EARTHQUAKE ACTIVITY IN THE YELLOWSTONE REGION

Preliminary Epicenters

July 1 – September 30, 2020

Prepared by the University of Utah Seismograph Stations and funded by
the U.S. Geological Survey (Cooperative Agreement No. G16AC00029)

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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.

- 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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July 1 – September 30, 2020

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During the three-month period July 1 through September 30, 2020, the University of Utah Seismograph Stations (UUSS) located 334 earthquakes within the Yellowstone region (Figure 1). The total includes 35 earthquakes in the magnitude 2 range. The largest event to occur during this period was a magnitude 2.8 earthquake on September 10. There were two 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

None

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 15 earthquakes ($-0.3 \leq M \leq 0.9$) occurred about 10.7 mi NE of Old Faithful, YNP from August 18th – 19th.
B. A swarm of 10 earthquakes ($-0.2 \leq M \leq 1.5$) occurred about 5.2 mi NNW of West Yellowstone, MT from September 1st – 5th.
C. A swarm of 123 earthquakes ($-0.1 \leq M \leq 2.8$) occurred about 6.3 mi SE of West Thumb Geyser Basin, YNP from September 10th – 16th.

These swarms are labeled in Figure 1.

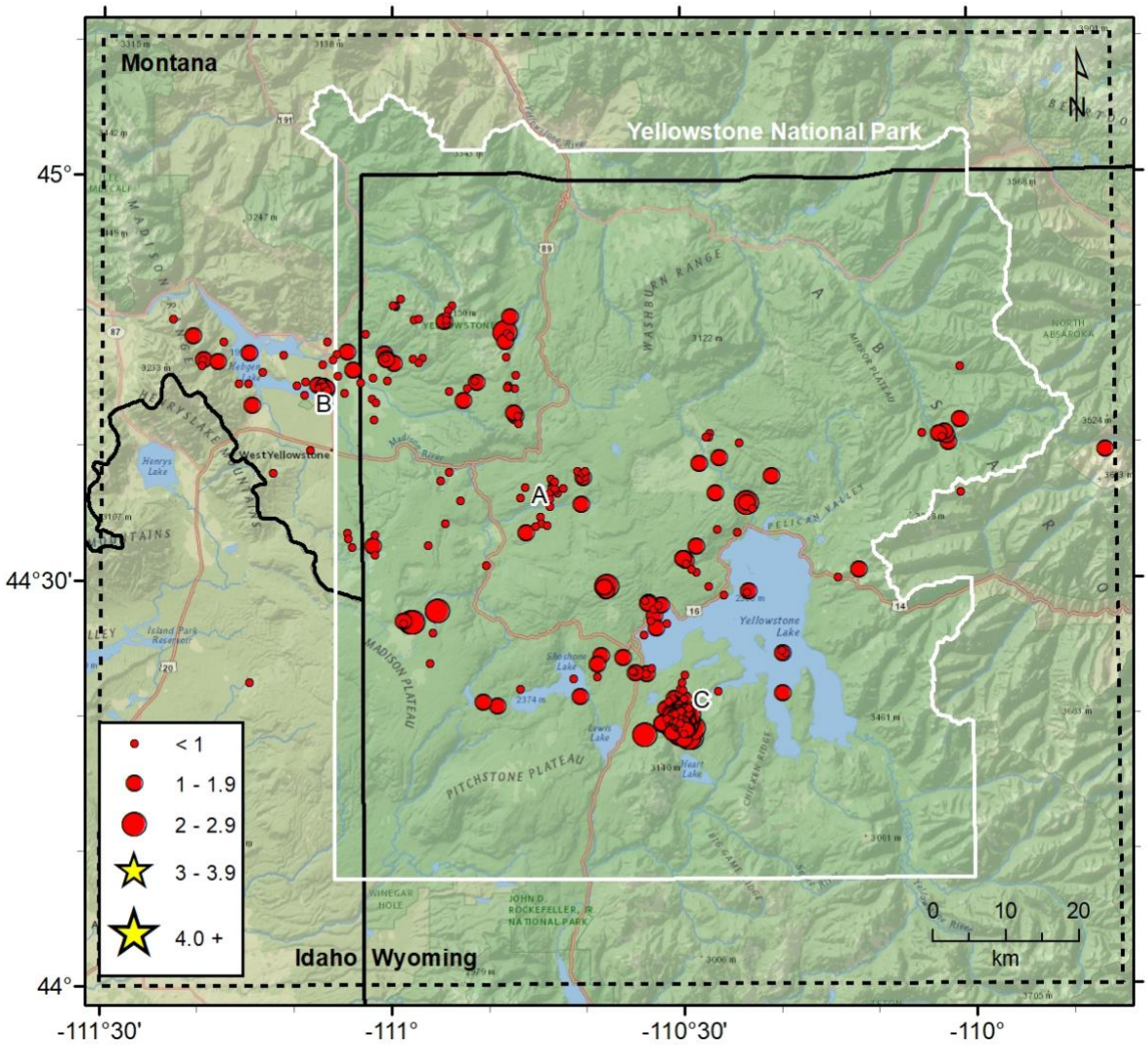

Figure 1. Epicenters of earthquakes located by the University of Utah Seismograph Stations, July 1, 2020, through September 30, 2020. Earthquake swarms (labeled A–C) are discussed in the text.

