GSA DATA REPOSITORY 2017210

Chuang et al., 2017, Plateau subduction, intraslab seismicity, and the Denali (Alaska) volcanic gap: Geology, doi:10.1130/G38867.1.

SUPPLEMENTAL INFORMATION

LFE Template Assembly

LFE templates were prepared by selecting 24-hour-long, tremor records from 13 3-component station broadband stations from central Alaska (see Table DR1) for dates that were identified by Wech (2015) to exhibit strong tremor activity. These records were instrument corrected to particle velocity, resampled to 40 sps and filtered between 1-8 Hz, the dominant tremor frequency band. Horizontal component records organized in a spatially consistent manner were visually examined for signs of discrete LFE arrivals displaying consistent move-out across stations. Waveforms from candidate time windows and subsets of stations where arrivals could be discerned were selected as initial templates within a network matched filter to identify similar repeating waveforms at different times. Detections were registered if the summed network correlation coefficient exceeded 8 times the median absolute deviation, a threshold that has been shown to be a robust criterion for LFE detection (Shelly et al., 2007). If a significant number of detections was registered, a new template was formed by stacking all waveforms corresponding to a given channel (including stations not included within the initial station subset) at the detection times. Those stations exhibiting coherent arrivals were redeployed within the matched filter and the detection stacking process was repeated until significant new detections were no longer found. The final 6 templates at those stations (RND, WAT2-7) typically exhibiting the highest signal-to-noise ratios, are shown in Figures DR1-DR6.

LFE Template Hypocentral Location

Signal-to-noise ratios of the LFE template waveforms were sufficient to pick arrival times of at least 2 P-wave and 8 S-waves for each template enabling accurate determination of hypocentral depths which is not possible for raw tremor waveforms.

We employed USGS Hypoinverse[1] (Klein, 2002) software and the USGS Southern Alaska velocity model (Fogelman et al, 1993, see Table DR2) used by Wech (2015) in his tremor study and the Alaska Earthquake Center for regular earthquakes in this region. LFE template hypocenters are listed in Table DR3 with nominal errors in horizontal and vertical coordinates of 0.15 km and 1.17 km, respectively.

Figures

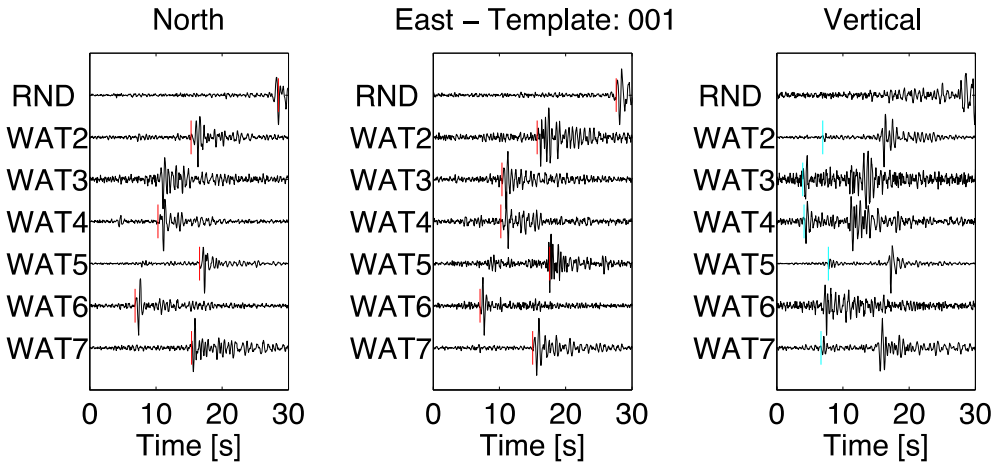
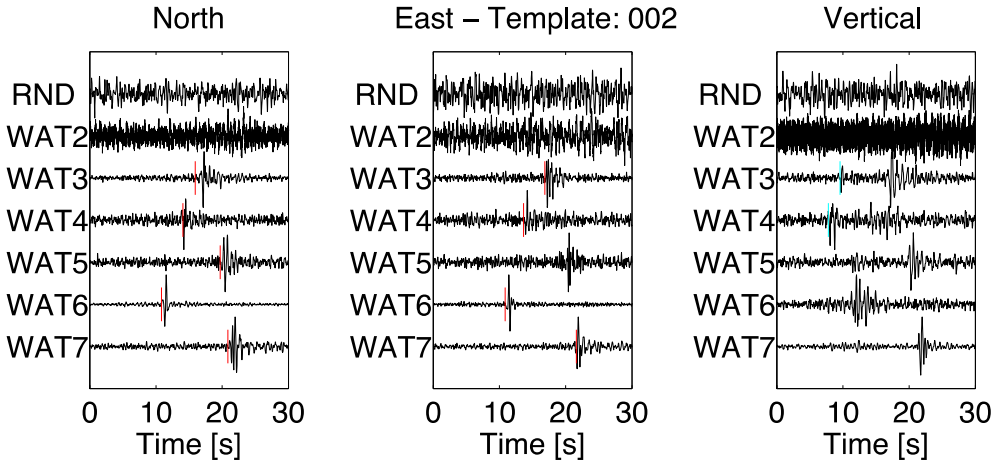


