EARTHQUAKE ACTIVITY IN THE YELLOWSTONE REGION

Preliminary Epicenters

October 1 – December 31, 2020

Prepared by the University of Utah Seismograph Stations and funded by
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Foreword and Data Explanation

This report contains an epicenter map (Figure 1) and listings of earthquakes (Tables 1 and 2) detected and located in the Yellowstone region (lat. 44° 00′ – 45° 10′ N, long. 109° 45′ – 111° 30′ W). The computer program HYPOINVERSE-2000 (F. W. Klein, 2012, U.S. Geological Survey Open-File Report 02-171 revised) was used to process the earthquake data. This report also includes maps and a table of operating seismograph stations in the University of Utah's Yellowstone seismic network (Figure 2, Table 3).

The earthquake listing in Table 2 is estimated to be systematically complete above magnitude 1.5 within Yellowstone. *These data are preliminary—both the locations and magnitudes in this table are subject to revision.*

The following data are listed for each earthquake in Table 2:

- Date (yymmdd) and origin time in Coordinated Universal Time (UTC). To convert to local time, subtract seven hours for Mountain Standard Time (MST) and six hours for Mountain Daylight Time (MDT). During the report period, local time was MDT through 02:00 (2:00 a.m.) on November 1 and MST thereafter.

- Earthquake location coordinates in degrees and minutes of north latitude and west longitude, and depth in kilometers below sea level. Note that prior to October 1, 2012, the earthquake depths in these quarterly reports were computed relative to a datum of 2000 m above sea level.

- "*" indicates poor depth resolution: no recording stations within 10 km or twice the depth.

- MAG, the computed Richter local magnitude (M_L) for each earthquake. "W" indicates that peak amplitude measurements from Wood-Anderson records were used. Otherwise, the estimate is calculated from signal durations and is more correctly identified as coda magnitude (M_C). The notation "--" indicates that a reliable magnitude estimate could not be made.

- NO, the number of P and S readings used in the solution.

- GAP, the largest azimuthal separation in degrees between recording stations used in the solution.

- DMN, the epicentral distance in kilometers to the closest station.

- RMS, the weighted root-mean-square of the travel-time residuals in seconds:

$$RMS = \left(\frac{\sum_i (W_i R_i)^2}{\sum_i (W_i)^2} \right)^{\frac{1}{2}}$$

where: R_i is the observed minus the computed arrival time for the i-th P or S reading, and W_i is the relative weight given to the i-th P or S arrival time (0.0 for no weight through 1.0 for full weight).

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October 1 – December 31, 2020

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During the three-month period October 1 through December 31, 2020, the University of Utah Seismograph Stations (UUSS) located 478 earthquakes within the Yellowstone region (Figure 1). The total includes 1 earthquake in the magnitude 3 range and 27 earthquakes in the magnitude 2 range. The largest event to occur during this period was a magnitude 3.1 earthquake on November 25. There were no earthquakes reported felt in the region during the report period (see Table 1, a cumulative tabulation of earthquakes that were felt in the Yellowstone region during 2020). Additional information on earthquakes within the Yellowstone region is available from the University of Utah Seismograph Stations.

Online Information

A complete copy of this report, including maps and the earthquake catalog, is available on the UUSS web site at *https://quake.utah.edu/earthquake-center/quarterly-seismicity-reports*.

Note: On October 1, 2012, UUSS began using the ANSS Quake Monitoring System (AQMS) software package for data acquisition and data processing. The primary effect on the data reported herein comes from computing the earthquake locations with a newer version of the computer program HYPOINVERSE-2000 (F. W. Klein, 2012, U.S. Geological Survey Open-File Report 02-171 revised) and a revised and expanded set of velocity models. As implemented at UUSS, this new version of the location program accounts for station elevation differences more accurately and reports focal depths relative to sea level instead of the 2000 m elevation datum used previously.

For earthquakes of magnitude 3 and larger in the Yellowstone region, the U. S. Geological Survey automatically posts a Community Internet Intensity Map (CIIM) on its "Did You Feel It?" web page at http://earthquake.usgs.gov/earthquakes/dyfi/. We encourage anyone who feels an earthquake to report their observations on this interactive web site; felt information is available by zip code on the CIIM site or can be obtained from UUSS directly.

Earthquakes of Magnitude 3.0 or Larger

M_L 3.1	Nov 25	05:58 MST	8.7 mi NNE of West Yellowstone, MT

Notable Swarm Seismicity

During the report period, there were eight earthquake swarms in the Yellowstone region. For reporting purposes, we use the Mogi definition [Mogi, 1963] of a swarm and require each swarm to have ten or more earthquakes. Note that typically, around 50% of Yellowstone earthquakes occur as part of a seismic swarm [Farrell et al., 2009].

A. A swarm of 10 earthquakes ($-0.8 \leq M \leq 2.0$) occurred about 9.2 mi W of Norris Geyser Basin, YNP on October 7th.
B. A swarm of 11 earthquakes ($0.1 \leq M \leq 2.0$) occurred about 10.0 mi NE of West Yellowstone, MT from October 30th – 31st.
C. A swarm of 14 earthquakes ($-0.5 \leq M \leq 3.1$) occurred about 7.7 mi NNE of West Yellowstone, MT from November 24th – 27th.
D. A swarm of 113 earthquakes ($-0.7 \leq M \leq 2.6$) occurred about 12.0 mi E of West Thumb Geyser Basin, YNP from December 1st – 4th.
E. A swarm of 14 earthquakes ($0.0 \leq M \leq 2.6$) occurred about 12.9 mi E of West Thumb Geyser Basin, YNP from December 6th – 7th.
F. A swarm of 37 earthquakes ($0.1 \leq M \leq 1.8$) occurred about 6.1 mi N of West Thumb Geyser Basin, YNP from December 7th – 8th.
G. A swarm of 17 earthquakes ($-0.7 \leq M \leq 1.2$) occurred about 12.8 mi E of West Thumb Geyser Basin, YNP on December 9th.
H. A swarm of 48 earthquakes ($-0.4 \leq M \leq 2.0$) occurred about 9.8 mi NNE of Old Faithful, YNP from December 24th – 25th.

These swarms are labeled in Figure 1.

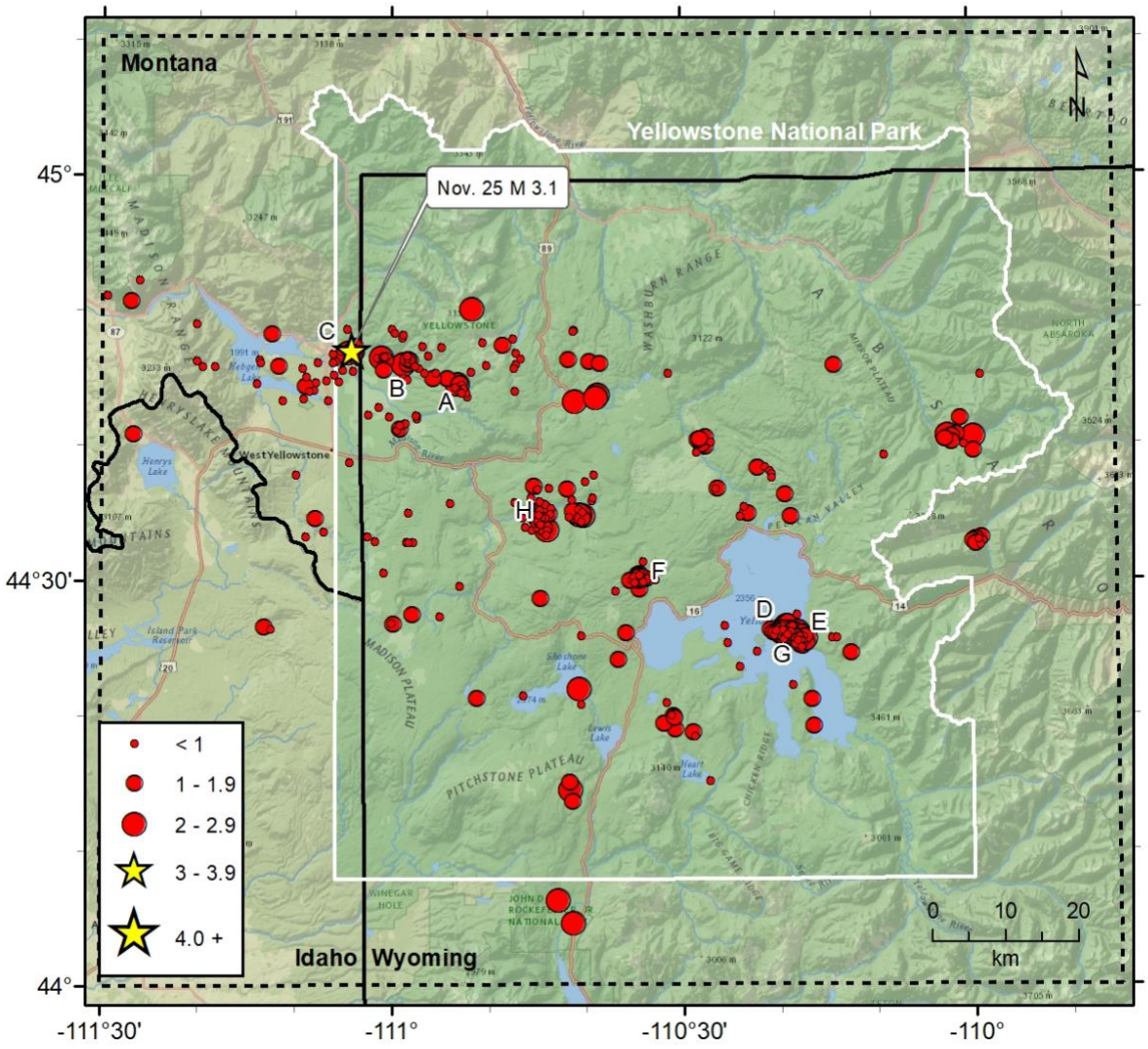

Figure 1. Epicenters of earthquakes located by the University of Utah Seismograph Stations, October 1, 2020, through December 31, 2020. Earthquake swarms (labeled A–H) are discussed in the text.