Table 1

EARTHQUAKES FELT IN THE YELLOWSTONE REGION
January 1, 2020 to September 30, 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
September 30, 2020

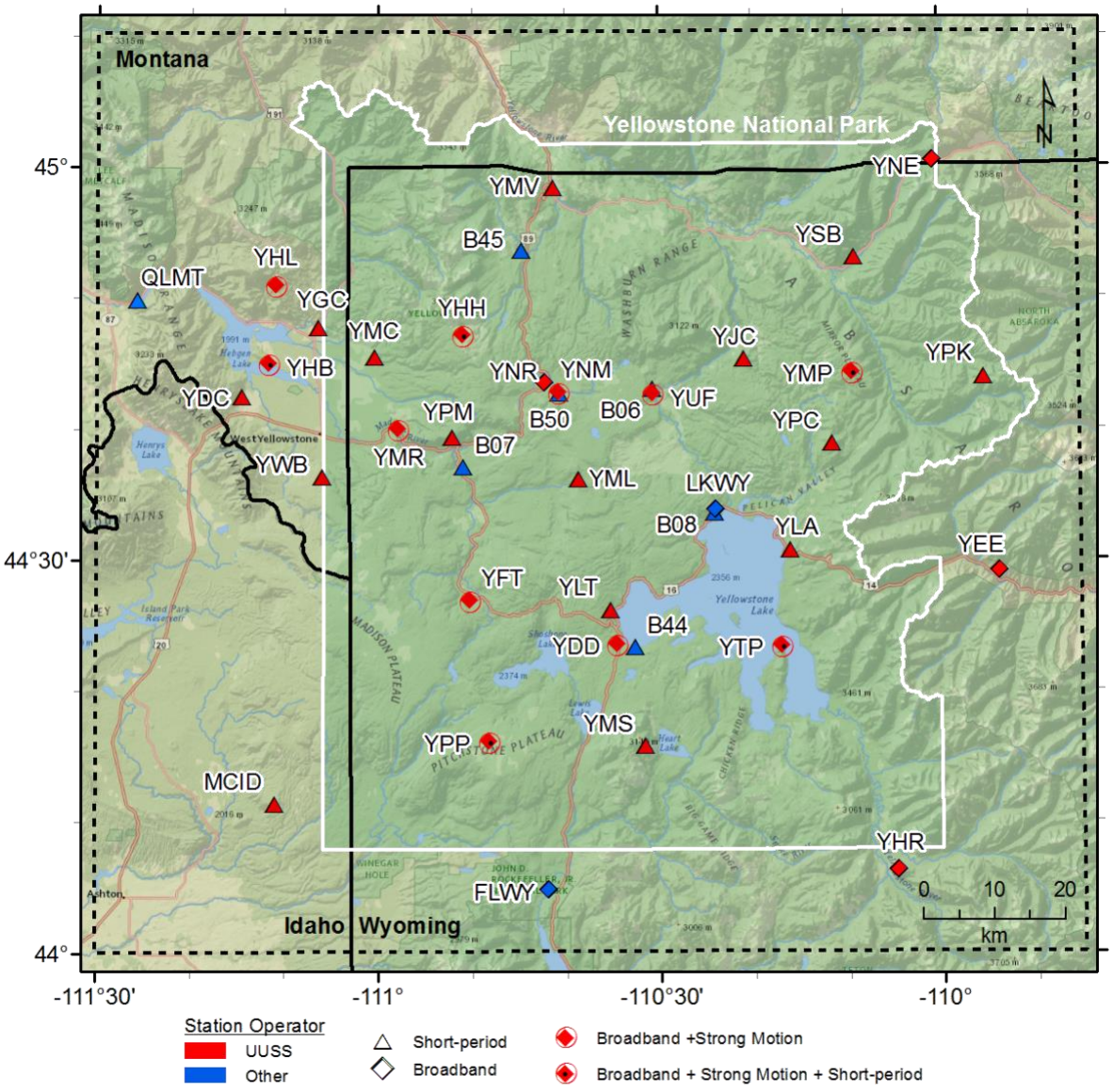

Figure 2. Seismograph stations of the Yellowstone Seismic Network as of September 30, 2020.

