EARTHQUAKE ACTIVITY IN THE YELLOWSTONE REGION

Preliminary Epicenters

October 1 – December 31, 2018

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 4 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).

EARTHQUAKE ACTIVITY IN THE YELLOWSTONE REGION
October 1 – December 31, 2018

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During the three-month period October 1 through December 31, 2018, the University of Utah Seismograph Stations (UUSS) located 315 earthquakes within the Yellowstone region (Figure 1). The total includes 1 earthquake in the magnitude 3 range, and 25 earthquakes in the magnitude 2 range. The largest event to occur during this period was a magnitude 3.1 earthquake on December 20th. 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 2018). 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	December 20	09:36 MST	18.7 mi WNW of West Yellowstone, MT

Notable Swarm Seismicity

During the report period, there were three 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 23 earthquakes ($-0.2 \leq M \leq 2.4$) occurred about 9.1 mi N of West Yellowstone, MT on November 4th.
B. A swarm of 22 earthquakes ($-0.1 \leq M \leq 2.3$) occurred about 5.7 mi NW of Norris Junction, YNP from November 22nd – 24th.
C. A swarm of 53 earthquakes ($0.0 \leq M \leq 2.8$) occurred about 4.8 mi WNW of Lake, YNP on December 31st.

These swarms are labeled in Figure 1.

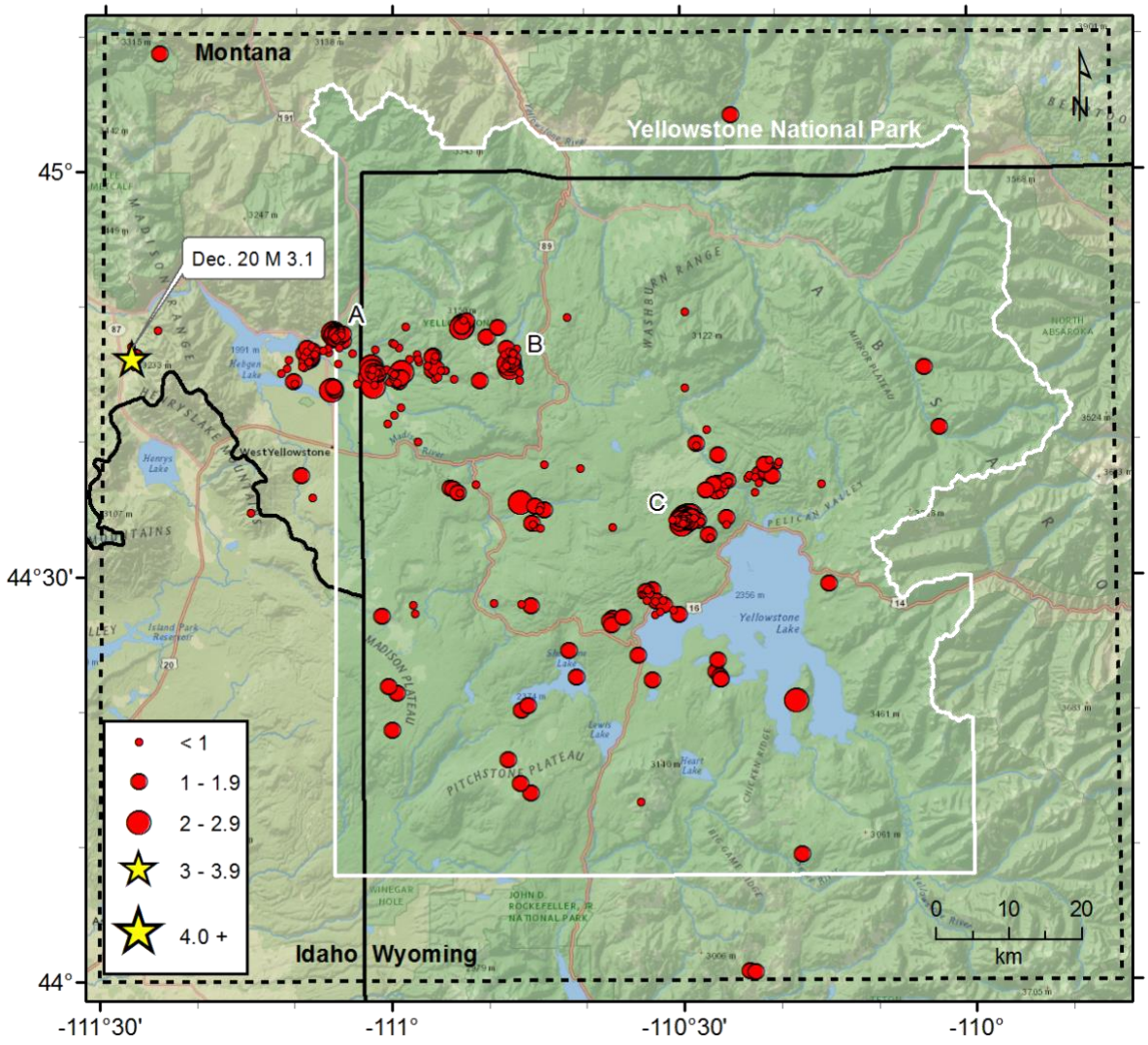

Figure 1. Epicenters of earthquakes located by the University of Utah Seismograph Stations, October 1, 2018, through December 31, 2018. Earthquake swarms (labeled A–C) are discussed in the text.

