An eight-year-long low-frequency earthquake catalog for Southern Cascadia

Ariane Ducellier[1], **Kenneth C. Creager**[1]

[1]University of Washington

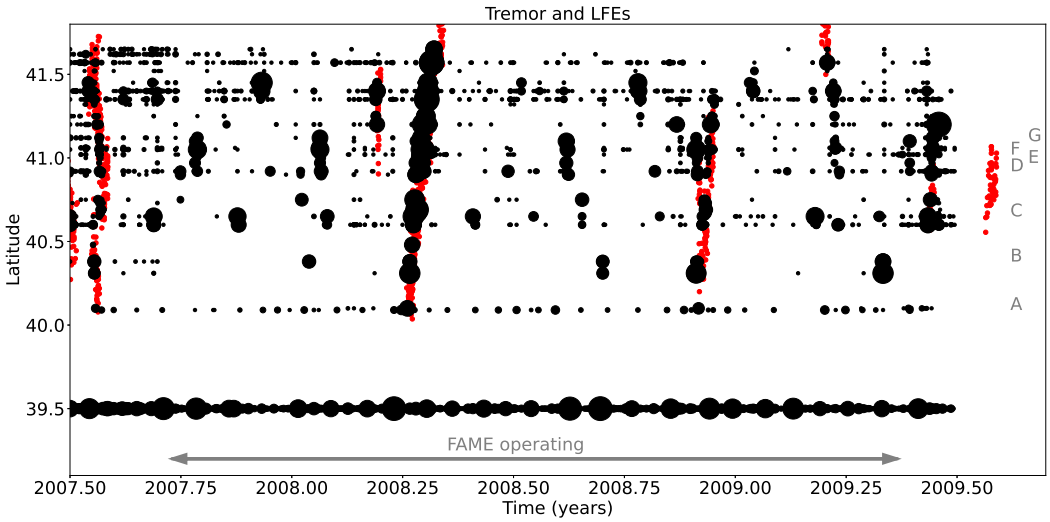

Figure S1. Same as Figure 3 from the main text, but without filtering the LFEs. They are many false detections at the beginning and the end of the catalog because the FAME stations were not yet installed / already removed.

Corresponding author: Ariane Ducellier, ducela@uw.edu

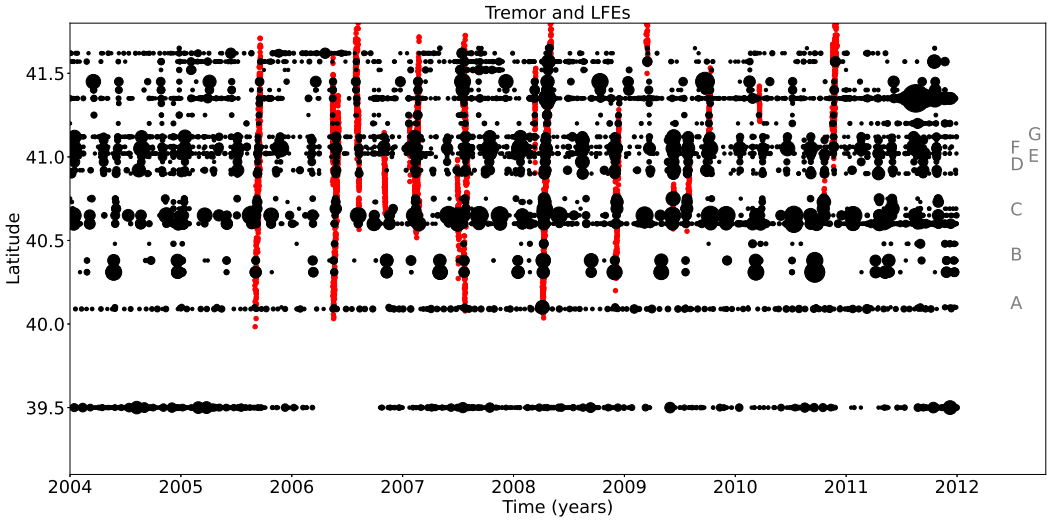

Figure S2. Same as Figure 6 from the main text, but without filtering the LFEs.