Table 1

EARTHQUAKES FELT IN THE YELLOWSTONE REGION
January 1, 2020 to December 31, 2020

Date	Time†	Felt Information‡	Latitude	Longitude	Magnitude§
March 31	09:36 MDT 15:36 UTC	Montana. Felt (II) at West Yellowstone, MT.	44º 44.40′	111º 08.28′	M_L 3.1
August 20 August 21	23:12 MDT 05:12 UTC	Yellowstone. Felt (III) at Yellowstone National Park.	44º 26.96′	110º 58.01′	M_L 2.6
September 10	05:42 MDT 11:42 UTC	Yellowstone. Felt (II) at Yellowstone National Park.	44º 18.68′	110º 30.33′	M_L 2.8

† Times are listed both as Local Time—Mountain Standard Time (MST) or Mountain Daylight Time (MDT)—and as Coordinated Universal Time (UTC).
? Indicates on-line reports that appear questionable given the distance from the source
‡ *CIIM* indicates the availability of a Community Internet Intensity Map (http://earthquake.usgs.gov/earthquakes/dyfi), compiled by the U.S. Geological Survey (USGS); *ShakeMap* indicates the availability of computer-generated maps of ground-shaking (*https://quake.utah.edu*), produced by the University of Utah Seismograph Stations (UUSS). Roman numerals correspond to the Modified Mercalli intensity scale. Unless otherwise indicated, felt information is from the USGS (1) CIIM reports and/or (2) PDE Monthly (or) Weekly Listing Files (http://earthquake.usgs.gov/data/pde.php).
§ Richter local magnitude (M_L) or coda magnitude (M_C) determined by UUSS. If labeled "NEIC," data are from the National Earthquake Information Center of the USGS.

Yellowstone Seismic Network
December 31, 2020

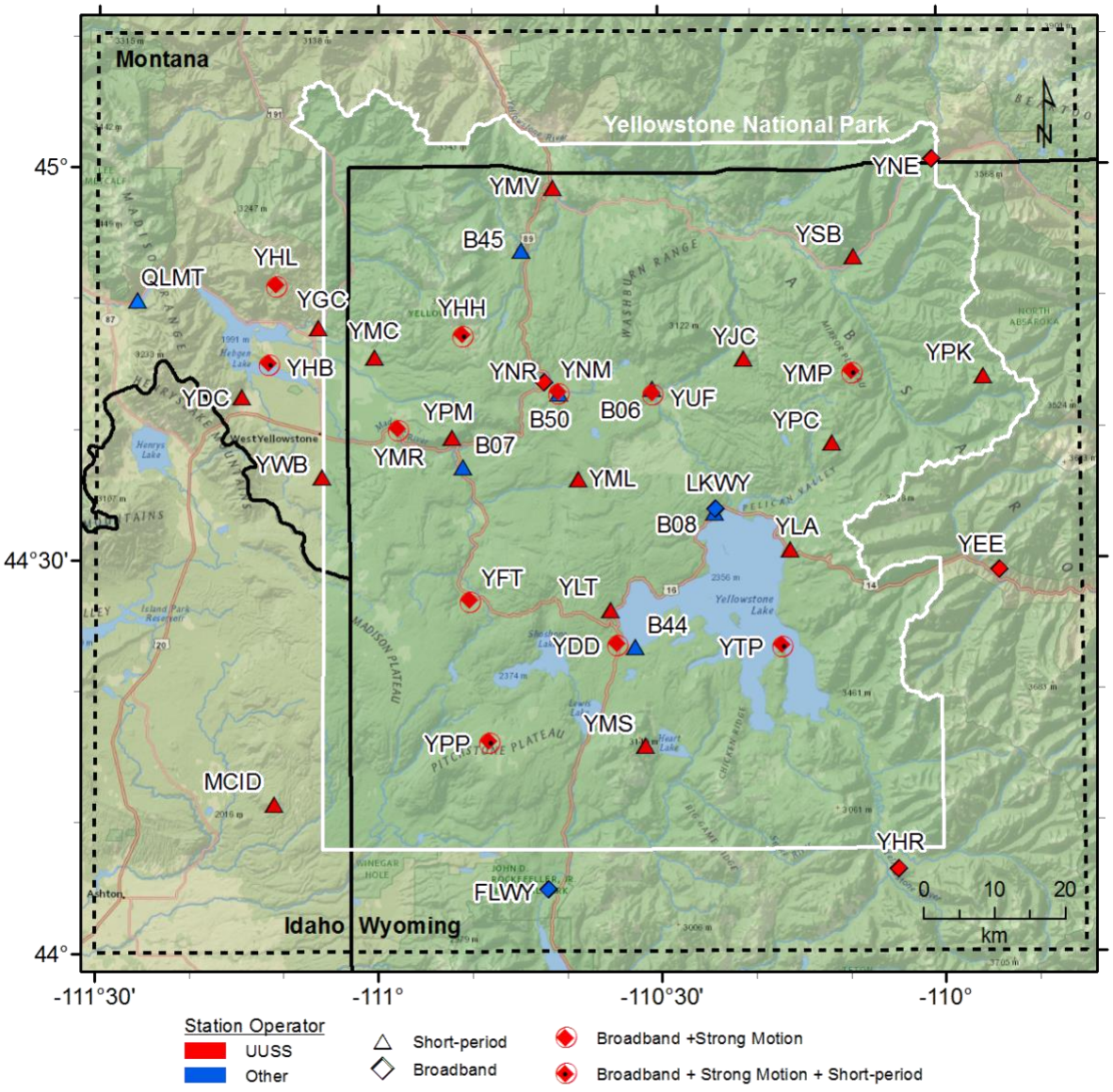

Figure 2. Seismograph stations of the Yellowstone Seismic Network as of December 31, 2020.

Table 2. Earthquakes in the Yellowstone Region: October 1–December 31, 2020

DATE	ORIGIN TIME	LATITUDE	LONGITUDE	DEPTH	MAG	NO	GAP	DMN	RMS
201001	10:54:47.60	44º46.16’	111º06.11’	12.9	0.5	19	90	3	0.17
201001	21:09:56.61	44º40.84’	111º26.82’	12.9	1.9W	33	56	17	0.17
201002	07:38:22.75	44º24.21’	110º36.61’	2.0	1.2W	13	119	3	0.11
201002	21:41:31.81	44º43.51’	110º38.91’	4.8	2.0W	17	147	3	0.15
201002	22:34:05.59	44º43.73’	110º38.73’	5.2	2.1W	23	133	3	0.18
201002	22:46:03.15	44º30.59’	111º00.89’	16.0	0.6	17	131	13	0.19
201005	07:47:31.79	44º19.25’	110º16.54’	8.4	1.8W	17	172	8	0.16
201006	02:36:44.82	44º40.13’	110º02.07’	12.7	1.1	8	162	11	0.18
201006	13:39:22.57	44º33.42’	110º44.02’	3.8	0.6	10	138	9	0.11
201006	17:38:16.69	44º46.33’	111º03.97’	10.3	0.1	12	129	5	0.12
201007	04:24:50.64	44º33.79’	110º43.95’	7.8	2.0W	25	66	9	0.18
201007	04:26:02.66	44º33.89’	110º44.22’	6.9	1.2W	22	68	9	0.14
201007	04:57:23.99	44º38.34’	110º22.17’	7.3	1.5W	17	78	9	0.18
201007	05:01:04.12	44º33.44’	110º44.10’	4.6	0.2	14	90	9	0.11
201007	07:13:08.85	44º33.77’	110º43.97’	5.6	0.6W	19	84	9	0.17
201007	09:18:37.46	44º40.43’	110º28.17’	3.4	1.2W	9	189	5	0.13
201007	14:47:05.45	44º45.85’	110º14.21’	7.5	1.5W	9	123	7	0.11
201007	19:58:12.68	44º44.56’	110º53.15’	9.8	2.0W	20	63	6	0.16
201007	19:59:23.77	44º44.59’	110º53.00’	6.3	1.0W	17	90	6	0.14
201007	19:59:50.00	44º44.53’	110º53.13’	7.2	1.2W	18	90	6	0.17
201007	20:02:39.65	44º44.17’	110º52.65’	3.9	0.3	11	95	6	0.18
201007	20:07:12.86	44º44.30’	110º53.44’	2.2	-0.8	7	120	6	0.06
201007	20:07:18.46	44º44.02’	110º53.06’	2.3	-0.6	8	120	7	0.12
201007	20:07:31.44	44º43.99’	110º52.92’	2.2	-0.4	10	95	7	0.11
201007	20:07:36.57	44º44.18’	110º53.03’	3.0	0.2	12	99	6	0.13
201007	20:07:42.32	44º44.05’	110º53.07’	2.0	-0.1	10	97	7	0.12
201007	20:12:36.69	44º44.25’	110º52.59’	5.4	0.1	10	96	6	0.13
201009	22:27:28.11	44º34.71’	110º18.78’	4.7	1.4	9	134	7	0.11
201011	02:55:24.45	44º44.41’	111º08.94’	14.1	1.1W	14	62	4	0.14
201011	14:57:17.06	44º46.18’	110º39.55’	4.6	1.7W	16	149	6	0.15
201012	17:23:47.28	44º49.01’	111º20.21’	7.7	0.6	14	86	8	0.16
201013	11:45:14.85	44º39.50’	109º59.79’	14.2	1.0	10	183	10	0.16
201013	13:09:10.39	44º40.58’	110º02.06’	14.7	1.1	9	158	11	0.18
201014	04:58:05.64	44º48.16’	110º58.85’	4.9	0.3	12	169	5	0.19
201015	04:41:51.40	44º46.21’	111º05.84’	8.5	0.6	20	96	3	0.20
201016	01:47:36.61	44º43.22’	110º41.05’	4.7	2.0W	22	104	1	0.15
201017	04:44:59.68	44º25.37’	110º25.39’	2.4	0.8	8	143	10	0.17
201018	11:03:21.96	44º19.03’	110º30.84’	1.1	1.9	10	126	6	0.05
201019	05:59:46.39	44º40.36’	110º28.41’	5.9	1.2W	12	109	5	0.14
201020	13:36:27.84	44º44.68’	111º07.89’	14.9	0.7W	15	63	5	0.14
201021	00:05:24.09	44º40.58’	110º27.60’	2.9	1.4W	15	114	6	0.19
201021	01:32:50.89	44º46.07’	110º38.50’	1.9	1.7W	18	100	7	0.26
201021	02:03:29.33	44º47.38’	110º56.82’	6.1	-0.3	12	160	6	0.17
201021	02:03:39.78	44º46.63’	110º56.23’	4.8	0.3	13	188	6	0.13
201021	08:22:05.38	44º34.75’	110º24.02’	3.2	0.6	11	145	2	0.13