Table 1

EARTHQUAKES FELT IN THE YELLOWSTONE REGION
January 1, 2018 to December 31, 2018

Date	Time†	Felt Information‡	Latitude	Longitude	Magnitude§
February 25	08:10 MST 15:10 UTC	Yellowstone. Felt (III) at West Yellowstone, MT.	44º 45.24′	110º 59.70′	M_L 3.0
May 06	08:54 MDT 14:54 UTC	Yellowstone. Felt (II) at Yellowstone National Park.	44º 45.12′	110º 57.84′	M_L 3.1
May 25	02:04 MDT 08:04 UTC	Yellowstone. Felt (III) at West Yellowstone, MT.	44º 45.72′	111º 07.62′	M_L 2.6

† 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, 2018

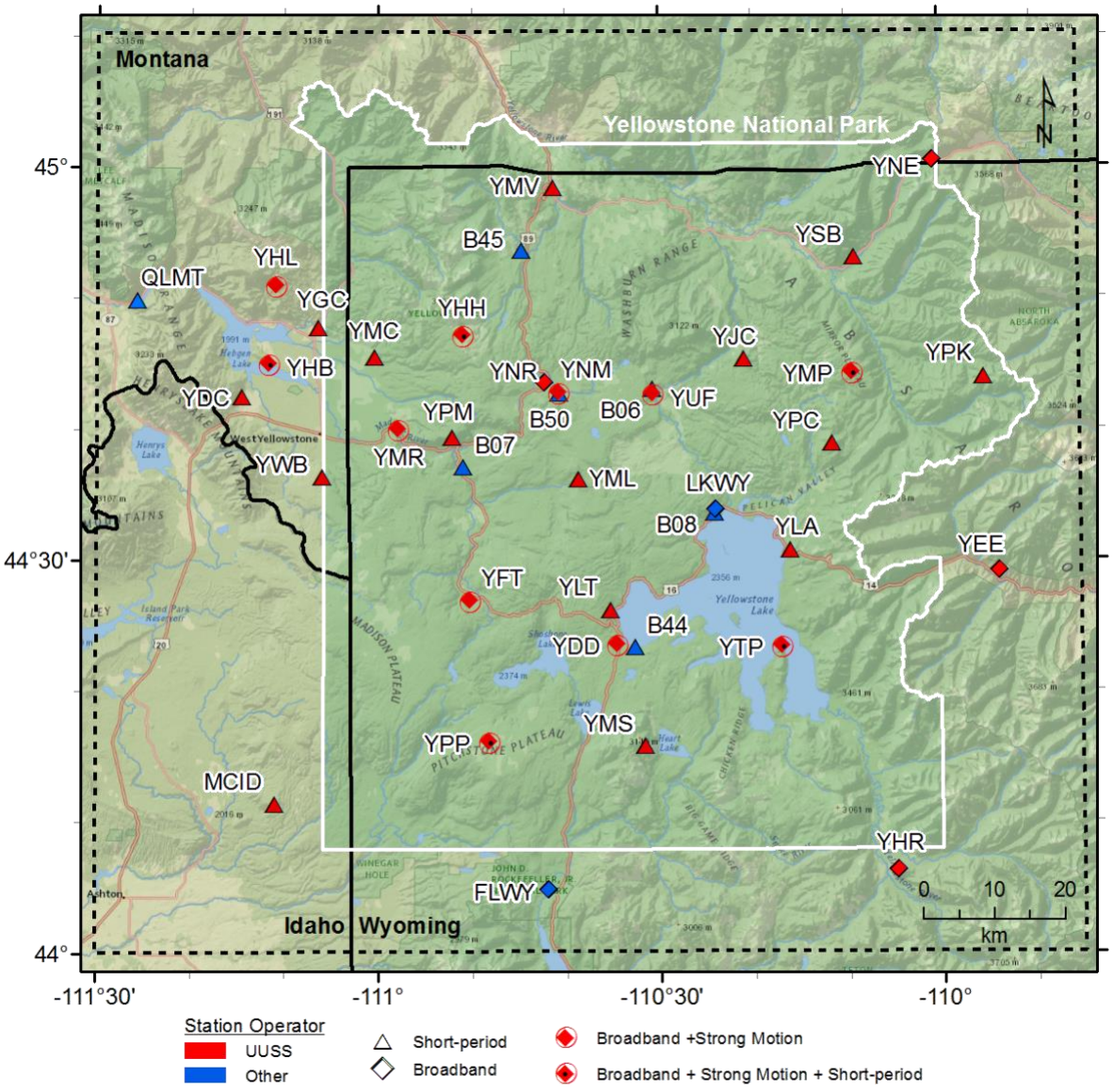

Figure 2. Seismograph stations of the Yellowstone Seismic Network as of December 31, 2018.