Table 2. Earthquakes in the Yellowstone Region: July 1–September 30, 2020

DATE	ORIGIN TIME	LATITUDE	LONGITUDE	DEPTH	MAG	NO	GAP	DMN	RMS
200702	02:25:54.58	44º43.01’	111º14.52’	7.5	1.1W	15	168	1	0.19
200702	05:53:57.37	44º32.58’	111º01.93’	15.8	1.4W	20	125	9	0.14
200702	05:59:53.09	44º33.44’	111º01.78’	14.8	0.5	10	250	8	0.16
200703	08:08:17.61	44º43.35’	110º52.58’	4.3	1.4W	19	74	7	0.14
200703	20:47:31.24	44º33.54’	110º46.10’	8.9	0.9	7	143	9	0.13
200704	05:56:03.45	44º40.07’	110º02.38’	13.0	1.7W	15	132	12	0.16
200704	12:50:06.62	44º46.02’	111º07.21’	13.2	0.7W	10	78	3	0.12
200704	19:18:21.41	44º45.57’	111º04.03’	7.2	1.0W	14	121	5	0.12
200706	09:57:30.43	44º43.94’	111º04.90’	10.0	0.4W	14	78	7	0.15
200706	12:23:47.21	44º46.36’	111º06.09’	11.1	0.3	11	92	3	0.13
200707	01:21:34.74	44º28.16’	110º32.21’	3.8	1.5W	14	102	5	0.07
200709	07:16:32.66	44º49.55’	110º47.72’	3.8	1.0W	18	115	6	0.14
200710	09:25:49.20	44º48.14’	110º47.78’	5.2	0.2	12	114	5	0.13
200711	18:07:44.43	44º46.78’	111º00.78’	9.2	1.2W	19	144	2	0.11
200711	18:38:51.32	44º46.43’	111º00.60’	8.8	1.1W	15	114	2	0.15
200711	21:40:08.12	44º46.37’	111º00.58’	8.2	1.0W	17	114	2	0.11
200711	23:16:38.58	44º46.48’	111º00.70’	8.0	0.6	15	114	2	0.12
200715	08:46:07.73	44º23.34’	110º35.24’	1.8	0.6	12	114	1	0.12
200715	08:52:16.13	44º23.19’	110º34.91’	2.0	1.3W	15	74	1	0.08
200715	09:07:28.29	44º23.29’	110º34.95’	1.9	0.7	8	122	1	0.07
200715	17:53:52.91	44º24.79’	110º19.76’	5.2	0.2	7	139	4	0.07
200716	10:31:11.01	44º44.60’	111º14.92’	12.3	0.1	13	208	4	0.15
200716	22:04:08.20	44º46.44’	110º57.80’	6.0	0.5	11	194	4	0.17
200718	08:30:21.73	44º38.10’	110º40.81’	5.2	0.6W	14	125	4	0.14
200718	09:41:45.56	44º38.09’	110º40.03’	5.1	-0.1	9	155	4	0.15
200718	13:50:06.26	44º35.66’	110º40.45’	7.9	1.2W	22	76	3	0.18
200718	13:50:23.66	44º36.50’	110º42.87’	6.1	0.6	8	122	6	0.24
200718	15:22:41.45	44º40.86’	110º27.08’	2.1	0.8	8	113	6	0.21
200721	12:18:07.89	44º44.33’	111º06.92’	10.7	0.2	17	77	6	0.18
200721	13:19:03.78	44º35.93’	110º52.94’	8.8	-0.4	7	282	4	0.14
200721	14:22:58.08	44º34.28’	110º54.45’	9.1	0.8	15	129	7	0.16
200722	10:43:59.52	44º40.19’	110º24.05’	3.7	0.4	7	240	10	0.03
200722	11:21:22.00	44º44.69’	110º51.24’	3.8	1.2W	19	76	5	0.16
200722	11:39:09.39	44º37.55’	110º40.51’	5.2	0.9	24	55	3	0.16
200723	16:52:08.97	44º46.08’	110º59.76’	6.9	1.1W	19	136	1	0.19
200723	21:08:48.64	44º33.77’	110º26.33’	1.6	0.5	9	158	3	0.09
200725	13:24:18.66	44º22.53’	111º14.74’	17.8	0.8	12	199	21	0.12
200725	23:07:54.99	44º45.15’	111º05.58’	11.6	0.5	15	90	5	0.20
200726	06:14:36.34	44º37.59’	110º40.21’	4.9	1.0W	24	71	3	0.21
200726	07:15:32.78	44º37.68’	110º40.05’	5.5	0.8W	20	90	3	0.18
200726	08:11:10.20	44º47.69’	111º06.67’	11.1	0.5W	15	109	0	0.14
200726	12:00:22.76	44º31.94’	111º01.81’	17.6	0.1	12	142	10	0.13
200727	09:33:08.74	44º40.52’	110º03.00’	12.4	0.4	8	166	11	0.13
200728	16:51:43.84	44º21.44’	110º40.59’	4.2*	1.1	13	64	11	0.12
200730	11:09:27.25	44º27.05’	110º58.85’	6.8	1.3W	18	115	12	0.20

