

## Supplementary Material

Table S1. List of the sampling locations used to derive the extended atmospheric C<sub>CO2</sub> records. Most sites are fixed ground-based stations, unless specified between brackets.

Station	Location	Latitude	Longitude
ALT	Alert, Canada	82.45°N	62.51°W
AMS	Amsterdam Island	37.95°S	77.53°E
ASC	Ascension Island	7.92°S	14.42°W
ASK	Assekrem, Algeria	23.18°N	5.42°E
AZR	Terceira Island, Azores	38.77°N	27.38°W
BMW	Tudor Hill, Bermuda	32.27°N	64.88°W
BRW	Barrow, Alaska	71.32°N	156.61°W
CBA	Cold Bay, Alaska	55.21°N	162.72°W
CFA	Cape Ferguson, Queensland	19.28°S	147.06°E
CGO	Cape Grim, Tasmania	40.68°S	144.69°E
CHR	Christmas Island	1.7°N	157.17°W
CMN	Mt. Cimone Station, Italy	44.18°N	10.7°E
CPT	Cape Point, South Africa	34.35°S	18.49°E
CRZ	Crozet Island	46.45°S	51.85°E
ESP	Estevan Point, British Columbia	49.58°N	126.37°W
GMI	Mariana Islands	13.43°N	144.78°E
HBA	Halley Station, Antarctica	75.58°S	26.5°W
HUN	Hegyhatsal, Hungary	46.95°N	16.65°E
ICE	Storhofdi, Iceland	63.4°N	20.29°W
IZO	Izana, Canary Islands	28.31°N	16.5°W
KEY	Key Biscayne, Florida	25.67°N	80.16°W
KUM	Cape Kumukahi, Hawaii	19.52°N	154.82°W
LMP	Lampedusa, Italy	35.52°N	12.62°E
MAA	Mawson Station, Antarctica	67.62°S	62.87°E
MHD	Mace Head, Ireland	53.33°N	9.9°W
MID	Sand Island, Midway	28.21°N	177.38°W
MLO	Mauna Loa, Hawaii	19.54°N	155.58°W
MQA	Macquarie Island	54.48°S	158.97°E
NWR	Niwot Ridge, Colorado	40.05°N	105.58°W
PAL	Pallas-Sammaltunturi, GAW Station, Finland	67.97°N	24.12°E
POCS30	Pacific Ocean (ship)	[32.5 – 27.5°S]	[176°E – 168°W]
POCS20	Pacific Ocean (ship)	[22.5 – 17.5°S]	[176°E – 164°W]
POCS10	Pacific Ocean (ship)	[12.5 – 7.5°S]	[178 – 144°W]
POC000	Pacific Ocean (ship)	[2.5°S – 2.5°N]	[172 – 138°W]
POCN10	Pacific Ocean (ship)	[7.5 – 12.5°N]	[166 – 132°W]
POCN20	Pacific Ocean (ship)	[17.5 – 22.5°N]	[158 – 124°W]
POCN30	Pacific Ocean (ship)	[27.5 – 32.5°N]	[150 – 120°W]
RPB	Ragged Point, Barbados	13.17°N	59.43°W
RYO	Ryori, Japan	39.03°N	141.83°E
SCH	Schauinsland, Germany	48°N	8°E

SEY	Mahe Island, Seychelles	4.67°S	55.17°E
SHM	Shemya Island, Alaska	52.72°N	174.1°E
SIS	Shetland Islands, Scotland	60.17°N	1.17°W
SMO	Tutuila, American Samoa	14.25°S	170.56°W
SPO	South Pole, Antarctica	89.98°S	24.8°W
STM	Ocean Station M, Norway	66°N	2°E
SYO	Syowa Station, Antarctica	69°S	39.58°E
TAP	Tae-ahn Peninsula, South Korea	36.73°N	126.13°E
UTA	Wendover, Utah	39.9°N	113.72°W
UUM	Ulaan Uul, Mongolia	44.45°N	111.1°E
WIS	WIS Station, Israel	31.13°N	34.88°E
WLG	Mt. Waliguan, China	36.29°N	100.9°E
ZEP	Ny-Alesund, Svalbard	78.9°N	11.88°E

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