Table 2. Earthquakes in the Yellowstone Region: October 1–December 31, 2018

DATE	ORIGIN TIME	LATITUDE	LONGITUDE	DEPTH	MAG	NO	GAP	DMN	RMS
181001	17:27:32.68	44º00.84’	110º23.31’	16.3	1.3	8	221	26	0.11
181001	19:02:13.28	44º00.76’	110º22.66’	8.9*	1.2	11	204	27	0.17
181002	12:49:01.32	44º48.51’	110º49.04’	4.8	1.4W	19	111	3	0.17
181002	22:31:23.76	44º46.15’	111º08.18’	6.1	0.6	11	91	4	0.15
181003	00:09:01.34	44º13.39’	110º34.42’	11.1	0.9	13	122	6	0.17
181003	09:14:29.59	44º33.79’	110º45.14’	4.1	0.8	6	148	10	0.12
181003	09:15:29.44	44º34.04’	110º45.57’	6.6	1.3W	21	87	9	0.19
181004	08:47:10.89	44º45.21’	110º59.06’	9.8	2.7W	39	47	2	0.18
181004	12:12:32.37	44º44.79’	110º59.10’	6.7	1.2W	20	98	2	0.14
181005	05:50:51.85	44º48.68’	110º52.71’	7.1	2.3W	28	49	3	0.17
181006	11:35:16.97	44º45.37’	110º54.46’	8.2	0.9W	16	104	6	0.14
181006	12:31:43.31	44º14.10’	110º45.70’	3.7	1.7	11	124	5	0.21
181006	15:00:42.36	44º45.36’	110º54.62’	8.9	0.9W	16	103	6	0.18
181007	04:44:33.41	44º21.51’	110º59.52’	7.6*	1.5W	11	123	16	0.10
181007	06:41:34.87	44º44.62’	110º50.92’	5.5	1.1W	12	104	5	0.12
181007	12:15:04.80	44º48.63’	110º52.80’	5.0	1.2W	12	128	3	0.09
181007	13:13:33.40	44º37.78’	110º21.25’	6.0	1.5W	12	72	8	0.08
181008	11:38:54.31	44º37.13’	110º25.26’	2.0	1.5W	14	107	6	0.15
181008	17:29:31.51	44º46.18’	111º10.73’	6.0	0.3	8	142	2	0.08
181009	22:03:58.02	44º40.97’	110º03.27’	12.8	1.2	7	159	10	0.15
181009	23:47:11.12	44º45.39’	110º54.95’	8.4	0.2	16	118	6	0.24
181010	16:56:08.32	44º45.44’	110º04.73’	12.2	1.5	8	104	6	0.14
181010	20:52:04.41	44º16.56’	110º48.04’	5.7	1.7W	18	82	1	0.30
181011	17:30:41.85	44º46.58’	110º57.43’	8.9	0.9W	10	178	4	0.17
181011	18:07:05.41	44º46.04’	110º57.24’	8.2	0.6	12	136	4	0.14
181013	12:56:17.28	44º45.32’	111º01.93’	6.1	1.4W	22	123	2	0.17
181013	13:52:54.80	44º44.86’	111º02.30’	6.8	2.6W	26	98	3	0.17
181013	14:40:09.80	44º35.03’	110º44.28’	5.5	1.2	11	136	8	0.14
181013	14:42:56.00	44º35.33’	110º45.27’	5.6	1.3W	17	92	8	0.17
181013	14:53:58.75	44º45.04’	111º02.19’	5.6	0.0	15	123	3	0.18
181013	15:04:19.98	44º45.26’	111º01.99’	5.9	0.9W	16	122	2	0.17
181013	17:03:13.75	44º49.05’	110º52.32’	5.0	1.1W	14	130	4	0.11
181014	11:01:12.80	44º45.09’	111º02.28’	7.1	0.9W	14	123	3	0.09
181015	10:12:26.31	44º28.13’	110º49.45’	4.5	0.9	9	128	2	0.06
181015	19:45:11.63	44º45.31’	111º02.03’	6.5	2.0W	24	102	2	0.19
181015	20:47:56.78	44º45.44’	111º02.05’	5.5	0.7W	14	124	2	0.13
181016	08:37:58.56	44º45.63’	111º02.17’	9.4	2.2W	28	68	2	0.19
181016	09:09:06.97	44º26.79’	110º37.55’	5.5	1.2W	12	108	3	0.09
181016	09:53:52.78	44º27.00’	110º37.22’	4.8	1.3W	14	67	3	0.15
181016	22:14:51.72	44º45.45’	111º02.06’	6.3	0.0	14	124	2	0.21
181017	21:36:00.90	44º45.20’	110º46.77’	4.1	0.9	17	106	7	0.19
181019	02:05:53.70	44º45.31’	111º02.07’	6.9	0.3	15	126	2	0.14
181019	04:37:48.99	44º36.29’	110º22.42’	5.3	0.5	14	134	5	0.20
181019	16:06:49.39	44º36.95’	110º51.33’	7.5	0.3	11	247	1	0.14
181020	00:43:06.95	44º46.44’	110º55.77’	8.6	1.8W	18	113	6	0.15