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DATE	ORIGIN TIME	LATITUDE	LONGITUDE	DEPTH	MAG	NO	GAP	DMN	RMS
200730	11:10:39.92	44º26.89’	110º58.78’	12.0	0.9W	12	122	11	0.18
200730	11:35:40.04	44º42.20’	110º47.00’	4.2	0.8W	9	109	8	0.11
200801	06:00:10.05	44º29.62’	110º37.84’	4.0	2.1W	28	39	7	0.20
200801	06:00:31.95	44º29.28’	110º37.88’	3.3	1.5	17	95	7	0.14
200801	06:03:05.65	44º29.52’	110º38.07’	4.1	1.5W	19	52	7	0.13
200801	18:06:06.89	44º42.22’	110º47.22’	4.5	1.5W	17	59	7	0.11
200801	18:33:59.04	44º41.65’	110º46.93’	5.0	0.7	10	100	8	0.12
200802	19:40:54.75	44º42.43’	110º47.38’	4.5	1.2W	12	100	7	0.13
200803	20:41:31.20	44º46.82’	111º14.80’	12.6	1.7W	21	217	5	0.19
200803	22:15:07.27	44º23.93’	110º56.11’	18.6	0.6	7	128	18	0.32
200803	22:42:58.30	44º28.51’	110º33.87’	6.0	0.3	6	133	5	0.13
200803	22:43:09.01	44º27.90’	110º32.95’	2.1	0.5	8	110	4	0.17
200803	22:43:39.23	44º28.16’	110º32.55’	2.5	0.3	6	181	5	0.11
200804	08:36:00.45	44º44.84’	110º51.38’	2.2	0.5	9	99	5	0.09
200805	01:50:54.75	44º30.18’	110º13.95’	3.8	0.8	7	261	3	0.03
200805	01:51:09.23	44º30.70’	110º11.72’	4.5	1.4	11	113	6	0.09
200805	13:35:55.71	44º50.35’	110º59.72’	7.1	0.3	14	200	9	0.14
200805	13:35:55.81	44º50.28’	110º59.61’	5.4	0.6	16	199	9	0.17
200806	00:36:10.94	44º36.43’	110º26.49’	4.4	1.4W	14	58	6	0.10
200806	13:05:50.71	44º40.56’	110º27.21’	2.1	0.6	10	117	6	0.07
200807	01:45:36.78	44º50.37’	110º59.92’	5.4	0.3	11	199	9	0.11
200809	16:53:25.70	44º20.45’	110º30.18’	2.1	0.7	7	134	6	0.04
200810	20:57:08.81	44º49.21’	110º54.54’	5.1	1.2W	16	137	6	0.16
200812	21:02:38.34	44º39.66’	111º08.50’	2.7	0.6	8	153	7	0.19
200813	20:26:02.12	44º41.74’	110º01.16’	14.1	1.8	11	95	9	0.12
200816	06:20:51.84	44º48.26’	111º02.74’	5.4	0.7W	12	160	5	0.10
200816	22:07:58.02	44º44.32’	110º48.10’	4.0	0.3	9	138	7	0.08
200817	11:46:20.64	44º46.58’	110º48.20’	2.2	0.4	11	105	4	0.10
200818	02:34:50.64	44º32.52’	110º28.53’	4.0	1.1W	10	80	6	0.08
200818	09:44:11.42	44º35.50’	110º43.62’	5.0	0.2	7	211	7	0.07
200818	09:44:42.86	44º34.10’	110º43.99’	2.5	-0.3	6	242	8	0.03
200818	09:44:48.56	44º36.07’	110º43.63’	3.9	--	7	196	7	0.08
200818	09:45:02.15	44º36.87’	110º43.50’	2.6	0.6	7	175	7	0.21
200818	09:46:34.09	44º36.98’	110º43.44’	2.1	0.9	9	172	7	0.07
200818	09:46:58.83	44º37.39’	110º43.43’	3.0	0.9	9	161	7	0.08
200818	09:47:34.46	44º36.48’	110º43.69’	2.8	0.5	7	186	7	0.13
200818	10:07:16.06	44º36.87’	110º42.29’	9.0	0.9W	13	109	5	0.13
200818	10:07:34.99	44º37.32’	110º43.35’	3.9	0.9	14	100	7	0.10
200818	10:08:03.31	44º37.32’	110º43.15’	4.2	--	9	162	6	0.10
200818	10:09:18.49	44º37.55’	110º43.56’	2.0	0.7W	14	76	7	0.22
200818	10:11:06.82	44º36.86’	110º43.15’	5.1	0.4	7	174	6	0.06
200818	10:13:33.02	44º36.74’	110º43.08’	6.1	0.4	8	178	6	0.06
200818	17:08:26.57	44º35.70’	110º23.28’	4.2	1.9W	19	64	3	0.17
200818	17:09:45.69	44º35.70’	110º23.25’	4.4	2.2W	17	65	3	0.12
200818	17:17:09.80	44º35.29’	110º22.70’	4.2	0.8	10	102	4	0.07

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DATE	ORIGIN TIME	LATITUDE	LONGITUDE	DEPTH	MAG	NO	GAP	DMN	RMS
200819	12:29:38.70	44º36.16’	110º46.71’	6.7	0.5	8	131	6	0.10
200819	12:32:02.35	44º36.95’	110º46.22’	3.2	0.7	14	172	6	0.14
200821	02:15:48.69	44º44.51’	111º07.37’	11.3	0.6W	15	97	6	0.15
200821	02:56:44.92	44º44.45’	111º07.71’	12.1	1.6W	19	64	5	0.13
200821	02:58:37.47	44º44.63’	111º07.17’	11.6	0.4W	13	93	6	0.10
200821	02:58:58.07	44º44.41’	111º07.00’	12.7	-0.2	9	162	6	0.09
200821	05:11:13.47	44º26.93’	110º57.82’	6.0	2.3W	23	111	10	0.17
200821	05:11:23.95	44º27.80’	110º55.31’	2.1	2.4W	8	163	7	0.10
200821	05:12:05.95	44º26.96’	110º58.01’	7.6	2.6W	25	118	10	0.21
200821	05:15:36.53	44º32.67’	110º56.27’	11.1	0.5	7	225	11	0.13
200822	06:47:07.37	44º44.82’	111º00.54’	9.9	-0.1	12	67	1	0.14
200822	13:56:08.86	44º24.32’	110º36.13’	3.4	1.2W	11	149	2	0.06
200822	16:41:41.12	44º43.20’	111º01.63’	7.3	0.2	8	80	5	0.11
200822	18:51:14.41	44º29.15’	110º23.36’	3.2	-0.1	8	124	8	0.08
200822	19:12:25.07	44º29.17’	110º23.17’	2.6	0.9	10	100	8	0.11
200823	11:21:56.33	44º49.37’	111º22.72’	10.9	0.8	13	192	16	0.10
200824	06:56:17.84	44º36.41’	110º01.13’	15.7	0.8	12	99	16	0.14
200824	09:27:43.27	44º41.92’	111º01.88’	6.6	0.1	11	87	6	0.18
200825	11:40:48.47	44º44.01’	110º54.10’	6.5	-0.1	10	103	7	0.10
200825	13:18:07.32	44º26.51’	110º32.76’	0.4	1.1	7	201	3	0.04
200825	13:18:35.67	44º28.41’	110º33.51’	4.3	1.4W	17	84	5	0.18
200825	13:18:56.60	44º28.34’	110º33.60’	3.8	1.3	13	114	5	0.14
200825	13:19:17.12	44º25.99’	110º34.03’	-0.3	--	6	116	2	0.09
200825	13:19:27.35	44º26.84’	110º31.65’	-3.3	--	6	154	5	0.13
200826	00:56:29.82	44º28.93’	110º25.69’	2.3	0.7	11	91	9	0.10
200826	07:36:04.56	44º37.70’	110º20.69’	5.5	1.3W	14	75	8	0.08
200828	00:05:57.03	44º43.51’	111º02.07’	7.1	0.3	7	118	4	0.07
200829	00:02:14.36	44º45.00’	111º02.02’	7.7	0.4	11	233	2	0.16
200830	05:09:39.28	44º31.60’	110º29.83’	4.4	1.7W	17	70	8	0.12
200830	05:12:31.72	44º31.24’	110º29.65’	2.2	--	9	137	9	0.08
200830	05:12:37.07	44º29.58’	110º27.32’	2.0	0.9	8	183	9	0.18
200830	05:13:22.93	44º30.61’	110º28.51’	3.0	0.5	8	176	8	0.12
200830	05:26:53.76	44º31.59’	110º29.90’	3.2	1.0	10	110	9	0.11
200830	05:40:27.86	44º31.47’	110º29.65’	5.9	1.3	8	134	8	0.07
200830	17:53:57.28	44º46.14’	110º57.23’	7.0	0.2	14	179	4	0.20
200830	17:54:01.07	44º46.49’	110º56.86’	7.8	0.6	12	185	5	0.16
200830	21:47:58.44	44º30.85’	110º29.01’	2.9	--	7	184	8	0.08
200831	15:11:54.76	44º38.04’	110º54.14’	8.0	0.4	7	197	4	0.06
200831	15:41:34.93	44º37.45’	110º55.02’	6.0	0.1	6	228	5	0.05
200901	04:17:56.46	44º37.96’	110º40.30’	4.6	0.2	12	121	4	0.12
200901	06:23:27.17	44º44.23’	111º07.59’	11.6	-0.2	13	101	6	0.14
200901	07:05:38.62	44º47.71’	111º17.52’	13.7	0.9W	15	242	9	0.17
200902	08:55:17.11	44º43.76’	111º09.08’	6.7	-0.2	10	83	4	0.13
200902	16:38:25.30	44º44.24’	110º47.23’	4.2	0.9	13	146	8	0.11
200903	07:00:03.79	44º44.37’	111º07.28’	12.1	0.0	13	110	6	0.11