Table 2. Earthquakes in the Yellowstone Region: October 1–December 31, 2020

DATE	ORIGIN TIME	LATITUDE	LONGITUDE	DEPTH	MAG	NO	GAP	DMN	RMS
201021	08:35:24.00	44º34.92’	110º23.18’	4.2	1.9W	16	95	2	0.13
201021	12:17:15.58	44º37.86’	110º20.70’	2.3	0.7	12	134	9	0.10
201021	17:26:18.69	44º44.60’	111º13.96’	5.3	0.2	9	189	3	0.14
201022	13:48:41.96	44º21.02’	110º31.73’	0.1	0.4	7	247	5	0.13
201023	14:40:22.67	44º45.38’	110º56.64’	2.2	--	8	150	5	0.08
201023	14:40:24.78	44º45.89’	110º57.67’	7.8	0.0	13	172	4	0.20
201023	20:41:53.76	44º29.60’	110º53.05’	9.8	0.2	8	177	6	0.14
201023	22:48:56.99	44º39.89’	110º27.54’	2.7	1.6W	13	89	7	0.19
201023	22:49:22.58	44º39.50’	110º28.48’	2.5	0.8	9	108	7	0.22
201023	22:51:04.95	44º40.22’	110º27.03’	4.8	0.4	5	121	7	0.03
201023	22:51:18.86	44º40.03’	110º27.97’	2.9	1.5W	8	112	6	0.19
201024	13:43:55.85	44º37.32’	110º40.04’	5.2	0.6	14	83	3	0.13
201024	15:25:51.88	44º44.95’	110º54.29’	8.8	1.2W	16	100	6	0.12
201024	19:10:05.66	44º47.98’	110º58.91’	5.5	0.6	15	130	5	0.11
201025	04:01:36.78	44º29.27’	110º36.93’	4.2*	0.9	18	88	11	0.16
201025	12:58:08.26	44º26.69’	110º25.68’	2.7*	0.3	7	123	11	0.11
201025	19:10:13.37	44º27.36’	110º55.10’	9.5	0.4	7	221	7	0.10
201025	19:10:35.97	44º27.56’	110º57.98’	1.9	1.6	8	149	10	0.22
201026	00:32:00.89	44º33.27’	111º02.53’	17.2	0.2	9	257	7	0.10
201026	00:48:45.43	44º32.93’	111º01.81’	16.5	0.4	10	137	8	0.12
201026	17:17:26.42	44º52.24’	111º26.22’	9.8	0.6	12	284	4	0.16
201027	00:45:48.29	44º45.87’	111º18.34’	9.1	0.7	17	98	8	0.13
201028	04:02:03.52	44º34.63’	111º07.97’	11.1	1.1W	20	107	4	0.15
201028	04:27:28.40	44º33.64’	111º07.05’	9.6	-0.1	12	163	5	0.11
201028	11:43:11.05	44º42.87’	111º01.37’	7.8	0.2	16	79	5	0.15
201030	02:24:41.20	44º47.42’	110º48.55’	4.6	1.6W	23	112	3	0.19
201030	05:58:04.21	44º46.02’	110º58.84’	6.4	2.0W	30	104	2	0.20
201030	06:16:45.13	44º46.16’	110º58.32’	6.1	0.9W	19	105	3	0.16
201030	07:13:19.50	44º46.05’	110º58.42’	6.0	1.3W	17	104	3	0.16
201030	08:35:52.87	44º46.38’	110º58.05’	5.5	0.4	13	141	3	0.12
201030	08:41:06.65	44º46.63’	110º58.40’	5.8	0.2	14	145	3	0.11
201030	10:54:36.44	44º46.64’	110º58.32’	5.7	0.5	15	145	3	0.15
201030	12:00:03.81	44º46.64’	110º58.43’	6.1	0.1	13	145	3	0.13
201030	12:24:29.62	44º45.72’	110º57.27’	3.6	0.1	6	142	4	0.07
201030	12:43:31.51	44º46.83’	110º47.14’	2.8	0.7	7	210	5	0.08
201030	13:23:57.95	44º46.29’	110º58.15’	6.7	1.1W	18	114	3	0.16
201030	20:55:13.28	44º45.08’	109º59.07’	11.4	0.9	6	206	5	0.05
201030	20:56:09.20	44º41.87’	110º01.15’	14.0	1.2	8	149	9	0.18
201031	07:12:08.09	44º46.36’	110º58.34’	6.7	0.9W	20	115	3	0.16
201031	07:24:31.69	44º46.42’	110º58.41’	6.5	0.3	11	142	3	0.16
201031	15:51:03.12	44º50.67’	111º27.08’	8.4*	1.0	11	134	21	0.25
201101	03:11:06.81	44º21.57’	110º46.50’	7.9	0.4	6	119	10	0.19
201101	03:11:13.67	44º21.33’	110º51.29’	2.2	1.2	8	203	10	0.19
201101	12:17:29.68	44º32.87’	110º58.30’	11.0	0.4	17	99	12	0.16
201101	12:25:51.22	44º32.84’	110º58.34’	11.3	0.3	13	100	12	0.14

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DATE	ORIGIN TIME	LATITUDE	LONGITUDE	DEPTH	MAG	NO	GAP	DMN	RMS
201101	12:50:16.87	44º32.89’	110º57.88’	11.1	0.3	12	97	13	0.16
201101	13:51:41.37	44º32.86’	110º58.49’	11.4	0.8	12	100	12	0.15
201101	19:20:49.73	44º46.36’	111º13.74’	11.6	0.2	11	195	4	0.12
201101	19:20:49.77	44º46.17’	111º13.60’	11.2	0.1	12	191	3	0.12
201103	02:03:47.83	44º45.99’	110º47.21’	4.6	0.7W	23	90	6	0.19
201103	02:11:39.67	44º45.71’	110º47.34’	4.5	0.6	19	89	6	0.17
201103	03:05:06.89	44º46.42’	110º46.72’	4.8	0.0	10	202	6	0.15
201103	14:22:49.21	44º47.91’	110º47.42’	4.7	0.3	11	121	5	0.09
201103	15:14:55.44	44º45.93’	110º50.22’	7.0	-0.2	11	135	3	0.18
201104	15:56:46.31	44º42.30’	111º02.50’	10.9	0.6	17	69	7	0.15
201105	08:23:29.02	44º44.09’	111º08.11’	12.6	0.4	15	68	5	0.13
201106	01:43:20.13	44º34.63’	110º40.37’	5.8	1.3W	17	65	4	0.11
201106	01:43:36.31	44º34.86’	110º40.61’	5.7	2.0W	25	66	4	0.19
201106	01:46:26.83	44º34.81’	110º40.22’	5.9	2.2W	28	52	4	0.16
201106	01:51:30.19	44º34.61’	110º40.30’	5.7	1.7W	15	65	4	0.13
201106	01:52:41.86	44º35.11’	110º40.29’	5.9	0.4	15	64	3	0.13
201106	02:03:41.91	44º37.80’	110º39.17’	5.2	-0.2	9	102	3	0.10
201106	02:03:50.01	44º34.41’	110º40.39’	5.1	0.7	15	131	4	0.18
201106	16:48:29.94	44º35.95’	110º39.38’	5.2	0.5	10	252	1	0.14
201106	23:53:14.88	44º37.63’	110º20.68’	6.0	0.6	10	90	9	0.08
201107	08:43:36.46	44º43.89’	110º52.82’	2.1	--	9	92	7	0.10
201107	08:43:38.41	44º43.91’	110º52.27’	5.3	0.3	13	82	6	0.11
201107	10:16:39.40	44º44.55’	110º52.83’	5.9	0.5	13	104	6	0.12
201108	06:41:32.67	44º22.03’	110º40.69’	3.9	2.3W	20	91	9	0.15
201108	14:54:33.58	44º43.35’	111º11.31’	8.6	0.1	10	99	3	0.12
201109	08:41:25.84	44º41.53’	110º58.93’	5.3	0.6	11	94	3	0.18
201109	17:16:33.09	44º26.80’	110º59.86’	8.5	1.2W	17	128	13	0.23
201109	18:28:02.66	44º47.20’	111º04.33’	11.1	0.2	13	115	3	0.10
201110	05:16:48.41	44º25.95’	110º40.48’	1.8	0.7	10	107	9	0.22
201110	12:57:46.78	44º41.18’	110º59.49’	4.8	0.6	13	98	3	0.14
201110	12:59:43.92	44º41.13’	110º59.56’	4.7	0.7	8	157	3	0.14
201110	13:41:53.54	44º41.27’	110º59.18’	5.9	1.8W	21	52	3	0.17
201110	18:53:52.83	44º41.62’	110º58.58’	4.9	0.5	13	129	3	0.20
201110	20:28:45.44	44º42.04’	110º57.39’	1.8	0.5	7	138	4	0.20
201111	04:08:51.61	44º42.25’	110º57.46’	1.4	0.4	10	130	4	0.16
201111	07:49:44.87	44º45.82’	111º19.61’	4.9	0.9W	13	240	9	0.15
201111	13:29:08.41	44º46.27’	111º20.22’	6.5	0.7	11	244	10	0.13
201111	19:54:20.98	44º43.63’	110º52.21’	4.1	0.6	13	83	7	0.11
201112	03:45:16.56	44º46.17’	111º07.67’	10.5	-0.1	13	85	3	0.17
201112	04:24:19.76	44º41.53’	110º59.19’	6.2	0.4	12	95	3	0.19
201112	04:24:30.84	44º45.50’	111º04.09’	10.1	-0.2	6	298	5	0.01
201113	07:30:41.82	44º36.78’	110º41.85’	2.9	1.5W	12	62	4	0.07
201113	07:31:18.82	44º35.13’	110º41.29’	7.0	1.5W	25	68	4	0.21
201113	07:31:34.02	44º34.71’	110º41.67’	5.9	0.3	9	166	5	0.17
201113	07:32:13.11	44º36.16’	110º39.28’	9.3	--	9	108	1	0.08