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DATE	ORIGIN TIME	LATITUDE	LONGITUDE	DEPTH	MAG	NO	GAP	DMN	RMS
181020	00:57:14.24	44º46.37’	110º55.83’	8.7	1.5W	17	113	6	0.15
181020	01:46:42.23	44º46.41’	110º55.57’	8.4	0.4	11	112	6	0.10
181020	04:32:43.11	44º46.13’	110º55.70’	6.5	0.6	12	111	6	0.12
181021	13:00:37.55	44º45.08’	111º02.32’	6.2	0.1	13	123	3	0.13
181021	17:20:31.20	44º44.85’	111º01.85’	5.7	0.4	12	123	2	0.16
181021	21:07:06.94	44º20.83’	110º18.30’	10.1	2.7W	28	82	5	0.22
181022	11:04:49.21	44º45.71’	110º56.31’	9.6	0.3	14	108	5	0.16
181022	11:04:49.72	44º44.72’	110º55.53’	5.1	0.3	9	127	7	0.10
181022	22:20:43.56	44º48.52’	110º52.83’	4.9	2.1W	24	117	3	0.18
181023	01:23:10.90	44º48.65’	110º58.63’	5.7	0.3	11	177	6	0.16
181024	10:56:39.66	44º44.02’	110º29.64’	2.0	0.9W	13	155	2	0.20
181024	22:56:57.73	44º22.65’	110º41.01’	2.9	1.6	7	157	10	0.10
181025	03:39:47.28	44º45.25’	111º00.09’	7.9	0.2	15	106	1	0.21
181025	03:42:02.86	44º45.44’	111º00.56’	8.3	0.6W	13	108	0	0.14
181025	05:34:12.54	44º49.13’	110º52.60’	4.9	0.7	14	132	4	0.15
181025	14:59:46.58	44º45.08’	111º02.14’	5.5	0.8W	17	115	2	0.14
181025	15:06:01.97	44º44.93’	111º01.83’	5.9	0.4	12	114	2	0.10
181026	10:29:30.18	44º22.42’	110º33.15’	4.7	1.4W	12	165	8	0.15
181028	12:11:41.81	44º42.09’	110º59.85’	9.0	0.4	14	72	4	0.13
181030	11:38:51.86	44º39.73’	110º28.44’	4.1	0.6	12	176	6	0.22
181030	11:46:23.82	44º48.27’	111º24.44’	8.9	0.7W	11	164	3	0.08
181030	12:31:09.76	44º45.21’	111º01.63’	5.8	0.3	18	116	2	0.17
181031	00:35:45.67	44º35.63’	110º46.71’	8.9	2.0W	24	77	6	0.20
181102	04:27:10.82	44º44.74’	110º53.57’	8.3	0.3	11	97	6	0.11
181102	08:09:37.14	44º21.99’	111º00.36’	4.7*	1.0	8	161	17	0.16
181102	14:04:07.29	44º35.03’	110º44.76’	7.3	0.7	11	149	9	0.14
181102	20:46:21.22	44º36.45’	110º27.57’	2.5	1.0	10	152	7	0.12
181103	01:49:54.23	44º37.56’	111º09.49’	13.6	1.1W	22	104	5	0.19
181103	10:10:56.84	44º49.27’	110º41.86’	3.3	0.4	16	151	9	0.15
181103	12:24:20.34	44º40.13’	110º57.38’	5.0	0.2	8	111	1	0.19
181104	15:49:13.78	44º47.07’	111º05.54’	4.2	0.5	11	128	2	0.27
181104	15:54:01.20	44º47.60’	111º06.16’	11.6	1.9W	12	134	0	0.11
181104	16:07:19.57	44º48.12’	111º05.82’	10.4	1.5W	19	120	1	0.15
181104	16:09:01.27	44º48.36’	111º05.34’	10.3	0.8W	15	151	2	0.17
181104	16:09:14.83	44º47.98’	111º05.34’	7.5	0.2	15	145	1	0.18
181104	16:12:31.61	44º48.03’	111º05.09’	10.6	1.0W	13	199	2	0.15
181104	16:13:40.09	44º47.86’	111º06.06’	10.8	--	15	116	0	0.13
181104	16:13:41.77	44º47.58’	111º05.11’	8.9	1.8W	14	145	2	0.14
181104	16:14:48.35	44º47.67’	111º05.90’	9.3	1.6W	20	114	1	0.16
181104	16:20:02.26	44º47.86’	111º05.52’	10.3	1.2W	22	118	1	0.16
181104	16:20:27.68	44º47.71’	111º05.86’	9.4	-0.2	11	139	1	0.15
181104	16:32:44.24	44º47.97’	111º05.84’	10.5	0.9W	13	142	8	0.12
181104	16:45:02.15	44º46.98’	111º06.70’	8.8	0.4	13	93	2	0.14
181104	16:46:18.96	44º47.94’	111º05.71’	10.2	1.2W	19	119	1	0.18
181104	16:46:27.83	44º47.97’	111º05.79’	9.6	1.7W	19	119	1	0.16