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DATE	ORIGIN TIME	LATITUDE	LONGITUDE	DEPTH	MAG	NO	GAP	DMN	RMS
200903	23:57:06.28	44º47.71’	110º48.29’	3.7	1.1W	17	121	4	0.12
200904	04:34:06.23	44º44.44’	111º07.35’	13.5	0.6W	14	77	6	0.13
200904	06:10:28.88	44º48.30’	110º48.04’	4.6	0.5	16	104	4	0.18
200904	07:18:50.69	44º44.28’	111º06.82’	12.7	1.0W	15	77	6	0.16
200904	10:10:30.90	44º46.31’	111º19.52’	7.7	1.5W	21	177	10	0.17
200904	10:35:20.26	44º44.45’	111º07.05’	14.1	0.7W	15	68	6	0.11
200904	10:53:56.11	44º44.08’	111º06.84’	12.8	1.0W	15	69	7	0.16
200904	10:57:15.47	44º44.14’	111º06.73’	12.6	-0.2	8	163	7	0.14
200905	04:00:40.60	44º48.42’	110º48.22’	8.6	2.3W	32	61	4	0.22
200905	04:08:13.22	44º46.31’	111º19.68’	5.8	0.4	9	243	10	0.13
200905	06:07:10.49	44º44.20’	111º07.04’	10.3	-0.2	11	79	6	0.16
200905	14:13:15.01	44º19.40’	110º32.21’	6.2	1.3W	12	104	7	0.09
200905	14:13:15.04	44º19.49’	110º32.23’	5.6	1.3W	11	104	7	0.12
200905	16:14:47.64	44º40.73’	110º03.32’	12.4	1.1	10	89	10	0.15
200905	19:16:17.81	44º40.85’	110º02.73’	10.7	1.1	10	152	11	0.19
200905	19:23:42.22	44º44.40’	111º07.12’	12.8	1.5W	17	66	6	0.13
200906	23:05:00.97	44º44.70’	111º03.26’	8.2	0.1	9	107	4	0.13
200908	05:59:27.71	44º34.26’	110º44.54’	6.0	0.9W	14	118	9	0.10
200908	05:59:55.18	44º34.04’	110º45.19’	2.7	0.5	8	144	10	0.06
200908	06:13:49.07	44º34.78’	110º44.66’	6.4	0.9W	9	204	9	0.14
200909	08:19:47.59	44º45.44’	111º13.44’	11.8	0.5	13	183	2	0.16
200909	13:34:43.06	44º46.81’	111º05.73’	13.3	0.5	11	113	2	0.13
200909	18:26:20.60	44º49.38’	110º57.21’	7.5	0.4	15	144	8	0.16
200910	00:20:27.77	44º20.14’	110º30.40’	2.6	0.9	11	122	7	0.17
200910	03:39:38.41	44º19.87’	110º30.22’	6.7	1.7W	14	125	7	0.24
200910	05:36:44.94	44º33.12’	111º04.56’	11.1	0.4	15	145	6	0.22
200910	05:42:07.32	44º32.55’	111º04.08’	7.5	0.2	11	146	7	0.13
200910	07:50:28.89	44º23.52’	110º33.24’	2.8	0.5	7	130	1	0.10
200910	07:50:40.57	44º19.88’	110º30.78’	3.9	1.2W	11	120	7	0.10
200910	08:25:00.77	44º19.98’	110º30.44’	3.8	1.2	9	124	7	0.15
200910	08:42:15.24	44º21.22’	110º29.93’	2.0	1.5W	8	175	5	0.11
200910	08:52:41.22	44º46.91’	111º04.64’	11.3	1.0W	14	112	3	0.15
200910	10:42:12.64	44º19.36’	110º30.44’	2.2	1.0	9	129	7	0.13
200910	10:52:18.48	44º19.85’	110º30.08’	2.9	1.5W	10	128	7	0.09
200910	10:52:54.17	44º20.23’	110º30.60’	4.0	0.7	9	119	6	0.09
200910	10:53:02.63	44º19.61’	110º30.67’	5.5	1.7W	10	123	7	0.11
200910	10:53:20.80	44º19.58’	110º31.31’	0.8	1.6	7	164	7	0.10
200910	10:54:34.92	44º20.04’	110º29.41’	4.1	2.0W	19	132	8	0.24
200910	10:55:49.36	44º19.70’	110º30.30’	3.7	1.8W	13	128	7	0.12
200910	10:58:12.86	44º20.28’	110º29.87’	2.0	1.1	12	127	7	0.17
200910	11:01:07.46	44º19.64’	110º30.77’	2.2	0.9	10	122	7	0.13
200910	11:03:02.17	44º19.59’	110º29.55’	2.2	2.1W	19	134	8	0.14
200910	11:09:16.30	44º19.18’	110º30.49’	2.2	1.8W	14	130	6	0.12
200910	11:09:41.06	44º19.53’	110º30.68’	3.5	2.0	13	124	7	0.10
200910	11:25:58.98	44º18.24’	110º29.94’	2.5	1.0	7	148	5	0.10