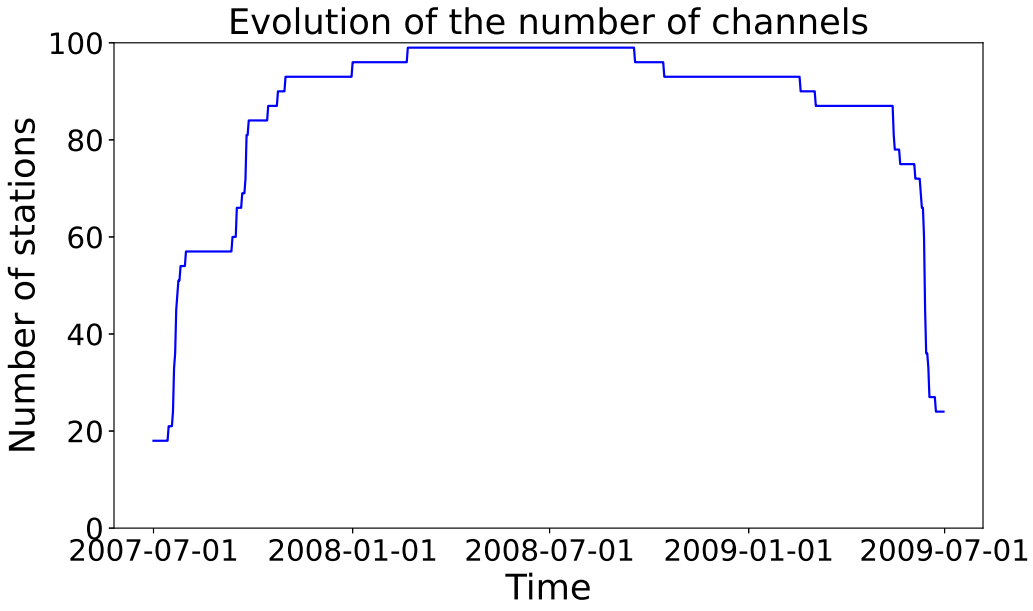

Figure S3. Evolution of the number of channels available for the computation of the 2007-2009 catalog using the temporary FAME stations.

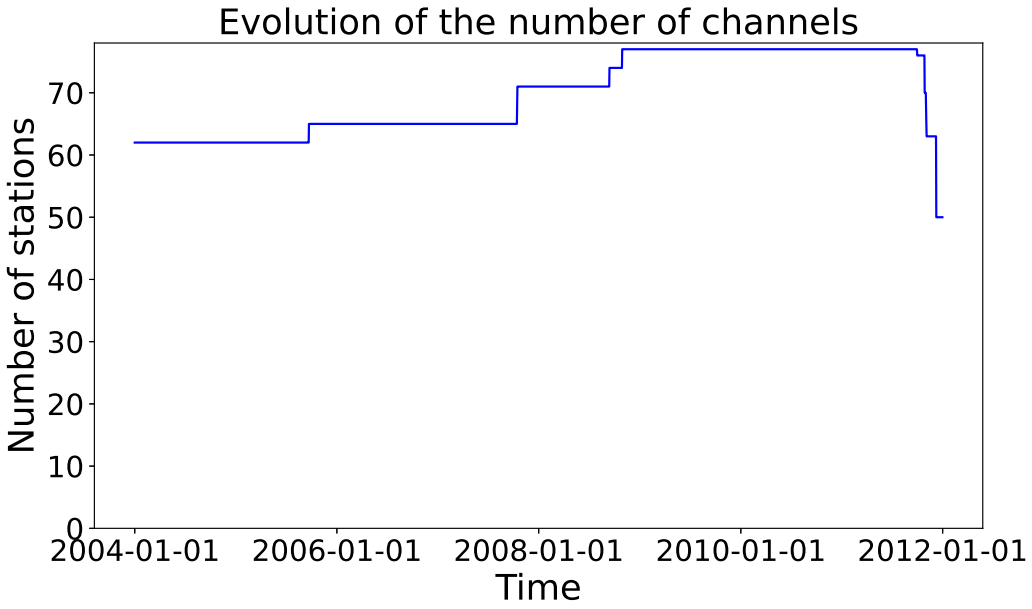

Figure S4. Evolution of the number of channels available for the computation of the 2004-2011 catalog using the permanent stations.

Table S1. Temporary stations used for the 2007-2009 catalog. The data centers providing the seismic waveforms are the Incorporated Research Institutions for Seismology (IRIS) (Alan Levander, 2007), and the Northern California Earthquake Data Center (NCEDC), doi:10.7932/NCEDC.

