1984-1985	1989-1990
1987-1988	1988-1989	1990-1991
1991-1992	1992-1993	1995-1996
1997-1998	1993-1994	1996-1997
1998-1999	1994-1995	2001-2002
2002-2003	1999-2000	2004-2005
2003-2004	2000-2001	2005-2006
2006-2007	2009-2010	2007-2008
2008-2009	2010-2011	2012-2013
2014-2015	2011-2012	2013-2014

Table S6. TNA positive, neutral, and negative years. Calculated based on the average SST anomaly between August to February preceding flood peaks in the Amazon basin.

Positive	Neutral	Negative
1987-1988	1979-1980	1982-1983
1995-1996	1980-1981	1983-1984
1997-1998	1981-1982	1984-1985
2001-2002	1990-1991	1985-1986
2003-2004	1996-1997	1986-1987
2004-2005	1998-1999	1988-1989
2005-2006	1999-2000	1989-1990
2006-2007	2002-2003	1991-1992
2009-2010	2007-2008	1992-1993
2010-2011	2008-2009	1993-1994
2012-2013	2011-2012	1994-1995
2013-2014	2014-2015	2000-2001

Table S7. TSA positive, neutral, and negative years. Calculated based on the average SST anomaly between August to February preceding flood peaks in the Amazon basin.

Positive	Neutral	Negative
1984-1985	1981-1982	1979-1980
1987-1988	1983-1984	1980-1981
1988-1989	1985-1986	1982-1983
1993-1994	1994-1995	1986-1987
1997-1998	2000-2001	1989-1990
1998-1999	2001-2002	1990-1991
1999-2000	2002-2003	1991-1992
2003-2004	2006-2007	1992-1993
2004-2005	2007-2008	1995-1996
2008-2009	2012-2013	1996-1997
2009-2010	2013-2014	2005-2006
2010-2011	2014-2015	2011-2012