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DATE	ORIGIN TIME	LATITUDE	LONGITUDE	DEPTH	MAG	NO	GAP	DMN	RMS
200910	11:37:18.53	44º19.38’	110º31.76’	2.1	1.7	6	110	7	0.20
200910	11:40:22.54	44º19.22’	110º29.82’	1.2	2.6W	20	134	7	0.21
200910	11:42:53.06	44º18.68’	110º30.33’	1.9	2.8W	18	131	6	0.12
200910	11:44:41.86	44º19.90’	110º29.80’	2.1	2.2W	14	129	7	0.22
200910	11:47:57.18	44º19.63’	110º30.81’	2.1	1.0	9	122	7	0.13
200910	11:48:26.25	44º19.31’	110º30.48’	4.6	1.4W	10	128	7	0.06
200910	11:48:38.29	44º21.69’	110º30.42’	2.1	0.9	7	226	4	0.14
200910	11:48:47.61	44º18.81’	110º30.44’	2.6	2.2W	9	134	6	0.08
200910	11:53:29.41	44º20.25’	110º30.00’	2.2	1.6	11	126	7	0.15
200910	11:54:00.40	44º21.29’	110º29.87’	2.0	0.7	10	174	5	0.17
200910	11:57:43.64	44º19.59’	110º30.08’	2.0	1.0	12	130	7	0.18
200910	11:57:43.86	44º19.79’	110º30.36’	2.0	1.1	12	126	7	0.25
200910	11:58:15.21	44º21.95’	110º30.28’	3.8	0.1	8	167	4	0.08
200910	12:02:34.78	44º20.04’	110º30.20’	1.3	1.4W	11	126	7	0.12
200910	12:08:52.19	44º19.46’	110º30.65’	2.5	1.5	10	135	7	0.17
200910	12:09:01.16	44º19.32’	110º30.44’	3.2	2.4W	10	126	7	0.10
200910	12:09:31.80	44º19.34’	110º31.25’	0.5	2.8	10	118	7	0.27
200910	12:12:36.24	44º19.03’	110º30.31’	1.8	1.9W	17	134	6	0.14
200910	12:19:33.53	44º18.70’	110º29.77’	2.0	2.4W	16	139	6	0.23
200910	12:21:57.55	44º19.23’	110º29.38’	1.9	2.7W	18	138	7	0.20
200910	12:23:14.91	44º19.06’	110º28.97’	-3.4	2.2	9	150	7	0.19
200910	12:23:34.57	44º18.61’	110º33.98’	9.2	2.2	7	205	6	0.07
200910	12:29:48.37	44º20.48’	110º30.75’	2.7	1.6	9	117	6	0.15
200910	12:29:58.84	44º18.72’	110º30.62’	2.5	1.3	8	136	6	0.06
200910	12:30:40.40	44º19.73’	110º31.21’	5.0	0.8	10	116	7	0.11
200910	12:33:36.78	44º19.92’	110º30.53’	4.3	1.2	8	123	7	0.06
200910	12:44:20.94	44º18.74’	110º30.64’	4.0	1.1	9	132	6	0.12
200910	12:50:06.82	44º19.28’	110º29.91’	4.4	2.7W	19	119	7	0.19
200910	12:56:05.98	44º20.27’	110º29.80’	2.1	1.0	11	127	7	0.17
200910	13:01:51.37	44º18.68’	110º29.52’	3.9	2.3W	21	120	6	0.17
200910	13:07:01.50	44º18.75’	110º29.77’	3.0	2.4W	22	126	6	0.16
200910	13:18:45.88	44º18.71’	110º29.98’	2.6	2.3W	21	79	6	0.18
200910	13:19:34.29	44º19.76’	110º30.51’	2.0	2.2W	12	124	7	0.16
200910	13:23:09.26	44º18.76’	110º30.34’	2.0	1.7W	8	136	6	0.09
200910	13:26:39.38	44º18.38’	110º29.15’	5.6	2.8W	31	122	6	0.26
200910	13:34:19.11	44º19.51’	110º30.53’	1.9	1.7W	11	126	7	0.18
200910	13:40:17.56	44º19.95’	110º30.90’	1.2	1.0	13	118	7	0.17
200910	13:40:46.07	44º19.65’	110º30.51’	2.0	2.0W	11	124	7	0.13
200910	13:43:30.72	44º18.94’	110º30.58’	2.0	1.4	13	131	6	0.28
200910	13:58:00.36	44º21.27’	110º30.85’	3.9	1.7	9	110	5	0.25
200910	13:58:15.65	44º20.29’	110º30.66’	2.1	1.5	11	119	6	0.17
200910	13:58:32.21	44º19.42’	110º31.05’	2.1	1.1	10	121	7	0.13
200910	14:01:07.40	44º19.43’	110º30.12’	5.6	1.0	8	132	7	0.07
200910	14:02:48.18	44º20.05’	110º30.52’	2.2	1.9W	12	122	7	0.22
200910	14:03:30.40	44º19.93’	110º30.61’	2.1	1.7W	9	122	7	0.17