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DATE	ORIGIN TIME	LATITUDE	LONGITUDE	DEPTH	MAG	NO	GAP	DMN	RMS
181104	16:46:42.20	44º48.00’	111º05.88’	10.5	2.0W	23	118	1	0.18
181104	16:58:19.01	44º48.02’	111º06.24’	11.0	1.8W	19	117	1	0.15
181104	16:58:39.57	44º48.12’	111º05.64’	10.0	0.7	13	146	1	0.15
181104	17:11:48.06	44º48.09’	111º06.17’	11.0	2.4W	20	118	1	0.15
181104	18:03:51.72	44º47.98’	111º05.82’	10.0	1.1W	18	143	1	0.14
181104	18:45:57.00	44º46.74’	111º06.58’	7.9	0.9W	10	136	8	0.14
181104	20:31:46.34	44º48.02’	111º05.68’	10.8	0.4	15	144	1	0.10
181104	20:32:14.65	44º48.21’	111º05.37’	9.9	0.2	14	149	2	0.12
181105	13:27:22.01	44º35.99’	111º08.25’	7.1	0.6	8	205	3	0.11
181105	13:51:36.96	44º24.60’	110º41.76’	3.7	1.1	9	169	9	0.10
181106	22:18:43.78	44º46.82’	111º08.85’	11.0	0.3	13	80	4	0.12
181107	23:57:40.68	44º46.21’	110º57.35’	9.8	0.0	14	139	4	0.13
181108	03:13:06.18	44º46.88’	111º07.93’	11.2	0.2	17	96	3	0.18
181108	06:20:07.15	44º46.58’	111º08.11’	9.8	0.0	17	96	3	0.20
181108	09:47:04.29	44º46.67’	111º09.18’	10.8	1.6W	21	77	4	0.16
181108	09:49:03.59	44º46.96’	111º08.85’	12.0	1.3W	15	85	4	0.12
181108	09:53:49.10	44º46.65’	111º08.90’	11.0	0.9W	15	75	4	0.16
181108	13:40:02.68	44º46.79’	111º08.34’	11.0	1.3W	16	110	6	0.17
181109	06:04:45.83	44º37.40’	110º22.44’	4.6	0.2	13	138	7	0.16
181109	06:05:04.31	44º37.54’	110º23.03’	4.2	0.4	11	181	7	0.11
181109	06:10:21.73	44º38.32’	110º21.38’	2.6	0.9	11	85	9	0.10
181109	06:12:36.96	44º37.64’	110º21.88’	2.2	1.8	15	76	7	0.18
181109	06:15:32.05	44º37.36’	110º23.14’	3.6	0.6	12	131	6	0.08
181109	15:48:08.32	44º48.62’	110º52.80’	4.7	1.0W	20	128	3	0.17
181109	18:52:49.53	44º38.14’	110º40.49’	6.6	0.4	18	87	4	0.21
181110	10:12:47.64	44º46.32’	111º08.56’	10.4	1.2W	22	65	4	0.20
181111	18:56:03.36	44º22.44’	110º26.04’	8.3	1.2W	19	78	9	0.18
181111	20:25:22.11	44º22.98’	110º26.59’	8.0	1.4	10	191	8	0.08
181112	00:38:38.47	44º23.84’	110º26.37’	2.6	1.2	11	173	8	0.09
181112	03:26:03.83	44º28.01’	110º57.88’	4.0	0.6W	9	227	10	0.15
181112	03:37:40.44	44º27.37’	110º57.64’	4.3	0.7	10	119	10	0.08
181112	06:02:02.53	44º34.01’	110º45.46’	5.4	0.4W	14	99	9	0.15
181112	08:07:49.62	44º22.44’	110º26.06’	8.8	1.3W	12	134	9	0.10
181112	10:25:27.61	44º45.11’	111º01.47’	6.6	1.6W	19	102	2	0.16
181112	12:34:32.59	44º46.96’	111º01.75’	8.1	0.3	13	145	3	0.10
181112	12:48:30.64	44º45.24’	111º01.66’	6.6	0.7	13	118	2	0.11
181112	13:01:07.04	44º39.05’	110º26.24’	4.9	1.4W	14	132	9	0.10
181113	11:17:56.79	44º45.16’	111º01.51’	6.5	0.4	17	120	2	0.15
181113	12:16:15.57	44º45.64’	111º09.40’	8.8	0.2	15	108	3	0.18
181113	12:17:28.44	44º46.04’	111º08.69’	9.7	0.6	20	61	4	0.20
181113	12:29:47.46	44º22.68’	110º26.18’	11.5	1.3W	16	108	9	0.18
181113	13:22:43.28	44º46.35’	111º08.44’	11.5	0.7W	18	97	4	0.19
181113	14:14:31.26	44º44.76’	110º59.93’	8.3	0.8W	13	101	2	0.17
181113	16:51:18.52	44º45.98’	111º08.85’	10.3	1.1W	16	98	4	0.16
181113	19:03:54.90	44º45.17’	110º59.66’	9.5	0.4	17	122	1	0.18

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DATE	ORIGIN TIME	LATITUDE	LONGITUDE	DEPTH	MAG	NO	GAP	DMN	RMS
181113	19:03:55.02	44º44.57’	111º00.28’	9.0	0.8W	12	150	2	0.17
181113	19:04:27.65	44º45.12’	110º59.84’	8.5	-0.1	10	143	1	0.18
181113	19:04:37.89	44º44.96’	110º59.89’	8.9	0.4	13	100	1	0.16
181114	02:59:30.49	44º40.94’	110º27.42’	4.6	0.3	11	110	5	0.14
181115	03:21:22.54	44º39.87’	110º28.52’	2.2	1.3W	16	107	6	0.13
181118	09:44:01.23	44º32.92’	110º27.09’	2.1	0.9	13	79	4	0.14
181118	17:09:29.94	44º45.52’	111º10.94’	8.2	0.3	15	82	1	0.18
181118	17:10:16.15	44º45.14’	111º11.54’	7.9	-0.2	8	122	0	0.16
181118	22:16:05.60	44º33.11’	110º27.23’	2.0	1.0	14	83	4	0.11
181119	08:07:48.43	44º09.45’	110º17.83’	8.6*	1.1	18	106	18	0.16
181120	03:20:23.27	44º27.23’	110º30.34’	2.0	1.1	8	169	7	0.22
181120	09:03:53.57	44º44.50’	111º10.24’	11.9	1.8W	18	59	2	0.15
181120	16:09:13.64	44º49.71’	110º29.56’	3.3*	0.5	18	131	12	0.19
181120	18:47:45.53	44º45.26’	111º01.23’	5.7	0.6W	13	155	1	0.18
181120	21:06:30.71	44º38.43’	110º44.21’	6.0	0.3	10	138	8	0.12
181121	11:14:38.79	44º27.08’	110º36.19’	2.8	1.0	5	153	2	0.13
181122	00:13:09.57	44º47.02’	110º48.20’	4.6	1.6W	21	95	4	0.19
181122	00:35:49.96	44º46.64’	111º04.12’	10.6	0.5	16	132	4	0.15
181122	01:58:44.82	44º46.56’	110º48.33’	2.4	0.7	14	88	4	0.13
181122	02:38:02.87	44º46.76’	110º47.83’	1.9	0.6	15	94	4	0.15
181122	06:53:35.31	44º46.22’	110º58.20’	7.0	0.1	10	139	10	0.08
181123	09:04:55.88	44º26.50’	110º37.36’	5.8	1.1	12	142	3	0.15
181123	09:48:15.76	44º33.73’	110º37.19’	2.1	0.1	11	103	5	0.10
181123	10:23:02.89	44º46.66’	110º47.44’	5.3	-0.1	11	202	5	0.16
181123	10:23:09.47	44º46.17’	110º47.61’	3.9	0.5	14	188	5	0.13
181123	12:41:47.65	44º45.72’	110º48.13’	4.0	--	11	84	5	0.14
181123	12:43:20.81	44º45.71’	110º47.67’	2.1	0.7	12	88	5	0.13
181123	13:17:36.89	44º18.71’	110º59.95’	6.3*	1.4	7	132	20	0.17
181123	14:18:41.50	44º45.86’	110º47.91’	4.8	2.2W	27	82	5	0.17
181123	15:07:55.26	44º45.53’	110º48.48’	4.9	0.3	11	84	5	0.17
181123	15:08:24.48	44º46.05’	110º48.04’	4.9	0.7	15	86	5	0.17
181123	16:25:09.80	44º45.61’	110º47.81’	4.9	2.2W	26	82	5	0.19
181123	16:27:50.86	44º47.00’	110º47.06’	4.9	0.4	12	184	5	0.16
181123	16:28:20.30	44º46.13’	110º47.38’	3.6	0.9	16	90	5	0.17
181123	16:31:40.41	44º46.01’	110º47.19’	2.0	0.8	13	110	6	0.16
181123	16:31:48.42	44º45.78’	110º47.62’	4.7	1.9W	23	87	5	0.21
181123	16:35:03.72	44º45.95’	110º47.92’	4.5	0.7	18	88	5	0.23
181123	17:02:43.62	44º46.69’	110º47.45’	5.0	0.4	10	181	5	0.09
181123	21:55:30.80	44º46.10’	110º47.94’	4.5	0.7	13	86	5	0.14
181124	03:12:28.11	44º46.25’	110º47.42’	4.1	1.6W	17	171	5	0.14
181124	03:12:44.02	44º20.17’	110º46.64’	2.0*	1.4	11	95	14	0.28
181124	09:33:25.58	44º45.91’	110º47.85’	5.0	0.8W	17	87	5	0.19
181124	13:29:29.60	44º45.81’	110º47.84’	4.8	0.6	15	86	5	0.15
181124	14:00:58.95	44º45.84’	110º48.28’	4.5	0.5	17	84	5	0.17
181124	18:56:07.46	44º45.17’	111º01.45’	7.0	1.3W	23	103	2	0.15