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DATE	ORIGIN TIME	LATITUDE	LONGITUDE	DEPTH	MAG	NO	GAP	DMN	RMS
201113	07:38:22.90	44º34.83’	110º40.97’	5.8	1.5W	12	109	4	0.13
201113	07:41:29.71	44º35.98’	110º41.35’	4.8	0.7	12	77	4	0.09
201113	07:42:20.01	44º35.32’	110º40.72’	6.8	0.5	18	100	3	0.16
201114	03:08:13.15	44º48.36’	110º59.73’	4.4	0.3	15	170	5	0.15
201117	14:20:35.80	44º40.57’	109º59.75’	14.1	2.1	18	110	9	0.21
201117	15:40:21.44	44º45.37’	110º55.48’	9.7	0.1	12	104	6	0.10
201117	15:47:45.41	44º44.95’	110º55.80’	9.3	1.1W	17	102	6	0.18
201117	19:44:45.78	44º46.98’	111º05.34’	2.1	0.3	15	132	9	0.16
201118	10:12:23.79	44º13.70’	110º41.42’	4.0	1.9W	11	112	10	0.17
201118	10:16:25.25	44º14.59’	110º41.61’	5.0	2.1W	13	182	9	0.19
201118	10:16:49.30	44º15.10’	110º41.74’	2.6	1.3	7	246	9	0.11
201119	15:13:11.76	44º44.77’	111º05.48’	7.3	0.2	12	144	6	0.12
201120	00:36:58.48	44º38.42’	110º21.37’	2.1	0.9	8	116	10	0.06
201120	00:37:06.00	44º36.80’	110º26.54’	2.3	-0.2	6	183	7	0.10
201122	03:25:45.50	44º26.86’	111º00.12’	12.5	0.7W	13	129	13	0.16
201122	08:05:29.50	44º35.47’	110º23.62’	2.5	0.6	16	123	3	0.21
201122	08:59:12.66	44º45.48’	110º51.82’	3.0	-0.5	10	157	4	0.11
201122	12:07:29.95	44º33.08’	109º59.05’	11.6	1.2	12	98	10	0.21
201124	04:16:17.35	44º32.61’	109º59.63’	10.6	1.0	16	106	10	0.20
201124	06:49:32.38	44º45.02’	110º58.85’	7.4	0.9W	21	104	2	0.18
201124	07:29:41.10	44º32.54’	109º59.13’	10.4	0.9	14	105	9	0.17
201124	08:29:23.34	44º39.20’	110º09.08’	3.8	0.8	10	137	3	0.20
201124	09:41:16.52	44º32.85’	109º59.61’	8.9	1.7	18	90	10	0.18
201124	12:16:10.49	44º36.31’	110º19.31’	5.4*	1.9W	18	92	11	0.10
201124	13:27:11.64	44º32.81’	109º59.93’	9.8	1.1	15	114	11	0.14
201124	23:04:58.84	44º44.91’	110º58.46’	6.3	0.2	17	103	3	0.15
201124	23:08:11.56	44º46.63’	111º03.51’	7.8	0.3	20	135	4	0.11
201125	02:11:00.56	44º47.24’	111º03.91’	7.1	0.8	17	141	3	0.11
201125	02:14:39.42	44º46.85’	111º04.56’	7.3	2.1W	34	51	3	0.16
201125	10:09:31.61	44º46.96’	111º03.72’	6.8	1.2W	23	114	4	0.13
201125	12:42:33.49	44º19.43’	110º31.99’	6.4	1.2	13	108	7	0.06
201125	12:51:00.65	44º46.83’	111º03.89’	5.8	1.2W	21	104	4	0.18
201125	12:58:14.54	44º44.02’	111º08.55’	9.9	-0.3	16	85	5	0.14
201125	12:58:21.82	44º47.10’	111º04.10’	7.5	3.1W	33	105	3	0.17
201125	13:00:30.38	44º47.09’	111º04.17’	6.5	1.6W	29	104	3	0.17
201125	13:01:31.91	44º47.16’	111º03.67’	6.5	0.8	13	161	4	0.11
201125	13:03:48.54	44º47.33’	111º03.83’	6.5	1.0W	17	143	3	0.12
201125	13:12:07.69	44º47.07’	111º03.89’	6.4	0.7	15	139	4	0.10
201125	13:59:58.36	44º47.02’	111º03.79’	6.6	0.9W	13	139	4	0.08
201125	17:23:06.21	44º46.84’	111º03.74’	6.3	1.1W	17	137	4	0.13
201125	23:03:22.15	44º15.24’	110º27.18’	6.8	0.8	14	223	6	0.20
201126	00:53:05.39	44º45.30’	110º31.40’	2.0	0.6	12	170	4	0.07
201126	05:42:33.48	44º46.94’	111º03.36’	6.1	0.3	18	139	4	0.10
201126	06:50:54.61	44º50.12’	110º51.69’	8.1	2.2W	27	127	5	0.17
201127	06:35:11.38	44º45.27’	111º06.02’	12.0	-0.5	13	85	5	0.18

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DATE	ORIGIN TIME	LATITUDE	LONGITUDE	DEPTH	MAG	NO	GAP	DMN	RMS
201128	04:30:51.01	44º45.84’	111º11.71’	12.5	1.3W	20	81	1	0.15
201128	17:45:52.30	44º37.84’	111º09.90’	7.1	-0.5	12	230	6	0.20
201129	03:16:43.55	44º20.86’	110º40.54’	4.1	0.8	13	103	10	0.09
201129	07:50:33.79	44º38.75’	111º04.41’	11.1	0.0	12	133	5	0.16
201130	07:06:40.93	44º47.29’	110º54.87’	5.4	0.4	11	160	5	0.09
201130	22:17:46.91	44º48.60’	110º59.98’	4.2	0.7	16	173	6	0.19
201201	17:33:33.45	44º26.10’	110º18.33’	7.0	0.7	14	119	5	0.17
201201	17:33:58.69	44º26.20’	110º19.88’	2.3	-0.1	7	114	6	0.13
201202	06:45:37.49	44º26.27’	110º19.65’	2.3	1.0	14	117	6	0.11
201202	06:46:10.32	44º26.58’	110º19.12’	2.2	1.9	12	127	6	0.12
201202	06:46:42.61	44º25.66’	110º19.95’	2.0	0.9	9	120	5	0.25
201202	06:46:51.24	44º26.31’	110º19.29’	3.8	2.6	20	124	6	0.18
201202	06:46:59.25	44º26.09’	110º20.40’	2.2	1.2	8	116	6	0.13
201202	06:47:45.95	44º25.38’	110º17.25’	2.3	1.0	5	168	3	0.04
201202	06:47:53.98	44º26.16’	110º19.73’	2.1	1.8	14	115	6	0.15
201202	06:48:08.83	44º26.16’	110º19.76’	2.0	2.2	18	115	6	0.24
201202	06:48:23.02	44º26.14’	110º20.65’	4.8	1.4	10	100	7	0.15
201202	06:49:01.46	44º26.40’	110º19.34’	1.9	2.4	14	123	6	0.18
201202	06:49:19.47	44º26.46’	110º19.96’	2.5	1.9	11	113	7	0.12
201202	06:49:34.59	44º26.20’	110º19.29’	4.7	1.9W	16	123	6	0.11
201202	06:49:51.70	44º26.51’	110º20.11’	2.6	0.4	7	111	7	0.16
201202	06:49:56.99	44º26.75’	110º19.46’	2.0	1.8	13	122	7	0.23
201202	06:50:41.60	44º26.25’	110º19.07’	5.1	1.4	9	127	6	0.06
201202	06:51:10.21	44º26.07’	110º18.22’	7.3	1.8W	14	120	5	0.13
201202	06:52:42.07	44º26.26’	110º19.14’	2.0	0.6	10	127	6	0.13
201202	06:52:59.37	44º26.41’	110º19.40’	4.7	1.0	16	122	6	0.12
201202	06:53:45.14	44º26.18’	110º19.93’	2.5	0.4	12	112	6	0.15
201202	06:54:03.70	44º26.12’	110º19.64’	2.7	1.0	10	117	6	0.07
201202	06:54:22.02	44º26.29’	110º19.50’	2.3	0.6	7	120	6	0.03
201202	06:55:43.75	44º26.00’	110º19.66’	2.6	0.7	12	115	6	0.08
201202	06:56:08.87	44º24.72’	110º22.38’	2.0	0.8	9	153	7	0.16
201202	06:56:38.71	44º26.12’	110º19.55’	2.2	1.9	13	119	6	0.14
201202	06:57:04.95	44º26.30’	110º19.59’	2.5	1.0	10	118	6	0.10
201202	06:57:20.36	44º25.86’	110º20.09’	2.5	0.7	12	118	6	0.11
201202	06:57:30.04	44º26.05’	110º19.75’	2.3	0.8	12	115	6	0.15
201202	06:57:44.62	44º25.60’	110º18.22’	7.6	1.3	16	117	4	0.13
201202	06:58:15.33	44º26.26’	110º20.17’	2.5	0.0	9	116	7	0.09
201202	06:59:00.75	44º26.12’	110º18.13’	7.4	1.2	14	122	5	0.27
201202	06:59:16.72	44º26.33’	110º19.83’	2.4	0.7	12	115	6	0.13
201202	06:59:37.42	44º26.38’	110º19.43’	2.4	-0.2	9	121	6	0.11
201202	07:01:15.14	44º25.70’	110º18.47’	6.9	1.3	20	113	4	0.17
201202	07:02:49.24	44º26.42’	110º19.96’	2.4	0.2	10	112	7	0.14
201202	07:02:51.96	44º26.36’	110º20.22’	2.2	0.9	10	111	7	0.15
201202	07:02:58.75	44º26.15’	110º20.30’	2.3	1.6	9	114	6	0.14
201202	07:03:07.28	44º26.18’	110º19.63’	2.5	0.9	8	167	6	0.12