Station	Network	Channels	Location	Data center	Latitude	Longitude	Begin time	End time
B039	PB	EH1,EH2,EHZ	–	IRIS	41.4667	-122.4847	2007-10-15	3000-01-01
KCPB	NC	HHE,HHN,HHZ	–	NCEDC	39.6863	-123.5824	2002-10-17	3000-01-01
KHBB	NC	HHE,HHN,HHZ	–	NCEDC	40.6599	-123.2197	2003-09-11	3000-01-01
KRMB	NC	HHE,HHN,HHZ	–	NCEDC	41.5230	-123.9080	2001-06-16	3000-01-01
KSXB	NC	HHE,HHN,HHZ	–	NCEDC	41.8304	-123.8769	2001-07-13	3000-01-01
ME01	XQ	BHE,BHN,BHZ	01	IRIS	41.7752	-123.4034	2007-07-31	2009-06-12
ME02	XQ	BHE,BHN,BHZ	01	IRIS	41.6898	-122.3372	2007-07-22	2009-05-20
ME03	XQ	BHE,BHN,BHZ	01	IRIS	41.702	-123.881	2007-09-27	2009-06-13
ME04	XQ	BHE,BHN,BHZ	01	IRIS	41.355	-123.514	2007-07-23	2009-06-12
ME08	XQ	BHE,BHN,BHZ	01	IRIS	40.222	-123.305	2007-07-22	2009-06-03
ME09	XQ	BHE,BHN,BHZ	01	IRIS	41.086	-122.726	2007-07-21	2009-05-14
ME10	XQ	BHE,BHN,BHZ	01	IRIS	40.9591	-122.4619	2007-10-31	2009-06-12
ME12	XQ	BHE,BHN,BHZ	01	IRIS	40.104	-122.498	2007-07-20	2009-06-12
ME13	XQ	BHE,BHN,BHZ	01	IRIS	40.764	-122.918	2007-07-22	2009-06-12
ME16	XQ	BHE,BHN,BHZ	01	IRIS	40.577	-122.087	2007-07-20	2008-10-14
ME24	XQ	BHE,BHN,BHZ	01	IRIS	40.359	-122.047	2007-07-19	2009-05-15
ME26	XQ	BHE,BHN,BHZ	01	IRIS	40.157	-122.099	2007-07-26	2009-02-17
ME27	XQ	BHE,BHN,BHZ	01	IRIS	40.453	-123.155	2008-01-01	2009-06-13
ME28	XQ	BHE,BHN,BHZ	01	IRIS	40.327	-122.471	2007-07-20	2009-05-14
ME29	XQ	BHE,BHN,BHZ	01	IRIS	41.142	-123.1408	2007-09-21	2009-06-13
ME30	XQ	BHE,BHN,BHZ	01	IRIS	40.843	-123.565	2007-07-24	2009-06-22
ME42	XQ	BHE,BHN,BHZ	01	IRIS	39.7145	-123.273	2007-07-15	2009-06-16
ME43	XQ	BHE,BHN,BHZ	01	IRIS	39.5703	-123.175	2007-09-16	2009-06-16
ME44	XQ	BHE,BHN,BHZ	01	IRIS	39.4928	-123.187	2007-09-16	2009-06-15
ME45	XQ	BHE,BHN,BHZ	01	IRIS	39.4666	-122.9595	2007-09-12	2009-06-09
ME46	XQ	BHE,BHN,BHZ	01	IRIS	39.196	-122.968	2007-09-25	2009-06-11
ME47	XQ	BHE,BHN,BHZ	01	IRIS	39.1124	-122.8106	2007-09-25	2008-09-17
ME49	XQ	BHE,BHN,BHZ	01	IRIS	39.8633	-123.7194	2007-09-25	2009-06-08
ME52	XQ	BHE,BHN,BHZ	01	IRIS	39.3228	-123.2191	2008-02-21	2009-07-08
ME54	XQ	BHE,BHN,BHZ	01	IRIS	39.0132	-123.3779	2007-09-24	2009-03-03
ME57	XQ	BHE,BHN,BHZ	01	IRIS	39.9118	-122.5676	2007-10-24	2009-06-11
WDC	BK	BHE,BHN,BHZ	–	NCEDC	40.5799	-122.5411	1992-09-17	2011-05-06
YBH	BK	BHE,BHN,BHZ	–	NCEDC	41.7320	-122.7104	1993-07-24	2011-06-03

Table S2. Permanent stations used for the 2004-2011 catalog. The data centers providing the seismic waveforms are the Incorporated Research Institutions for Seismology (IRIS) (Alan Levander, 2007), and the Northern California Earthquake Data Center (NCEDC), doi:10.7932/NCEDC.