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DATE	ORIGIN TIME	LATITUDE	LONGITUDE	DEPTH	MAG	NO	GAP	DMN	RMS
181124	21:40:26.80	44º27.95’	110º45.68’	3.9	1.1	13	138	6	0.23
181124	23:28:53.59	44º44.42’	111º03.64’	11.7	0.1	16	129	5	0.15
181125	11:46:07.41	44º47.04’	110º59.31’	7.6	0.5	17	151	3	0.17
181126	20:11:07.27	44º47.12’	111º08.36’	11.3	0.3	9	151	3	0.10
181126	20:12:51.73	44º46.42’	111º09.19’	10.2	0.6	14	70	4	0.17
181127	11:37:18.01	44º28.84’	110º33.43’	4.1	0.7	13	127	5	0.10
181127	11:43:06.67	44º28.82’	110º33.73’	2.1	0.8W	17	74	5	0.13
181127	11:43:16.38	44º28.94’	110º33.77’	4.5	1.2W	18	73	5	0.14
181127	11:43:37.71	44º28.33’	110º32.02’	2.5	0.2	11	139	6	0.13
181127	11:47:05.59	44º29.06’	110º33.06’	2.1	1.5W	14	71	6	0.14
181130	06:30:11.78	44º47.44’	111º00.02’	7.6	0.9	15	125	4	0.16
181130	10:37:30.67	44º38.33’	110º20.06’	6.9	0.7	12	89	10	0.11
181130	10:37:38.69	44º38.66’	110º20.87’	2.3	0.4	8	117	10	0.10
181130	10:42:05.86	44º38.52’	110º19.88’	7.4	0.7	12	86	10	0.10
181201	21:22:40.82	44º28.10’	110º46.66’	1.8	0.7	8	192	5	0.09
181202	23:14:34.41	44º47.37’	110º59.83’	8.7	0.1	12	155	3	0.11
181203	01:24:09.58	44º46.18’	111º08.45’	12.0	1.3W	21	62	4	0.17
181203	01:25:39.64	44º46.28’	111º08.40’	11.2	1.0W	22	64	4	0.17
181203	08:26:33.83	44º46.31’	111º08.00’	12.2	0.4	18	91	3	0.17
181203	08:55:00.35	44º46.41’	111º07.95’	11.3	0.0	14	92	3	0.16
181203	08:55:06.74	44º44.41’	111º10.16’	2.9	0.0	8	173	8	0.09
181203	08:55:31.56	44º46.85’	111º07.24’	10.9	-0.7	9	153	9	0.16
181203	08:55:36.44	44º45.60’	111º09.22’	8.0	0.4	12	102	4	0.15
181204	05:56:38.56	44º14.79’	110º46.76’	13.9	1.0	11	93	19	0.21
181204	20:18:21.76	44º44.64’	110º46.82’	2.1	0.2	12	159	7	0.14
181205	21:15:05.27	44º35.32’	110º44.70’	5.8	0.8	17	87	8	0.21
181207	04:47:23.41	44º28.30’	110º33.69’	5.4	0.8	14	119	4	0.15
181208	07:19:20.21	44º47.84’	110º50.25’	5.0	1.7W	21	111	1	0.19
181210	05:46:19.10	45º04.21’	110º24.69’	9.5*	1.3	22	76	29	0.22
181210	09:30:24.02	44º38.20’	110º21.19’	3.6	1.7W	13	83	9	0.08
181210	14:28:08.80	44º37.49’	110º20.59’	6.6	1.0	13	101	8	0.14
181210	16:13:06.75	44º27.16’	111º01.09’	8.4	1.2W	21	134	15	0.20
181211	01:30:33.30	45º08.73’	111º24.31’	10.5*	1.2	14	89	35	0.14
181211	13:45:34.24	44º29.52’	110º14.83’	2.3	1.2	8	182	3	0.09
181214	06:54:50.47	44º36.66’	110º26.31’	5.3	2.3W	20	104	6	0.14
181214	07:03:17.79	44º36.84’	110º25.54’	3.9	0.8	8	185	6	0.10
181214	07:56:29.37	44º37.07’	110º25.14’	2.1	0.2	15	189	6	0.18
181214	10:20:35.64	44º27.99’	110º31.89’	1.9	1.4	14	75	6	0.20
181214	10:21:25.97	44º27.58’	110º30.98’	0.1	0.8	10	157	6	0.07
181214	10:51:44.55	44º28.77’	110º33.62’	3.9	0.8	12	129	5	0.11
181214	11:48:53.80	44º28.23’	110º32.77’	2.1	--	9	111	5	0.09
181214	11:49:28.70	44º28.28’	110º32.75’	2.4	1.5	7	111	5	0.07
181214	11:49:43.36	44º28.71’	110º34.22’	2.1	0.9	9	76	5	0.15
181214	11:59:41.44	44º28.77’	110º33.95’	5.1	0.8	13	141	5	0.12
181216	00:03:13.73	44º36.88’	110º26.68’	3.5*	1.3W	11	103	12	0.20