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DATE	ORIGIN TIME	LATITUDE	LONGITUDE	DEPTH	MAG	NO	GAP	DMN	RMS
201202	07:04:15.16	44º26.60’	110º19.30’	2.2	2.1	8	125	6	0.14
201202	07:04:19.34	44º25.90’	110º20.15’	2.5	0.3	9	118	6	0.17
201202	07:04:25.83	44º25.80’	110º19.89’	2.4	0.4	10	110	6	0.20
201202	07:04:31.36	44º26.01’	110º20.26’	2.5	0.9	10	106	6	0.18
201202	07:04:37.77	44º26.11’	110º19.45’	2.3	1.4	11	120	6	0.12
201202	07:04:56.34	44º26.52’	110º19.21’	2.3	0.6	10	126	6	0.24
201202	07:05:07.47	44º26.21’	110º19.53’	2.0	1.0	14	119	6	0.19
201202	07:05:17.84	44º26.24’	110º19.05’	2.2	0.3	8	128	6	0.34
201202	07:05:44.60	44º26.01’	110º19.15’	4.6	--	14	125	5	0.10
201202	07:05:48.00	44º26.88’	110º19.14’	1.9	1.6W	7	132	7	0.21
201202	07:07:59.10	44º26.65’	110º18.72’	3.2	-0.2	7	135	6	0.09
201202	07:08:15.07	44º26.38’	110º19.62’	2.1	0.9	13	118	6	0.12
201202	07:08:44.19	44º26.24’	110º19.93’	2.2	-0.4	7	114	6	0.15
201202	07:09:02.95	44º25.96’	110º20.54’	2.2	-0.3	9	124	6	0.14
201202	07:09:21.38	44º25.99’	110º19.67’	4.7	0.8	15	115	6	0.17
201202	07:11:36.07	44º26.30’	110º20.32’	2.8	-0.7	7	116	7	0.14
201202	07:12:11.49	44º26.48’	110º19.71’	2.5	0.7	12	117	7	0.13
201202	07:12:53.44	44º26.27’	110º19.52’	2.5	-0.1	9	119	6	0.15
201202	07:15:54.73	44º26.23’	110º18.12’	7.3	2.0W	21	112	5	0.17
201202	07:16:46.71	44º26.69’	110º18.69’	2.2	0.6	6	136	6	0.13
201202	07:17:24.41	44º26.03’	110º18.22’	7.4	1.3	16	120	5	0.20
201202	07:17:53.16	44º26.45’	110º18.92’	2.4	1.1	8	131	6	0.18
201202	07:19:53.43	44º24.64’	110º12.58’	5.5	1.5	9	206	6	0.16
201202	07:20:08.24	44º26.03’	110º19.62’	2.1	1.2	13	117	6	0.13
201202	07:21:00.20	44º25.55’	110º18.12’	0.9	1.8	13	145	4	0.16
201202	07:22:03.55	44º26.24’	110º19.92’	3.4	0.8	13	112	6	0.15
201202	07:22:08.09	44º26.12’	110º19.27’	2.3	0.8	9	124	6	0.24
201202	07:28:53.24	44º25.95’	110º19.72’	2.0	1.1	12	114	6	0.22
201202	07:29:02.61	44º25.77’	110º14.53’	0.1	0.3	8	232	5	0.16
201202	08:04:06.84	44º27.47’	110º18.13’	5.0	0.9	11	125	7	0.14
201202	08:12:45.60	44º25.54’	110º17.63’	8.3	0.6	10	129	4	0.08
201202	09:03:40.31	44º25.86’	110º18.24’	7.6	1.5W	20	81	5	0.19
201202	09:24:57.72	44º25.65’	110º18.06’	7.1	0.8	14	121	4	0.13
201202	09:50:24.70	44º25.92’	110º18.40’	6.1	0.7	15	116	5	0.15
201202	09:50:43.30	44º26.17’	110º19.45’	2.5	-0.1	8	120	6	0.12
201202	10:13:59.70	44º25.38’	110º17.47’	9.6	0.6	10	131	3	0.13
201202	10:35:58.27	44º25.86’	110º17.84’	7.8	1.1	13	126	4	0.11
201202	10:36:21.38	44º26.15’	110º19.25’	3.4	1.9	13	106	6	0.11
201202	10:36:32.71	44º26.16’	110º19.60’	2.3	1.3	10	117	6	0.10
201202	10:37:12.91	44º26.22’	110º18.73’	5.9	0.3	6	134	5	0.04
201202	10:38:41.30	44º26.48’	110º20.10’	2.4	0.2	9	111	7	0.12
201202	10:39:18.29	44º26.33’	110º19.63’	2.1	0.7	9	118	6	0.11
201202	10:41:12.90	44º26.32’	110º19.68’	2.4	-0.5	10	117	6	0.13
201202	10:41:46.74	44º26.58’	110º20.06’	2.5	0.8	11	111	7	0.16
201202	10:44:07.96	44º26.30’	110º18.64’	7.9	0.6	13	115	6	0.22

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201202	11:56:13.14	44º25.76’	110º18.03’	7.9	1.2	15	122	4	0.14
201202	12:00:56.11	44º25.73’	110º17.99’	7.2	1.7W	22	86	4	0.17
201202	12:05:42.11	44º25.52’	110º17.70’	8.5	0.7	10	127	4	0.06
201202	12:11:36.42	44º25.30’	110º17.61’	8.2	1.1	11	128	3	0.17
201202	12:11:46.99	44º26.03’	110º19.46’	2.1	0.4	10	120	6	0.10
201202	13:24:22.22	44º26.12’	110º18.25’	8.1	0.7	15	120	5	0.18
201202	13:35:03.18	44º25.77’	110º18.01’	7.0	1.1	16	85	4	0.11
201202	15:29:55.43	44º26.06’	110º18.55’	6.0	0.8	13	115	5	0.14
201202	17:26:01.20	44º45.73’	111º09.25’	7.0	-0.2	14	97	4	0.17
201202	19:02:36.49	44º26.19’	110º19.45’	2.7	-0.3	8	120	6	0.09
201202	19:02:41.14	44º25.74’	110º18.06’	7.5	1.0	17	121	4	0.16
201202	19:33:57.33	44º26.01’	110º17.94’	7.8	0.8	12	125	5	0.13
201202	21:38:17.89	44º25.76’	110º18.33’	7.7	0.7	12	79	4	0.13
201202	21:48:07.71	44º26.11’	110º17.71’	8.5	1.1	11	129	5	0.10
201202	21:48:39.64	44º26.40’	110º19.02’	5.4	0.6	9	129	6	0.07
201202	23:16:15.08	44º25.73’	110º17.93’	7.4	0.7	12	124	4	0.14
201202	23:16:42.20	44º25.88’	110º18.58’	7.2	0.7	15	113	5	0.19
201202	23:16:59.48	44º26.26’	110º19.59’	2.4	0.5	12	119	6	0.12
201202	23:47:42.58	44º34.69’	110º44.52’	5.8	0.3	13	91	8	0.16
201203	05:29:13.01	44º25.87’	110º18.10’	7.7	0.6	12	122	5	0.16
201203	05:57:46.45	44º26.00’	110º19.35’	2.6	0.3	13	122	5	0.12
201203	08:18:23.62	44º26.12’	110º19.71’	2.6	0.7	9	116	6	0.09
201203	08:35:50.94	44º26.18’	110º19.51’	2.1	0.6	11	120	6	0.14
201203	11:12:31.85	44º26.01’	110º20.15’	2.2	0.3	9	116	6	0.12
201203	11:12:58.65	44º25.69’	110º17.97’	7.9	0.8	15	85	4	0.20
201203	11:18:53.45	44º25.84’	110º17.48’	8.7	0.6	8	132	4	0.15
201203	12:44:07.06	44º25.82’	110º17.45’	8.4	1.0	12	132	4	0.17
201203	15:50:49.77	44º25.68’	110º17.94’	7.6	0.9	14	123	4	0.11
201203	18:06:31.93	44º25.57’	110º17.80’	7.9	0.5	12	125	4	0.15
201203	18:32:28.42	44º35.82’	110º47.26’	5.5	0.3	16	109	5	0.20
201204	01:55:16.80	44º25.84’	110º17.89’	7.9	0.5	10	125	4	0.16
201204	02:10:24.99	44º26.11’	110º19.24’	2.6	0.2	7	124	6	0.20
201204	02:10:29.93	44º25.99’	110º17.98’	7.0	2.1W	26	124	5	0.21
201204	02:11:03.94	44º26.27’	110º18.42’	6.2	1.1	21	81	5	0.20
201204	04:03:17.60	44º04.75’	110º41.37’	6.8*	2.0W	21	131	23	0.13
201206	00:33:24.79	44º46.35’	110º41.70’	2.0	1.5W	16	128	5	0.13
201206	12:16:44.53	44º46.80’	111º06.12’	8.5	0.3	17	98	2	0.16
201206	16:55:27.80	44º25.72’	110º17.34’	7.6	2.4W	35	77	4	0.25
201206	16:56:17.23	44º25.88’	110º19.06’	5.8	1.9	15	104	5	0.16
201206	16:57:11.63	44º25.92’	110º19.02’	5.2	1.7	19	71	5	0.14
201206	16:57:22.31	44º25.95’	110º18.37’	6.0	2.6W	23	74	5	0.16
201206	16:57:43.45	44º25.85’	110º19.18’	4.8	1.7	13	109	5	0.20
201206	16:57:49.08	44º26.10’	110º20.10’	2.2	1.7	8	159	6	0.15
201206	16:58:14.20	44º26.25’	110º19.62’	2.1	2.4	12	117	6	0.15
201206	17:14:41.69	44º26.15’	110º19.86’	1.9	0.6	11	113	6	0.25