Station	Network	Channels	Location	Data center	Latitude	Longitude	Begin time	End time
B039	PB	EH1,EH2,EHZ	–	IRIS	41.4667	-122.4847	2007-10-15	3000-01-01
B040	PB	EH1,EH2,EHZ	–	IRIS	41.8308	-122.4205	2007-10-16	3000-01-01
B933	PB	EH1,EH2,EHZ	–	IRIS	40.0600	-123.9690	2008-09-13	3000-01-01
B935	PB	EH1,EH2,EHZ	–	IRIS	40.4787	-123.5732	2008-10-29	3000-01-01
GASB	BK	BHE,BHN,BHZ	–	NCEDC	39.65471	-122.71595	2005-09-22	2011-06-16
GASB	BK	BHE,BHN,BHZ	0	NCEDC	39.65471	-122.71595	2011-06-16	3000-01-01
GBB	NC	EHZ	–	NCEDC	39.80127	-122.34550	2000-12-06	3000-01-01
GHM	NC	EHZ	–	NCEDC	39.49545	-122.93096	1984-01-01	3000-01-01
GRO	NC	EHZ	–	NCEDC	39.91684	-122.67117	1990-12-13	3000-01-01
GSN	NC	EHZ	–	NCEDC	38.94040	-123.19245	1984-01-01	2018-12-11
GTC	NC	SHZ	–	NCEDC	39.39944	-123.55532	1996-08-01	2011-10-27
GVV	NC	EHZ	–	NCEDC	39.77510	-122.67551	2002-04-28	3000-01-01
HOPS	BK	BHE,BHN,BHZ	–	NCEDC	38.99349	-123.07234	1994-10-21	2010-06-16
HOPS	BK	BHE,BHN,BHZ	0	NCEDC	38.99349	-123.07234	2010-06-16	3000-01-01
JCC	BK	BHE,BHN,BHZ	–	NCEDC	40.81745	-124.02955	2001-04-11	2010-08-19
JCC	BK	BHE,BHN,BHZ	0	NCEDC	40.81745	-124.02955	2010-08-19	3000-01-01
KBN	NC	SHZ	–	NCEDC	39.89237	-123.19503	1994-11-28	2011-10-27
KBS	NC	SHZ	–	NCEDC	39.91719	-123.59561	2002-10-17	2011-10-27
KCPB	NC	HHE,HHN,HHZ	–	NCEDC	39.68631	-123.58242	2002-10-17	3000-01-01
KCS	NC	SHZ	–	NCEDC	40.53791	-123.51394	1994-11-28	2011-11-01
KFP	NC	SHZ	–	NCEDC	39.63889	-123.42514	1994-11-28	2011-10-27
KHBB	NC	HHE,HHN,HHZ	–	NCEDC	40.65990	-123.21966	2003-09-11	3000-01-01
KHMB	NC	HHE,HHN,HHZ	–	NCEDC	40.87475	-123.73259	2002-06-13	3000-01-01
KIP	NC	SHZ	–	NCEDC	39.80841	-123.48130	1994-11-28	2011-10-27
KKP	NC	SHZ	–	NCEDC	40.14579	-123.46965	1994-11-28	2011-11-01
KOM	NC	SHZ	–	NCEDC	41.27872	-123.45315	1994-11-28	2011-11-02
KPP	NC	SHZ	–	NCEDC	40.34579	-123.36328	1994-11-28	2011-11-01
KRK	NC	SHZ	–	NCEDC	39.56315	-123.18367	1994-11-28	2011-10-27
KRMB	NC	HHE,HHN,HHZ	–	NCEDC	41.52296	-123.90797	2001-06-16	3000-01-01
KRP	NC	HHE,HHN,HHZ	–	NCEDC	41.15765	-124.02330	2002-06-12	3000-01-01
KSXB	NC	HHE,HHN,HHZ	–	NCEDC	41.83038	-123.87688	2001-07-13	3000-01-01
KTR	NC	SHZ	–	NCEDC	41.90847	-123.37755	1994-11-28	2011-11-02
LAM	NC	SHZ	–	NCEDC	41.60987	-122.62559	1994-11-28	2011-09-30
LBF	NC	SHZ	–	NCEDC	41.34707	-121.89098	1994-11-28	2011-11-03
LBK	NC	SHZ	–	NCEDC	41.08382	-122.66731	1994-11-28	2011-12-08
LBP	NC	SHZ	–	NCEDC	40.31671	-122.88193	1994-11-28	2011-12-08
LDB	NC	SHZ	–	NCEDC	40.43105	-121.78632	1994-11-28	2011-12-08
LGB	NC	SHZ	–	NCEDC	41.33418	-122.18771	2001-10-20	2011-11-03
LGP	NC	SHZ	–	NCEDC	40.91228	-122.82949	1994-11-28	2011-12-08
LPG	NC	SHZ	–	NCEDC	40.14514	-122.68788	1994-11-28	2011-12-08
LRB	NC	SHZ	–	NCEDC	40.14323	-122.55772	1994-11-28	2011-12-08
LRR	NC	SHZ	–	NCEDC	40.46630	-121.62230	1994-11-28	2011-12-08
LSF	NC	SHZ	–	NCEDC	40.65817	-122.52371	1994-11-28	2011-12-08
LSH	NC	SHZ	–	NCEDC	40.79294	-122.03943	2002-03-28	2011-12-08
LSR	NC	SHZ	–	NCEDC	41.10696	-122.27062	1994-11-28	2011-12-08
LTC	NC	SHZ	–	NCEDC	40.20842	-122.12548	2002-03-28	2011-12-08
LVR	NC	SHZ	–	NCEDC	40.03937	-122.67250	1994-11-28	2011-12-08
LWH	NC	SHZ	–	NCEDC	40.64180	-121.94857	1994-11-28	2011-12-08
WDC	BK	BHE,BHN,BHZ	–	NCEDC	40.57988	-122.54113	1992-09-17	2011-05-06
WDC	BK	BHE,BHN,BHZ	0	NCEDC	40.57988	-122.54113	2011-05-06	3000-01-01
YBH	BK	BHE,BHN,BHZ	–	NCEDC	41.73204	-122.71039	1993-07-24	2011-06-03
YBH	BK	BHE,BHN,BHZ	0	NCEDC	41.73204	-122.71039	2011-06-03	3000-01-01