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DATE	ORIGIN TIME	LATITUDE	LONGITUDE	DEPTH	MAG	NO	GAP	DMN	RMS
181217	05:05:16.44	44º42.67’	110º59.13’	7.3	0.7	13	124	5	0.08
181218	10:40:23.31	44º28.93’	110º33.39’	3.7	1.9	16	60	6	0.14
181218	10:41:02.47	44º29.00’	110º33.66’	3.8	0.8	18	59	6	0.13
181218	12:34:20.16	44º29.11’	110º33.63’	3.7	0.5	13	79	6	0.15
181218	19:06:21.40	44º43.91’	111º06.30’	12.4	2.3W	26	71	7	0.18
181219	01:33:50.60	44º34.81’	111º14.69’	13.5	0.9	14	160	12	0.13
181220	03:17:55.32	44º44.14’	111º06.11’	13.6	1.4W	13	73	7	0.11
181220	03:17:55.41	44º43.94’	111º05.97’	12.8	1.4W	19	71	7	0.14
181220	07:07:17.11	44º44.89’	110º55.24’	7.4	0.3	13	101	7	0.14
181220	16:29:45.41	44º46.34’	111º26.76’	14.3	1.5	20	94	7	0.12
181220	16:36:03.88	44º46.23’	111º27.00’	13.4	3.1W	27	95	7	0.14
181221	01:33:26.05	44º45.61’	111º26.88’	14.1	0.6	8	99	8	0.05
181221	03:23:14.92	44º20.53’	110º46.00’	2.7*	1.3	10	191	13	0.14
181222	06:51:22.32	44º45.51’	110º55.50’	7.7	1.2W	17	106	6	0.16
181222	12:20:58.73	44º47.09’	111º27.12’	16.3	--	8	135	5	0.08
181222	12:21:02.51	44º46.57’	111º26.51’	14.7	0.7	16	128	6	0.14
181222	13:42:18.59	44º45.85’	111º05.58’	10.4	-0.7	9	124	7	0.18
181223	09:51:37.60	44º45.36’	110º55.88’	9.3	1.6W	29	100	6	0.17
181223	21:18:48.24	44º36.32’	110º53.04’	4.0	0.5	9	151	3	0.08
181224	01:04:48.56	44º36.66’	110º53.96’	5.1	1.8W	22	95	4	0.18
181224	06:20:16.51	44º36.56’	110º53.70’	6.0	1.6W	22	73	4	0.21
181224	06:20:41.43	44º36.33’	110º53.21’	4.9	0.9	17	105	3	0.16
181224	16:38:34.80	44º44.49’	110º59.53’	6.8	0.4	14	137	2	0.15
181224	18:14:29.38	44º44.55’	110º59.33’	7.4	1.6W	27	84	2	0.16
181224	18:23:27.41	44º44.67’	110º59.61’	7.3	1.4W	21	80	2	0.15
181224	23:31:51.97	44º44.20’	111º01.99’	8.1	2.2W	26	107	3	0.14
181224	23:50:30.64	44º44.33’	111º01.84’	7.0	0.3	10	124	3	0.13
181225	10:29:55.84	44º27.47’	110º32.34’	3.6	0.3	10	99	5	0.12
181225	10:33:31.32	44º27.26’	110º32.83’	4.3	0.9	15	71	4	0.12
181226	04:26:53.60	44º24.22’	110º34.59’	5.1	1.2W	8	152	4	0.07
181227	03:56:43.20	44º36.84’	110º15.55’	7.2	0.4	6	130	7	0.04
181231	07:10:25.38	44º34.48’	110º29.40’	5.0	1.6W	14	108	7	0.13
181231	07:11:55.78	44º34.48’	110º28.88’	6.3	1.7W	14	112	7	0.13
181231	07:19:05.63	44º34.39’	110º29.33’	6.3	1.7W	12	107	7	0.11
181231	07:23:06.31	44º34.42’	110º29.65’	4.9	1.8W	20	72	8	0.14
181231	07:25:45.31	44º34.31’	110º30.05’	4.8	2.7W	24	51	8	0.13
181231	07:26:53.58	44º34.10’	110º29.14’	6.0	1.7W	10	104	7	0.12
181231	07:27:22.83	44º34.28’	110º30.24’	2.7	1.7	12	100	8	0.17
181231	07:28:45.25	44º34.37’	110º30.32’	2.0	1.5W	14	100	8	0.19
181231	07:28:58.01	44º34.27’	110º29.68’	3.7	2.2W	19	70	8	0.15
181231	07:29:17.39	44º34.23’	110º29.36’	5.7	1.4	14	105	7	0.20
181231	07:29:45.67	44º33.93’	110º30.03’	2.1	2.0W	16	97	8	0.19
181231	07:30:08.92	44º34.37’	110º29.64’	5.0	2.0W	18	71	7	0.18
181231	07:30:52.47	44º34.03’	110º30.29’	2.2	1.9W	12	96	8	0.11
181231	07:31:21.12	44º34.47’	110º29.72’	5.5	2.3W	24	72	8	0.15