Table 2. Earthquakes in the Yellowstone Region: October 1–December 31, 2020

DATE	ORIGIN TIME	LATITUDE	LONGITUDE	DEPTH	MAG	NO	GAP	DMN	RMS
201206	17:54:56.34	44º25.12’	110º17.66’	8.6	1.0	25	113	3	0.16
201206	17:55:05.72	44º26.01’	110º19.98’	2.0	1.1	10	114	6	0.14
201206	19:23:16.28	44º47.65’	110º50.63’	4.6	0.2	14	111	1	0.16
201206	20:21:24.99	44º26.13’	110º35.85’	2.0	1.3W	21	64	1	0.18
201206	20:30:56.49	44º26.60’	110º19.71’	2.2	0.0	10	117	7	0.11
201206	20:31:00.03	44º25.79’	110º14.09’	0.4	-0.1	6	240	6	0.24
201206	20:31:05.28	44º26.43’	110º19.64’	2.3	1.0	11	118	6	0.09
201206	20:47:01.20	44º25.52’	110º17.88’	8.3	0.6	12	123	4	0.08
201207	03:48:46.80	44º25.68’	110º18.23’	7.1	0.9	12	118	4	0.14
201207	16:08:49.63	44º30.14’	110º34.23’	2.1	0.7	10	107	7	0.19
201207	16:08:56.51	44º29.35’	110º34.46’	6.5	1.6W	9	104	6	0.08
201207	16:11:15.04	44º29.92’	110º34.07’	4.4	0.5	16	76	7	0.17
201207	16:11:29.19	44º30.52’	110º34.23’	2.0	0.8	14	108	8	0.30
201207	16:12:09.93	44º31.38’	110º34.04’	6.3	0.5	10	81	10	0.22
201207	16:14:59.19	44º30.61’	110º34.10’	4.0	0.8	18	78	8	0.23
201207	16:16:36.44	44º30.32’	110º34.51’	4.0	1.0	13	75	8	0.14
201207	16:17:13.66	44º30.23’	110º34.28’	4.5	1.5W	14	76	8	0.11
201207	16:20:09.91	44º30.16’	110º34.46’	3.9	1.5W	15	75	7	0.19
201207	16:24:21.37	44º30.01’	110º34.58’	5.0	1.6W	12	86	7	0.15
201207	16:29:54.61	44º30.02’	110º34.79’	4.1	0.9	11	135	7	0.14
201207	16:36:08.92	44º30.26’	110º34.62’	4.3	0.8	14	75	8	0.13
201207	16:36:33.69	44º30.09’	110º35.25’	2.0	0.9	9	102	7	0.14
201207	16:52:38.28	44º30.07’	110º32.82’	11.9	0.1	9	143	8	0.24
201207	16:52:46.96	44º30.07’	110º34.41’	5.9	1.1	8	136	7	0.20
201207	16:53:50.79	44º30.22’	110º34.45’	4.8	0.8	20	75	7	0.21
201207	16:54:28.90	44º30.12’	110º33.73’	2.0	1.1	16	77	8	0.28
201207	17:04:25.18	44º30.40’	110º34.42’	3.3	0.6	17	63	8	0.10
201207	17:04:48.82	44º30.27’	110º35.06’	4.2	0.7	7	198	8	0.04
201207	17:11:02.42	44º30.48’	110º34.48’	3.9	1.4W	20	76	8	0.17
201207	17:20:50.87	44º30.39’	110º34.46’	4.4	1.2	12	107	8	0.07
201207	17:23:39.35	44º29.98’	110º35.45’	-2.2	1.0	10	135	7	0.18
201207	17:24:35.82	44º29.90’	110º34.94’	-1.3	--	11	103	7	0.08
201207	17:25:42.44	44º30.14’	110º34.66’	5.3	1.0	10	135	7	0.16
201207	17:26:59.39	44º30.55’	110º34.25’	2.0	0.6	11	116	8	0.16
201207	17:32:56.96	44º30.41’	110º34.48’	2.0	0.4	11	114	8	0.17
201207	17:36:38.27	44º30.33’	110º34.37’	4.6	1.5W	15	107	8	0.14
201207	18:09:59.81	44º30.25’	110º34.44’	2.0	1.6W	15	75	8	0.16
201207	18:18:09.21	44º30.45’	110º34.69’	5.6	1.8W	16	76	8	0.18
201207	18:20:08.88	44º30.12’	110º34.67’	5.6	0.8	13	75	7	0.09
201207	18:22:25.49	44º30.35’	110º34.34’	4.8	1.5W	17	77	8	0.15
201207	19:04:37.62	44º30.38’	110º34.40’	2.0*	0.7	16	76	12	0.14
201207	19:20:35.72	44º30.38’	110º34.55’	2.1	0.7	13	76	8	0.15
201208	01:05:33.13	44º30.38’	110º34.40’	4.4	1.1	19	64	8	0.14
201208	01:05:49.61	44º30.27’	110º34.49’	2.4*	0.7	14	53	12	0.10
201208	02:49:21.41	44º35.77’	110º53.99’	12.0	0.1	14	120	5	0.17

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DATE	ORIGIN TIME	LATITUDE	LONGITUDE	DEPTH	MAG	NO	GAP	DMN	RMS
201208	03:51:38.58	44º30.33’	110º34.37’	5.2	0.6	18	81	8	0.10
201208	03:56:25.40	44º30.08’	110º34.20’	2.1	0.9	18	52	7	0.24
201208	20:40:19.30	44º48.25’	111º12.46’	1.0	1.4	7	109	6	0.25
201208	23:32:40.78	44º46.49’	111º01.05’	7.1	2.6W	28	106	2	0.19
201209	00:01:01.91	44º46.58’	111º00.93’	3.8	0.6	19	141	2	0.16
201209	00:09:37.42	44º46.61’	111º00.96’	4.6	0.8	17	142	2	0.12
201209	00:30:36.99	44º46.32’	111º00.68’	4.4	1.4W	24	114	1	0.16
201209	14:10:59.22	44º25.42’	110º17.85’	6.8	1.1	21	124	4	0.21
201209	15:33:04.71	44º25.88’	110º19.62’	2.0	0.2	10	117	6	0.10
201209	15:40:55.31	44º25.26’	110º17.74’	8.1	0.7	13	125	3	0.14
201209	15:46:04.43	44º23.63’	110º24.14’	2.2	-0.1	6	157	9	0.24
201209	15:46:30.00	44º25.11’	110º17.75’	8.1	0.3	10	123	3	0.12
201209	16:27:15.01	44º25.32’	110º18.36’	7.3	0.4	12	112	4	0.16
201209	16:33:59.24	44º26.06’	110º18.55’	9.9	0.6	10	115	5	0.14
201209	16:34:15.11	44º25.29’	110º18.28’	7.8	0.9	11	113	4	0.16
201209	16:37:55.39	44º25.25’	110º17.87’	6.9	0.7	18	122	3	0.19
201209	16:38:28.75	44º25.25’	110º17.87’	8.1	1.1	14	122	3	0.16
201209	16:38:28.85	44º25.30’	110º18.23’	7.2	0.8	13	114	4	0.15
201209	16:38:46.54	44º26.17’	110º18.88’	2.7	-0.6	5	180	5	0.13
201209	16:39:02.19	44º25.82’	110º19.79’	2.7	0.1	9	116	6	0.11
201209	16:39:07.13	44º25.92’	110º19.60’	2.2	0.2	10	164	6	0.12
201209	16:39:30.44	44º25.68’	110º19.56’	2.1	-0.7	7	120	5	0.10
201209	16:39:56.70	44º25.90’	110º19.39’	2.1	-0.2	8	120	5	0.12
201209	17:31:30.49	44º25.12’	110º17.63’	8.1	0.8	9	126	3	0.14
201209	17:43:30.91	44º33.28’	111º08.97’	15.4	0.5	18	154	7	0.16
201209	18:29:43.67	44º25.82’	110º19.60’	2.8	0.2	8	117	5	0.09
201210	03:41:28.27	44º40.65’	110º02.42’	11.4	2.0	22	94	11	0.22
201210	13:46:53.48	44º46.62’	111º00.49’	4.6	0.9	20	117	2	0.15
201210	17:26:16.57	44º43.49’	111º09.15’	13.0	0.6	18	74	5	0.13
201210	20:28:14.62	44º33.75’	110º45.56’	9.3	0.6	13	99	9	0.16
201211	06:30:38.03	44º46.59’	111º00.82’	4.3	0.5	13	142	2	0.11
201211	16:31:19.98	44º44.02’	110º47.23’	3.6	0.1	14	142	8	0.21
201211	17:01:05.46	44º32.93’	109º59.67’	9.6	1.2	19	193	19	0.20
201211	20:40:11.48	44º32.83’	109º58.82’	10.9	0.9	14	100	10	0.14
201211	20:41:29.80	44º32.93’	109º59.38’	9.9	0.7	13	101	10	0.19
201211	22:27:28.97	44º28.69’	110º44.67’	4.2	1.1W	20	75	8	0.15
201213	03:06:38.36	44º35.03’	110º58.31’	10.1	0.8	21	82	9	0.14
201213	09:02:09.01	44º21.20’	110º16.72’	9.7	1.1	9	215	4	0.04
201213	10:51:10.12	44º25.59’	110º18.07’	7.4	0.4	10	120	4	0.14
201213	21:08:38.63	44º40.38’	110º02.71’	13.6	0.9	12	156	12	0.09
201213	21:50:46.14	44º48.54’	110º41.16’	6.2	0.7	16	78	10	0.22
201213	21:51:08.39	44º48.47’	110º41.24’	4.3	0.5	17	78	10	0.17
201214	04:01:20.48	44º43.31’	111º06.56’	11.4	0.7W	19	77	8	0.22
201214	04:38:31.58	44º46.53’	111º00.81’	4.4	0.6	16	140	2	0.13
201214	21:47:04.15	44º25.74’	110º18.05’	7.9	1.2	23	84	4	0.21