Table S3. Thresholds used to clean the catalogs. An LFE is kept in the catalog if its cross-correlation value multiplied by the number of channels recording when it was detected is higher than the threshold. The threshold is missing for the families for which there were not enough permanent stations with good templates to obtain reliable LFE detections.

Family	Threshold 2007-2009	Threshold 2004-2011
080401.05.050	1.4	1.9
080405.11.042	2.0	1.6
080408.08.007	1.7	1.5
080408.15.023	2.0	1.3
080408.08.029	2.3	1.4
080408.16.026	1.8	1.4
080410.01.050	3.5	1.3
080410.09.032	3.9	1.4
080410.12.039	1.9	1.3
080410.12.040	5.4	2.3
080411.04.013	3.4	1.5
080411.04.023	3.6	1.5
080410.13.055	1.9	1.3
080412.03.029	2.2	1.0
080412.11.038	2.2	1.3
080412.22.047	3.2	1.5
080413.13.026	2.2	1.3
080412.22.040	3.5	1.6
080413.07.015	2.0	1.6
080413.07.023	1.8	1.4
080413.16.058	2.2	0.1
080413.18.013	2.6	1.2
080413.20.036	2.1	1.1
080414.12.016	2.0	1.2
080414.12.020	1.5	1.2
080414.10.058	1.8	1.2
080414.18.003	NA	NA
080415.11.006	4.6	1.6
080415.11.008	3.0	1.8
080415.24.028	2.5	1.7
080416.15.003	2.8	1.7
080418.03.001	5.0	1.5
080415.19.030	2.9	1.9
080419.24.054	3.4	2.2
080416.13.033	3.9	2.0
080417.15.043	3.3	1.7
080418.02.049	3.7	1.6
080419.04.046	3.5	1.5
080420.01.019	2.3	1.6
080420.04.009	2.2	1.4
080420.05.032	3.0	1.8
080420.08.042	1.8	1.5
080421.14.048	2.1	1.6
080421.15.050	1.9	1.5
080421.16.053	3.0	1.4
080421.16.054	2.3	1.4
080421.17.056	2.1	1.3
080421.23.033	2.7	1.4
080422.13.003	3.2	1.7
080422.12.039	1.7	1.1
080422.13.043	2.7	1.6
080422.15.030	2.0	1.5
080424.04.058	3.3	1.8
080424.05.060	2.2	1.7
080426.05.008	1.8	1.6
080426.06.027	2.1	1.8
080426.20.030	1.5	1.7
080427.04.052	2.5	1.5
080427.13.036	2.1	1.5
080427.20.043	2.5	2.0
080429.15.005	NA	NA
080326.07.004	NA	NA
080326.07.048	NA	NA
080326.08.015	2.7	1.0
080326.09.007	NA	NA
080328.09.029	NA	NA