Figure DR1. Particle-velocity waveforms for LFE template 1. a) North, east, and vertical components are shown in the panels from left to right. Note all traces have been normalized to maximum absolute amplitude. Model-predicted arrival times for S-waves (red) and P-waves (blue) are shown for those waveforms for which arrival times were picked.



[1] 1 Any use of trade, firm, or product names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

Figure DR2. Particle-velocity waveforms for LFE template 2. See Figure DR1 for details.

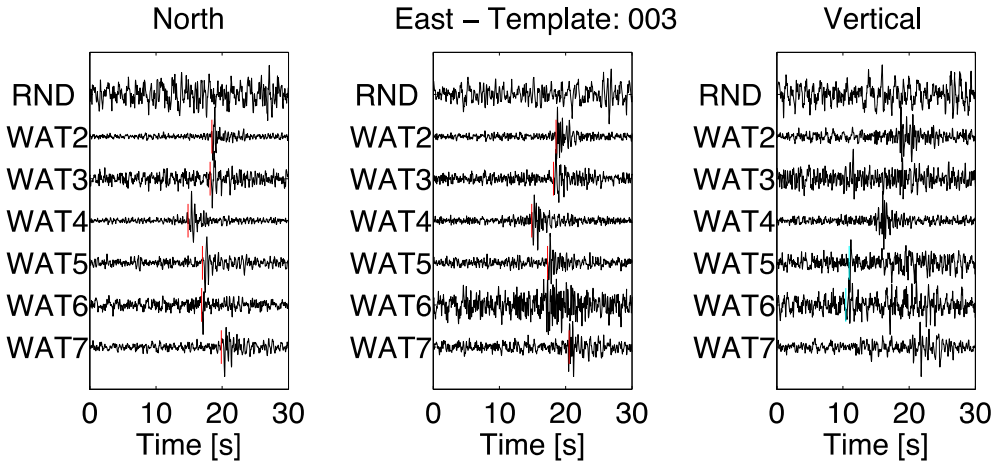


Figure DR3. Particle-velocity waveforms for LFE template 3. See Figure DR1 for details.

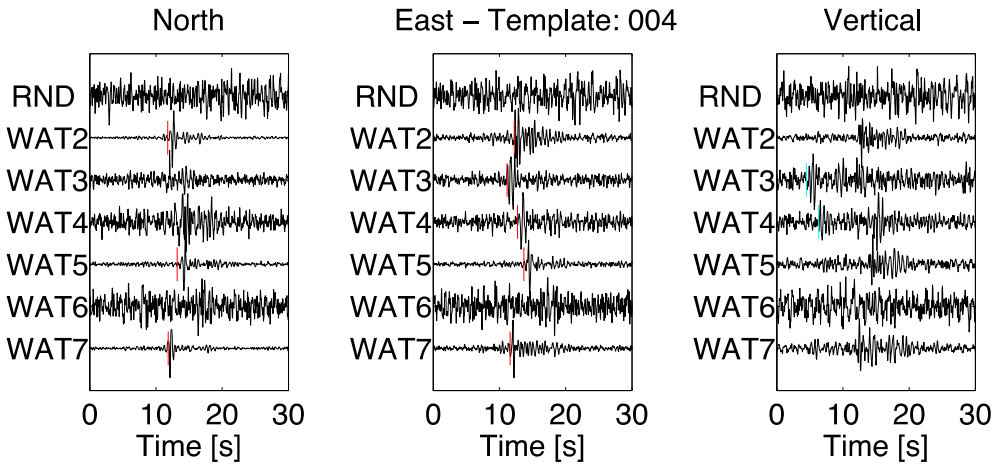


Figure DR4. Particle-velocity waveforms for LFE template 4. See Figure DR1 for details.