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DATE	ORIGIN TIME	LATITUDE	LONGITUDE	DEPTH	MAG	NO	GAP	DMN	RMS
201214	21:47:36.88	44º26.03’	110º18.60’	6.0	1.0	19	77	5	0.17
201214	22:05:25.67	44º26.33’	110º20.94’	1.9	1.5	10	108	7	0.15
201215	16:01:03.91	44º18.52’	110º28.80’	7.7	0.9	15	159	6	0.14
201215	18:16:02.67	44º18.79’	110º29.00’	8.1	1.0	15	154	7	0.12
201216	00:54:13.13	44º45.08’	111º08.90’	13.1	0.2	17	77	4	0.19
201217	01:08:11.53	44º40.01’	110º00.75’	13.3	0.9	12	172	10	0.20
201219	07:13:35.15	44º38.09’	110º20.93’	2.1	0.8	11	124	9	0.15
201219	10:25:58.31	44º46.49’	111º01.60’	5.5	0.9	18	105	2	0.11
201219	20:17:51.31	44º42.18’	111º00.32’	7.2	0.1	12	126	5	0.15
201219	20:18:39.53	44º42.23’	110º57.54’	4.6	-0.5	9	142	4	0.12
201221	09:09:21.22	44º40.72’	110º01.56’	10.1	1.2	9	173	10	0.19
201221	22:38:10.48	44º46.24’	111º03.52’	7.8	-0.1	14	130	4	0.16
201224	21:59:33.93	44º06.40’	110º42.89’	11.2	2.3W	23	108	3	0.19
201224	23:36:34.30	44º34.78’	110º44.76’	7.5	1.0	17	70	9	0.18
201225	00:06:11.32	44º34.61’	110º44.65’	6.5	0.6	10	140	9	0.11
201225	00:10:46.84	44º35.25’	110º44.43’	8.2	1.0	21	68	8	0.20
201225	00:11:45.63	44º37.01’	110º45.38’	2.6	1.0	10	242	7	0.08
201225	00:11:52.44	44º35.09’	110º44.76’	2.2	0.1	11	221	8	0.16
201225	00:12:30.00	44º35.03’	110º44.52’	7.6	2.0W	27	57	8	0.15
201225	00:19:11.50	44º34.46’	110º44.99’	4.8	-0.2	10	140	9	0.11
201225	00:19:33.05	44º34.90’	110º44.83’	5.4	-0.4	12	122	9	0.13
201225	00:19:46.78	44º34.98’	110º43.69’	3.8	0.6	14	76	7	0.17
201225	00:20:08.21	44º34.87’	110º44.51’	5.6	1.0	13	95	9	0.15
201225	00:20:50.28	44º34.34’	110º45.34’	4.0	0.5	12	160	9	0.14
201225	00:21:10.16	44º34.59’	110º45.02’	5.8	1.1	20	70	9	0.15
201225	00:23:35.39	44º34.69’	110º44.71’	5.9	0.6	19	69	9	0.14
201225	00:25:09.44	44º35.64’	110º44.19’	8.3	0.9W	17	66	8	0.16
201225	00:37:05.81	44º34.80’	110º44.67’	6.8	0.5	12	91	9	0.11
201225	00:37:48.25	44º35.25’	110º44.78’	4.7	0.0	10	88	8	0.09
201225	00:49:34.56	44º35.91’	110º44.77’	4.9	0.0	13	202	8	0.11
201225	00:50:09.46	44º35.40’	110º43.54’	4.2	0.7	18	79	7	0.18
201225	01:36:51.73	44º34.61’	110º44.63’	6.2	0.4	14	115	9	0.15
201225	01:36:53.57	44º34.98’	110º43.77’	0.3	1.0	9	116	7	0.15
201225	01:37:39.96	44º34.89’	110º44.68’	7.4	0.6	20	69	8	0.17
201225	01:48:41.66	44º34.38’	110º44.66’	5.1	0.6	13	144	9	0.11
201225	02:24:47.64	44º35.41’	110º44.43’	7.8	1.4W	23	67	8	0.19
201225	02:26:37.94	44º35.00’	110º44.57’	7.4	1.6W	21	69	8	0.18
201225	02:27:56.77	44º34.67’	110º44.68’	7.6	1.4W	23	69	9	0.17
201225	02:28:20.94	44º34.67’	110º44.52’	6.0	0.8	22	69	8	0.15
201225	02:34:32.17	44º34.71’	110º44.53’	7.4	0.9W	20	69	8	0.16
201225	02:54:27.84	44º34.87’	110º44.64’	7.9	1.8W	21	69	8	0.18
201225	02:56:12.01	44º36.84’	110º43.79’	2.5	0.4	11	176	9	0.10
201225	02:57:45.25	44º34.36’	110º44.91’	4.3	0.0	9	142	9	0.13
201225	02:58:19.11	44º34.54’	110º44.60’	7.1	0.7	15	79	9	0.14
201225	02:58:32.04	44º34.20’	110º44.67’	4.5	-0.4	8	192	10	0.15

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DATE	ORIGIN TIME	LATITUDE	LONGITUDE	DEPTH	MAG	NO	GAP	DMN	RMS
201225	04:05:24.18	44º34.19’	110º44.89’	2.7	0.5	14	95	9	0.10
201225	04:05:58.24	44º34.29’	110º44.65’	4.8	0.7	12	145	9	0.11
201225	04:07:37.39	44º34.83’	110º44.30’	5.6	0.9	17	74	8	0.17
201225	04:08:03.05	44º34.68’	110º44.79’	6.3	0.9	18	72	9	0.19
201225	05:59:54.99	44º34.55’	110º44.83’	6.7	0.3	12	140	9	0.14
201225	06:00:03.17	44º36.16’	110º45.64’	5.1	0.1	9	197	7	0.10
201225	06:00:20.90	44º36.77’	110º44.94’	2.3	-0.1	10	180	8	0.06
201225	06:00:26.75	44º36.69’	110º45.07’	2.4	-0.1	7	183	8	0.07
201225	07:33:50.33	44º34.69’	110º44.15’	6.0	0.4	13	143	8	0.14
201225	11:48:48.66	44º34.36’	110º44.95’	5.7	0.5	12	73	9	0.13
201225	12:29:34.20	44º34.32’	110º44.95’	6.4	0.7	12	95	9	0.13
201225	12:30:25.65	44º34.65’	110º46.56’	7.0	--	6	126	7	0.13
201225	12:30:31.27	44º34.01’	110º46.23’	5.5	0.2	6	136	8	0.06
201225	12:30:38.84	44º33.95’	110º45.07’	2.3	0.3	8	146	10	0.15
201225	12:30:46.98	44º34.25’	110º45.20’	2.2	0.3	10	96	9	0.21
201225	12:36:11.60	44º34.56’	110º44.35’	7.8	0.4	12	144	8	0.13
201225	18:36:16.49	44º48.63’	111º04.61’	10.7	0.4	14	158	3	0.11
201225	20:48:18.01	44º45.58’	111º05.16’	11.6	0.0	14	139	4	0.15
201226	02:06:07.42	44º51.11’	111º29.55’	7.6	0.5	11	135	5	0.10
201227	07:53:38.17	44º22.29’	110º18.63’	8.3	0.8	12	184	3	0.10
201228	19:36:35.83	44º26.58’	111º13.25’	12.4*	1.2W	18	101	31	0.21
201229	09:35:00.56	44º44.85’	111º06.76’	11.2	0.2	11	91	5	0.16
201230	01:46:35.73	44º45.58’	111º00.93’	11.0	1.4W	17	136	1	0.18
201230	22:37:52.07	44º26.45’	111º12.54’	18.1	0.9	11	137	20	0.11
201231	02:12:17.38	44º36.82’	110º26.36’	5.9	1.1	18	105	7	0.11
201231	07:21:04.89	44º19.99’	110º30.98’	5.9	1.3	14	117	7	0.08
201231	07:31:08.25	44º20.11’	110º31.17’	5.7	0.9	14	114	6	0.11
201231	07:48:44.19	44º19.90’	110º30.93’	5.3	1.0	17	119	7	0.12

number of earthquakes = 478
* indicates poor depth control
W indicates Wood-Anderson data used for magnitude calculation

Table 3
UNIVERSITY OF UTAH YELLOWSTONE SEISMIC NETWORK
Operating Seismograph Stations
December 31, 2020

SEED Station	Location	SEED Channel	No. of Channels	Network Code	Latitude	Longitude	Elevation (meters)	Sensor	Digitizer	Telemetry	Sponsor
B206*	Canyon206bwy2008, Yellowstone, WY	EH[ZEN]	3	PB	44° 46.66′	110° 30.70′	2400	IESE-S2	Q330	Digital	PBO
B207*	Madisn207bwy2007, Yellowstone, WY	EH[ZEN]	3	PB	44° 37.14′	110° 50.91′	2182	IESE-S2	Q330	Digital	PBO
B208*	Lakejn208bwy2008, Yellowstone, WY	EH[ZEN]	3	PB	44° 33.61′	110° 24.09′	2406	IESE-S2	Q330	Digital	PBO
B944*	Grantt944bwy2008, Yellowstone, WY	EH[ZEN]	3	PB	44° 23.38′	110° 32.63′	2365	IESE-S2	Q330	Digital	PBO
B945*	Panthr944swy2008, Yellowstone, WY	EH[ZEN]	3	PB	44° 53.64′	110° 44.65′	2249	IESE-S2	Q330	Digital	PBO
B950*	Norris950bwy2013, Yellowstone, WY	EH[ZEN]	3	PB	44° 42.77′	110° 40.71′	2328	IESE-S2	Q330	Digital	PBO
FLWY*	Flagg Ranch, WY	BH[ZEN]	3	IW	44° 04.96′	110° 41.96′	2078	3ESP	RT-130	Digital	ANSS
IMW*	Indian Meadows, WY	BH[ZEN]	3	IW	43° 53.58′	110° 56.58′	2670	3ESP	RT-130	Digital	ANSS
LKWY*	Lake, WY	BH[ZEN]	3	US	44° 33.91′	110° 24.00′	2424	STS-2	Q330	Digital	USGS
LOHW*	National Elk Refuge, WY	BH[ZEN]	3	IW	43° 36.76′	110° 36.30′	2245	3ESP	RT-130	Digital	ANSS
MCID	Moose Creek, ID	EHZ	1	WY	44° 11.45′	111° 11.03′	2137	L4C	PSN	Analog	USGS
MOOW*	Moose Ponds, WY	BH[ZEN]	3	IW	43° 44.92′	110° 44.69′	2128	3ESP	RT-130	Digital	ANSS
QLMT*	Earthquake Lake, MT	EHZ	1	MB	44° 49.84′	111° 25.80′	2064	L4C	-	Analog	MBMT
REDW*	Red-Top Meadows, WY	BH[ZEN]	3	IW	43° 21.74′	110° 51.18′	2322	3ESP	RT-130	Digital	ANSS
SNOW*	Snow King Mountain, WY	BH[ZEN]	3	IW	43° 27.75′	110° 45.31′	2390	3ESP	RT-130	Digital	ANSS
TPAW*	Teton Pass, WY	BH[ZEN]	3	IW	43° 29.41′	110° 57.04′	2512	3ESP	RT-130	Digital	ANSS
TPMT*	Teepe Creek, MT	EHZ	1	MB	44° 43.79′	111° 39.94′	2518	L4C	-	Analog	MBMT
YDC	Denny Creek, MT	EHZ	1	WY	44° 42.51′	111° 14.60′	2025	L4C	PSN	Analog	USGS
YDD	Grant Junction, Yellowstone, WY	HH[ZEN]	3	WY	44° 24.00′	110° 34.80′	2400	STS-2	Q330	Digital	NSF
		EN[ZEN]	3					Episensor			
YEE	East Entrance (YNP), WY	HH[ZEN]	3	WY	44° 29.12′	109° 53.81′	2270	Compact	Centaur	Digital	USGS
YFT	Old Faithful (YNP), WY	HH[ZEN]	3	WY	44° 27.05′	110° 50.24′	2292	Compact	Centaur	Digital	USGS
		EN[ZEN]	3					Titan			
YGC	Grayling Creek, MT	EHZ	1	WY	44° 47.77′	111° 06.45′	2075	L4C	PSN	Analog	USGS
YHB	Horse Butte, MT	EHZ	1	WY	44° 45.07′	111° 11.71′	2157	L4C	PSN	Analog	USGS
		HH[ZEN]	3					Compact	Centaur	Digital	
		EN[ZEN]	3					Titan			
YHH	Holmes Hill (YNP), WY	EHZ	1	WY	44° 47.30′	110° 51.03′	2717	S13	PSN	Analog	USGS
		HH[ZEN]	3					Trillium 120	Q330	Digital	
		EN[ZEN]	3					Titan			