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DATE	ORIGIN TIME	LATITUDE	LONGITUDE	DEPTH	MAG	NO	GAP	DMN	RMS
200910	14:08:25.45	44º20.38’	110º30.16’	2.0	0.9	10	123	6	0.24
200910	14:22:55.52	44º18.92’	110º30.45’	3.3	1.3	9	132	6	0.08
200910	14:31:34.06	44º19.35’	110º29.98’	3.6	1.9W	14	131	7	0.17
200910	15:13:59.57	44º20.18’	110º30.74’	2.1	0.8	8	118	6	0.19
200910	16:01:12.28	44º19.55’	110º30.34’	0.9	0.9	8	128	7	0.09
200910	16:05:01.33	44º20.07’	110º31.09’	2.0	0.9	8	115	8	0.11
200910	16:25:36.35	44º44.49’	111º09.89’	21.8	-0.1	10	79	3	0.21
200910	16:27:06.27	44º44.72’	111º08.99’	18.6	0.1	10	76	4	0.24
200910	17:01:11.77	44º19.50’	110º30.61’	1.3	1.7W	9	125	7	0.16
200910	17:59:50.86	44º20.25’	110º31.26’	2.2	1.0	7	112	8	0.16
200910	18:24:25.17	44º19.80’	110º31.66’	5.5	0.7	6	111	7	0.04
200910	18:33:51.74	44º20.00’	110º30.33’	1.2	2.6W	19	125	8	0.18
200910	18:36:46.62	44º19.35’	110º30.03’	-1.8	2.3W	14	134	7	0.21
200910	18:38:09.97	44º19.89’	110º30.23’	2.3	0.8	8	127	8	0.27
200910	18:38:41.89	44º21.10’	110º31.45’	-1.6	--	9	106	10	0.09
200910	18:39:25.32	44º19.76’	110º30.30’	2.2	1.3	8	127	7	0.13
200910	18:42:02.07	44º20.25’	110º31.16’	2.1	1.3	9	114	8	0.31
200910	18:56:01.49	44º19.08’	110º30.51’	1.5	2.0W	11	130	6	0.13
200910	19:00:44.56	44º21.31’	110º31.06’	4.5*	0.7	5	171	11	0.04
200910	19:06:14.34	44º19.59’	110º30.67’	1.3	0.6	7	124	7	0.04
200910	19:07:11.91	44º19.75’	110º29.97’	1.4	2.0W	12	131	8	0.16
200910	19:15:55.56	44º19.96’	110º30.44’	2.2	0.7	7	124	8	0.09
200910	19:36:47.13	44º20.30’	110º30.57’	1.8	1.5	8	120	8	0.24
200910	19:43:04.22	44º20.71’	110º30.64’	2.3	1.4	8	116	9	0.21
200910	19:47:44.58	44º18.74’	110º31.09’	7.9	1.0	7	125	5	0.13
200910	19:57:39.99	44º20.43’	110º30.43’	0.8	2.0W	14	119	9	0.14
200910	20:00:12.54	44º20.49’	110º30.40’	2.0	1.2	10	120	9	0.27
200910	20:02:15.77	44º20.01’	110º30.04’	1.8	1.4	9	127	8	0.16
200910	20:05:07.28	44º20.39’	110º30.19’	2.5	--	8	123	9	0.11
200910	20:07:03.21	44º20.44’	110º30.64’	1.9	1.8W	11	118	9	0.32
200910	20:11:00.55	44º20.11’	110º31.20’	3.6	1.0	8	114	8	0.12
200910	20:23:53.06	44º20.11’	110º30.10’	2.2	0.9	8	126	8	0.16
200910	20:50:46.71	44º20.49’	110º31.79’	1.4	1.3	8	105	9	0.08
200910	20:53:21.53	44º22.45’	110º30.07’	2.0	0.0	5	162	10	0.19
200910	20:53:31.71	44º20.54’	110º29.45’	0.9	0.6	6	128	9	0.26
200910	22:33:40.10	44º21.88’	110º30.02’	2.1	--	7	168	4	0.06
200910	22:33:44.64	44º23.05’	110º29.84’	2.0	0.2	9	156	4	0.11
200910	22:34:09.15	44º19.38’	110º30.21’	1.4	1.9W	9	131	7	0.09
200910	23:21:58.37	44º19.42’	110º30.28’	3.6	0.6	10	130	7	0.09
200911	01:24:21.01	44º20.37’	110º30.44’	2.0	0.5	9	121	6	0.15
200911	01:24:37.82	44º20.41’	110º30.59’	1.3	1.5	10	118	6	0.22
200911	01:43:28.89	44º19.87’	110º30.71’	3.2	0.7	8	121	7	0.10
200911	01:43:44.00	44º18.38’	110º29.46’	1.8	2.3W	11	153	6	0.20
200911	01:52:52.36	44º19.23’	110º29.74’	1.5	2.0W	16	139	7	0.14
200911	03:25:31.61	44º20.07’	110º30.48’	4.1	1.1	10	122	7	0.14