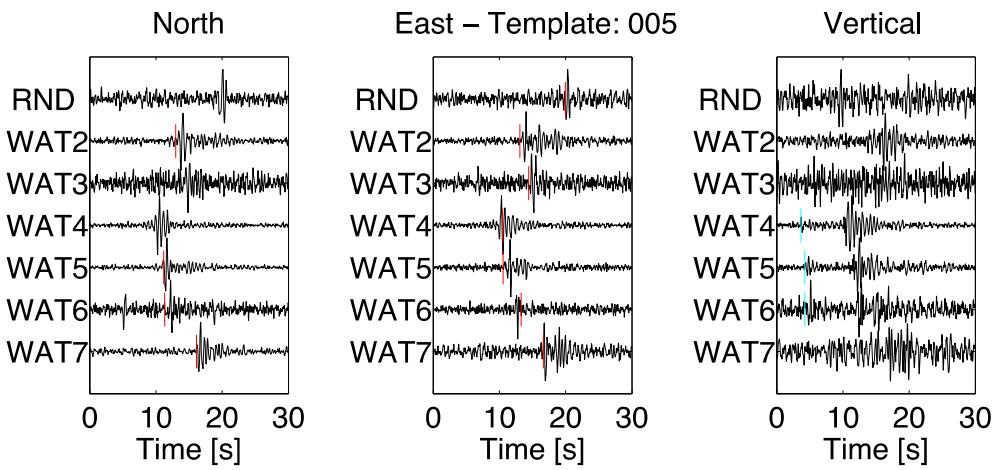


Figure DR5. Particle-velocity waveforms for LFE template 5. See Figure DR1 for details.

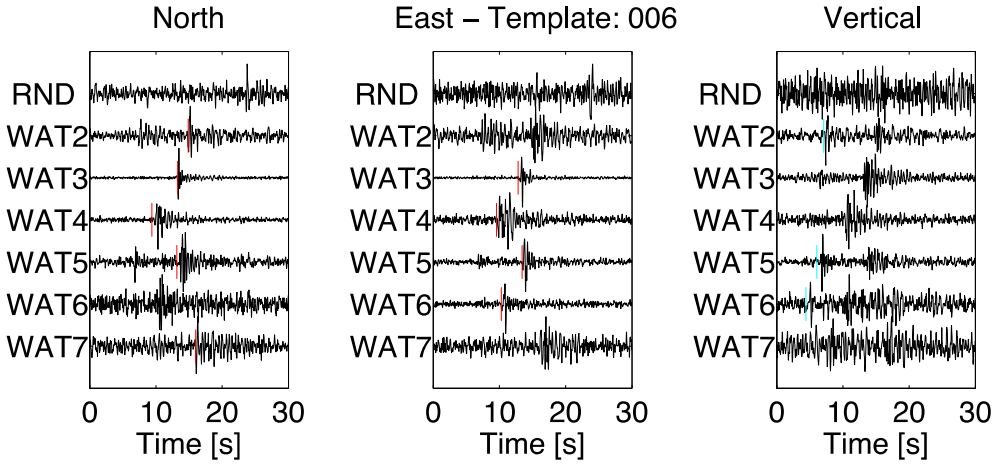


Figure DR6. Particle-velocity waveforms for LFE template 6. See Figure DR1 for details.