SEED Station	Location	SEED Channel	No. of Channels	Network Code	Latitude	Longitude	Elevation (meters)	Sensor	Digitizer	Telemetry	Sponsor
YHL	Hebgen Lake, MT	HH[ZEN]	3	WY	44° 51.05′	111° 10.98′	2691	Trillium 120	Q330	Digital	USGS
		EN[ZEN]	3					Titan			
YHR	Hawk's Rest, WY	HH[ZEN]	3	WY	44° 06.36′	110° 04.90′	2976	Trillium 120	Q330	Digital	USGS
YJC	Joseph′s Coat (YNP), WY	EH[ZEN]	3	WY	44° 45.33′	110° 20.95′	2684	S13	PSN	Analog	USGS
YLA	Lake Butte (YNP), WY	EHZ	1	WY	44° 30.76′	110° 16.12′	2580	L4C	PSN	Analog	USGS
YLT	Little Thumb Creek (YNP), WY	EHZ	1	WY	44° 26.25′	110° 35.28′	2439	L4C	PSN	Analog	USGS
YMC	Maple Creek (YNP), WY	EH[ZEN]	3	WY	44° 45.53′	111° 00.41′	2073	S13	PSN	Analog	USGS
YML	Mary Lake (YNP), WY	EH[ZEN]	3	WY	44° 36.20′	110° 38.63′	2653	S13	PSN	Analog	USGS
YMP	Mirror Plateau (YNP), WY	EHZ	1	WY	44° 44.38′	110° 09.40′	2774	S13	PSN	Analog	USGS
		HH[ZEN]	3					Trillium 120	Q330	Digital	
		EN[ZEN]	3					Titan			
YMR	Madison River (YNP), WY	HH[ZEN]	3	WY	44° 40.12′	110° 57.90′	2149	Trillium 120	Q330	Digital	USGS
		EN[ZEN]	3					Titan			
YMS	Mount Sheridan (YNP), WY	EHZ	1	WY	44° 15.84′	110° 31.67′	3106	L4C	PSN	Analog	USGS
YMV	Mammoth Vault (YNP), WY	EHZ	1	WY	44° 58.42′	110° 41.33′	1829	L4C	PSN	Analog	USGS
YNE	Northeast Entrance (YNP), WY	HH[ZEN]	3	WY	45° 00.46′	110° 00.48′	2343	Compact	Centaur	Digital	USGS
YNM	Norris Museum (YNP), WY	HH[ZEN]	3	WY	44° 43.59′	110° 42.22′	2311	Trillium 240	Q330	Digital	USGS
YNR	Norris Junction (YNP), WY	HH[ZEN]	3	WY	44° 42.93′	110° 40.75′	2336	Trillium 120	Q330	Digital	USGS
		EN[ZEN]	3					Titan			
YPC	Pelican Cone (YNP), WY	EHZ	1	WY	44° 38.88′	110° 11.55′	2932	L4C	PSN	Analog	USGS
YPK	Parker Peak (YNP), WY	EH[ZEN]	3	WY	44° 43.91′	109° 55.32′	2897	L4C	PSN	Analog	USGS
YPM	Purple Mountain (YNP), WY	EHZ	1	WY	44° 39.43′	110° 52.12′	2582	L4C	PSN	Analog	USGS
YPP	Pitchstone Plateau (YNP), WY	EHZ	1	WY	44° 16.26′	110° 48.27′	2707	S13	PSN	Analog	USGS
		HH[ZEN]	3					Trillium 120	Q330	Digital	
		EN[ZEN]	3					Titan			
YSB	Soda Butte (YNP), WY	EHZ	1	WY	44° 53.04′	110° 09.06′	2072	L4C	PSN	Analog	USGS
YTP	The Promontory (YNP), WY	EHZ	1	WY	44° 23.51′	110° 17.10′	2384	L4	PSN	Analog	USGS
		HH[ZEN]	3					Trillium 120	Q330	Digital	
		EN[ZEN]	3					Titan			
YUF	Upper Falls (YNP), WY	HH[ZEN]	3	WY	44° 42.76′	110° 30.71′	2394	40T	ANSS-130	Digital	USGS
		EN[ZEN]	3					Titan			
YWB	West Boundary (YNP), WY	EHZ	1	WY	44° 36.35′	111° 06.05′	2310	L4C	PSN	Analog	USGS

* Station operated by another agency and recorded as part of the Yellowstone Seismic Network
Network Statistics: 150 data channels from 46 stations were being recorded at the end of this report period

EXPLANATION OF TABLE

UURSN Code: Station code formerly used in routine processing. Owing to software limitations, the station code may not be the same code used by the original operator. For multi-component stations, the vertical, east-west, and north-south high gain (low gain) components are identified by an appended Z(V), E(L), and N(M), respectively, in UUSS phase files.

Location: General description of station location. YNP = Yellowstone National Park.

SEED Station: The SEED (Standard for the Exchange of Earthquake Data) station code used by the original operator.

SEED Channel: The SEED format uses three letters to name seismic channels. See <<http://www.iris.edu/manuals/SEEDManual_V2.4.pdf>> for information about the SEED channel naming convention. Relevant sections are reproduced below. In the SEED convention, each letter describes one aspect of the instrumentation and its digitization. The first letter specifies the general sampling rate and the response band of the instrument. Band codes used in this table include:

Band Code	Band Type	Sample Rate	Corner Period
E	Extremely short period	≥ 80 Hertz	< 10 seconds
H	High broadband	≥ 80 Hertz	≥ 10 seconds
B	Broadband	≥ 10 to < 80 Hertz	≥10 seconds
S	Short period	≥ 10 to < 80 Hertz	< 10 seconds

The second letter specifies the family to which the sensor belongs. Sensor families used in this table are:

Instrument Code	Description
H	High gain seismometer
L	Low gain seismometer
N	Accelerometer

The third letter specifies the physical configuration of the members of a multiple axis instrument package. Channel orientations used in this table are:

Z E N Traditional (Vertical, East-West, North-South)

Number of Channels: Total number of waveform channels recorded.

Network Code: The FDSN (Federation of Digital Seismographic Networks) registered network code. See <<http://www.iris.edu/dms/nodes/dmc/services/network_codes>> for information about registered seismograph network codes. Network codes referenced in this table:

Network Code	Network name; Network operator or responsible organization
IE	Idaho National Laboratory Seismic Network
IU	IRIS/USGS Network; USGS Albuquerque Seismological Laboratory
IW	Intermountain West Network, U.S. Geological Survey

MB	Montana Regional Seismic Network; Montana Bureau of Mines and Geology
PB	Plate Boundary Observatory
UU	University of Utah Regional Network; University of Utah
US	US National Network; USGS National Earthquake Information Center
WY	Yellowstone Wyoming Seismic Network; University of Utah

Latitude, Longitude: Sensor location in degrees and decimal minutes; North latitude, West longitude.

Elevation: Sensor altitude in meters above sea level.

Sensor	**Description**
L4, L4C	Mark Products L4 or L4C short-period seismometer
S13, 18300	Geotech S13 or 18300 short-period seismometer
Ranger	Kinemetrics Ranger short-period seismometer
40T	Guralp CMG-40T broadband seismometer
3T	Guralp CMG-3T broadband seismometer
3ESP	Guralp CMG-3ESP broadband seismometer
STS-2	Streckheisen STS-2 broadband seismometer
FBA23	Kinemetrics FBA-23 accelerometer
EpiSensor	Kinemetrics EpiSensor accelerometer
Applied Mems	Applied Mems accelerometer
PA-23	Geotech PA-23 accelerometer
Compact	Nanometrics Compact broadband seismometer
Trillium 120	Nanometrics Trillium 120 broadband seismometer
Trillium 240	Nanometrics Trillium 240 broadband seismometer
Titan	Nanometrics Titan accelerometer
Observer	Refraction Technology (REF TEK) Model 151 Observer broadband seismometer
IESE-S2	Institute of Earth Science and Engineering S-2 model borehole seismometer

Digitizer	**Description**
K2	Kinemetrics Altus Series K2 (19-bit resolution field digitizer)
Etna	Kinemetrics Altus Series Etna (18-bit resolution field digitizer)
72A-07	Refraction Technology (REF TEK) model 72A-07 (24-bit field digitizer)
72A-08	Refraction Technology (REF TEK) model 72A-08 (24-bit field digitizer)
ANSS-130	Refraction Technology (REF TEK) model 130-ANSS/02 (24-bit resolution field digitizer)
RT-130	Refraction Technology (REF TEK) model RT-130 (24-bit resolution field digitizer)
Q330	Quanterra, Inc Q330 digitizer (24-bit resolution field digitizer)
SMART-24	Geotech SMART-24 digitizer (24-bit resolution field digitizer)
PSN	PSN-ADC-SERIAL version III (16-bit resolution field digitizer)
Basalt	Kinemetrics Basalt (24-bit resolution field digitizer)
Taurus	Nanometrics Taurus (24-bit resolution field digitizer)
Centaur	Nanometrics Centaur (24-bit resolution field digitizer)

Telemetry	Description
Analog	Data transmission is analog along part of the transmission pathway
Digital	Data are converted to digital form at the station site
None	On-site recording system

Sponsor (or Operator for stations marked by * in preceding columns)

USGS	U.S. Geological Survey
Utah	State of Utah
ANSS	Advanced National Seismic System
INL	Idaho National Laboratory
MBMT	Montana Bureau of Mines and Geology
PBO	Plate Boundary Observatory
NSF	National Science Foundation

Network Changes During October 1–December 31, 2020

None