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181231	07:36:29.53	44º34.33’	110º30.19’	2.5	1.1	14	101	8	0.17
181231	07:36:55.31	44º34.05’	110º30.25’	2.0	0.5	14	97	8	0.25
181231	07:37:19.31	44º34.16’	110º27.99’	3.6*	0.9	11	210	15	0.15
181231	07:37:42.03	44º34.37’	110º29.99’	2.1	0.9	14	103	8	0.23
181231	07:37:53.37	44º34.57’	110º29.63’	2.0	0.9	13	108	8	0.30
181231	07:38:13.84	44º34.01’	110º29.91’	2.7	0.1	10	112	8	0.13
181231	07:39:59.28	44º34.25’	110º30.60’	3.6	0.4	10	125	9	0.23
181231	07:40:46.22	44º41.43’	111º00.52’	4.9	0.6	10	209	4	0.14
181231	07:40:49.17	44º36.16’	110º26.08’	2.1	-0.1	6	184	5	0.10
181231	07:41:46.45	44º33.93’	110º29.67’	2.5	0.3	9	99	7	0.13
181231	07:42:28.60	44º34.09’	110º29.77’	2.5	0.3	11	100	8	0.21
181231	07:42:39.56	44º34.11’	110º29.52’	2.1	1.1	10	102	7	0.18
181231	07:48:16.57	44º34.34’	110º28.82’	5.8	1.6W	14	110	6	0.14
181231	08:49:49.68	44º34.36’	110º29.76’	2.3	0.7	15	104	8	0.17
181231	09:07:48.09	44º33.89’	110º25.41’	2.0*	0.9	5	300	18	0.17
181231	09:08:26.45	44º34.28’	110º30.99’	2.3*	0.4	6	281	11	0.10
181231	09:28:36.45	44º33.71’	110º44.68’	2.4	0.8	9	152	9	0.08
181231	09:56:16.06	44º34.26’	110º29.72’	2.5	1.3W	10	103	8	0.15
181231	09:57:56.14	44º34.36’	110º29.20’	4.7	2.4W	21	77	7	0.13
181231	10:00:04.17	44º34.56’	110º29.40’	4.9	2.0W	20	110	7	0.11
181231	10:08:03.49	44º34.53’	110º29.11’	5.5	2.0W	19	111	7	0.12
181231	10:14:23.45	44º34.31’	110º29.28’	3.5	1.6W	18	106	7	0.19
181231	10:14:47.99	44º34.14’	110º29.65’	2.2	0.9	9	101	7	0.24
181231	10:15:15.74	44º34.27’	110º29.75’	2.4	1.1	13	103	8	0.19
181231	10:16:10.25	44º34.02’	110º29.68’	2.8	0.2	9	99	7	0.14
181231	10:16:23.90	44º34.35’	110º29.11’	5.1	1.5W	25	108	7	0.13
181231	10:16:48.92	44º34.43’	110º25.34’	16.0	1.7	8	155	2	0.10
181231	10:21:08.83	44º34.38’	110º29.18’	4.9	2.6	20	73	7	0.14
181231	10:21:22.88	44º34.11’	110º29.59’	2.5	2.8W	13	90	7	0.09
181231	10:31:34.61	44º34.06’	110º29.15’	3.3	1.2	6	159	7	0.14
181231	10:31:44.27	44º34.36’	110º29.70’	2.7	0.8	13	104	8	0.18
181231	10:32:19.18	44º34.29’	110º29.92’	2.5	1.4	12	102	8	0.22
181231	10:48:46.10	44º34.34’	110º29.32’	2.7	0.3	6	161	7	0.16
181231	10:48:57.41	44º37.00’	110º21.99’	2.2	0.1	6	249	7	0.16
181231	10:49:03.01	44º34.51’	110º28.90’	6.2	1.5W	14	112	7	0.16
181231	10:49:49.95	44º34.17’	110º29.75’	2.3	0.3	8	165	8	0.21
181231	10:50:17.55	44º34.34’	110º28.79’	5.0	1.5W	23	110	6	0.15
181231	10:50:35.16	44º34.38’	110º28.70’	4.8	0.0	11	112	6	0.23
181231	10:57:45.14	44º34.31’	110º29.67’	2.8	0.9	11	119	7	0.20
181231	11:02:24.95	44º34.21’	110º28.35’	6.4	1.3W	10	111	6	0.12
181231	11:03:04.24	44º34.42’	110º29.28’	2.0	1.4W	11	108	7	0.23
181231	11:06:46.19	44º34.23’	110º29.64’	2.2	0.2	10	119	7	0.17
181231	11:07:18.38	44º34.24’	110º29.78’	2.2	0.2	11	102	8	0.21
181231	11:08:43.93	44º34.22’	110º29.66’	2.2	0.4	9	126	7	0.19
181231	11:16:18.34	44º34.47’	110º29.06’	4.7	1.3W	22	110	7	0.14

number of earthquakes = 315
* 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, 2018

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	Taurus	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	ANSS-130	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	ANSS-130	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, 2018

None