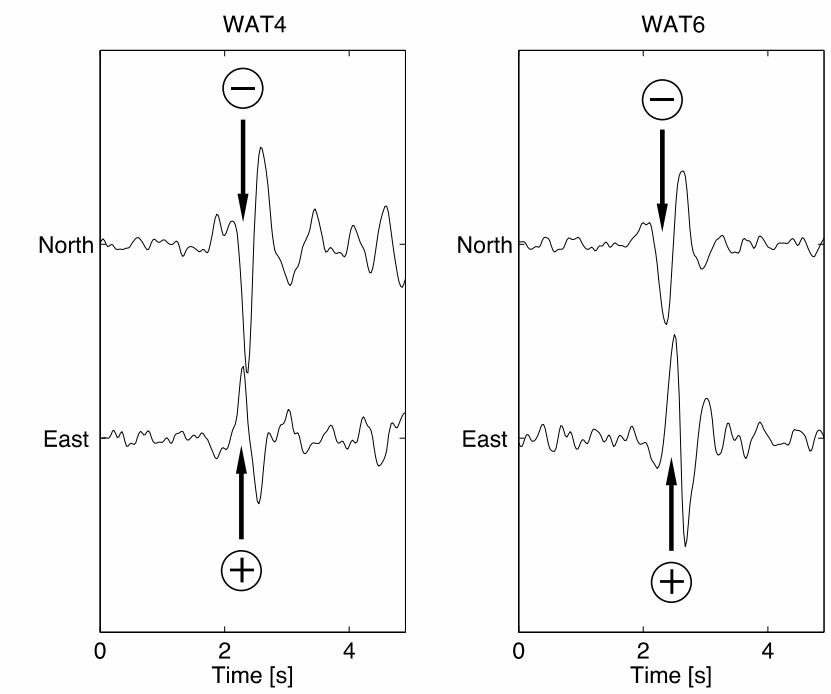


Figure DR7. Particle velocity waveforms of S-waves on horizontal components at stations WAT4 and WAT6 for Template 1. Waveforms display simple dipolar signatures expected on particle velocity waveforms from a spatially confined source. Leading pulses on north and east components are negative and positive polarity, respectively, indicating south eastward motion of the overriding plate.

TABLES

Station	Latitude (ºN)	Longitude (ºW)
GHO	61.7716	-148.9238
HARP	62.3986	-145.1567
PAX	62.9699	-145.4699
RND	63.4056	-148.8602
SAW	61.8070	-148.3318
SCM	61.8329	-147.3296
WAT1	62.8295	-148.5509
WAT2	62.9628	-148.5855
WAT3	62.6812	-148.5377
WAT4	62.8349	-147.9421
WAT5	63.0624	-148.2286
WAT6	62.5808	-147.7400
WAT7	62.8331	-148.8476

Table DR1. Locations of stations employed in this study.

P-velocity (km/s)	Depth (km)
5.3	0.0
5.6	4.0
6.2	10.0
6.9	15.0
7.4	20.0
7.7	25.0
7.9	33.0
8.1	47.0
8.3	65.0

Table DR2. Southern Alaska P-velocity model employed in the hypocentral location of LFE templates from central Alaska. S-velocities were computed from the P-velocity model assuming Vp/Vs=sqrt(3).

Template #	Latitude (ºN)	Longitude (ºW)	Depth (km)
1	62.433	147.883	40.3
2	62.550	147.500	42.2
3	62.833	147.833	50.2
4	62.733	148.617	57.6
5	62.933	147.550	50.2
6	62.733	147.750	45.5

Table DR3. LFE template hypocenters**.**

References

Fogleman, K.A., Lahr, J.C., Stephens, J.C. and Page, R.A., 1993, Earthquake locations determined by the southern Alaska seismograph network for October 1971 through May 1989: U.S. Geological Survey Open-File Report 93-309, 54 p.

Klein, F.W., 2002, User's guide to HYPOINVERSE-2000, a Fortran program to solve for earthquake locations and magnitudes: U.S. Geological Survey Open-File Report 02-171, 123 p.

Shelly, D.R., Beroza, G. C., Ide, S., 2007, Non-volcanic tremor and low-frequency earthquake swarms, *Nature*, **446**, 305-307 | doi:10.1038/nature05666

Wech, A., 2016, Extending Alaska's plate boundary: Tectonic tremor generated by Yakutat subduction, Geology, v. 44, p. 587-590, doi:10.1130/G37817.1