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DATE	ORIGIN TIME	LATITUDE	LONGITUDE	DEPTH	MAG	NO	GAP	DMN	RMS
200911	03:41:22.56	44º18.95’	110º29.68’	2.1	1.0	13	142	6	0.14
200911	04:27:08.61	44º19.54’	110º30.20’	1.3	1.5W	13	129	7	0.10
200911	05:50:16.45	44º18.66’	110º29.93’	3.1	0.8	13	142	6	0.12
200911	05:51:07.17	44º45.72’	110º01.06’	1.3	-0.5	8	112	8	0.13
200911	06:29:45.44	44º20.29’	110º29.64’	2.1	1.9W	22	129	7	0.26
200911	08:46:41.52	44º18.93’	110º30.52’	1.8	1.7W	13	131	6	0.16
200911	12:23:38.70	44º18.91’	110º29.67’	1.9	2.5W	17	144	6	0.18
200911	16:39:00.10	44º19.04’	110º29.66’	2.0	1.2	13	142	7	0.19
200911	17:26:57.88	44º18.93’	110º29.78’	1.7	1.0	9	141	6	0.08
200911	18:15:10.41	44º19.75’	110º30.15’	2.5	1.1	7	128	8	0.03
200911	18:17:09.13	44º19.61’	110º30.67’	2.1	0.6	6	123	7	0.12
200911	18:21:26.26	44º33.60’	111º04.59’	12.5	0.6	17	131	5	0.18
200912	10:34:08.78	44º22.93’	110º38.81’	3.7	0.0	7	142	6	0.09
200912	10:34:31.13	44º23.85’	110º38.83’	2.1	1.0	8	145	6	0.19
200912	10:34:48.88	44º24.45’	110º38.41’	4.3	1.5W	13	71	5	0.16
200912	11:29:00.65	44º50.34’	110º53.77’	7.6	0.9W	15	160	7	0.13
200912	12:02:34.41	44º50.89’	110º59.11’	4.7	0.3	14	209	10	0.13
200912	14:13:22.65	44º39.43’	109º46.10’	10.8	1.2	8	227	15	0.10
200912	23:22:15.96	44º20.56’	110º30.18’	3.7	1.1	14	121	6	0.22
200913	13:12:37.17	44º19.16’	110º29.85’	2.6	1.0	11	138	7	0.17
200913	17:48:36.97	44º39.02’	110º26.13’	3.6	1.4W	8	127	9	0.07
200913	20:09:21.41	44º38.63’	110º28.15’	4.8	1.5W	10	95	8	0.19
200914	04:18:03.01	44º20.33’	110º30.51’	3.2	1.4W	14	120	6	0.23
200914	04:18:30.10	44º20.16’	110º30.85’	5.9	-0.1	8	117	6	0.19
200914	04:18:33.32	44º19.96’	110º31.03’	6.1	2.3W	11	117	7	0.15
200914	04:42:31.61	44º19.35’	110º30.80’	0.7	1.9W	13	122	7	0.28
200914	04:57:34.51	44º21.26’	110º29.94’	7.7	0.6	9	174	5	0.13
200914	05:17:14.28	44º19.84’	110º30.05’	2.0	1.4W	14	129	7	0.26
200914	07:01:26.48	44º40.83’	110º05.07’	2.7*	0.4	8	128	14	0.07
200914	07:23:04.78	44º40.55’	110º02.51’	12.6	1.3	8	95	11	0.27
200914	22:31:26.77	44º48.09’	111º20.61’	13.3	1.5W	23	84	13	0.16
200915	00:39:49.21	44º50.01’	110º54.19’	5.5	0.8	12	131	7	0.13
200915	09:58:39.89	44º49.30’	110º54.39’	5.1	0.2	15	138	6	0.11
200915	23:09:29.01	44º49.01’	110º54.37’	4.9	0.8	15	136	5	0.17
200916	01:09:46.62	44º26.21’	110º55.82’	7.1	0.9	14	174	8	0.26
200916	01:24:34.93	44º20.73’	110º29.29’	6.6	0.9	12	128	7	0.22
200916	06:41:35.29	44º22.05’	110º46.72’	0.9	0.9	13	109	10	0.21
200916	08:19:22.66	44º49.60’	110º54.35’	5.5	0.3	20	141	6	0.16
200916	13:11:30.70	44º44.27’	110º52.22’	5.3	0.2	9	92	6	0.09
200916	14:47:35.72	44º37.99’	111º12.28’	12.1	0.2	13	165	9	0.19
200918	06:05:24.18	44º20.76’	110º49.10’	8.0	1.7W	14	90	8	0.30
200918	06:09:30.09	44º21.08’	110º50.57’	2.6	1.7W	14	88	9	0.08
200919	02:00:46.38	44º44.62’	111º15.86’	13.5	0.7	15	171	4	0.13
200919	06:40:55.76	44º21.79’	110º26.43’	6.7	0.8	16	114	9	0.21
200920	09:39:02.57	44º40.60’	110º27.50’	2.0	0.4	9	124	6	0.14

Table 2. Earthquakes in the Yellowstone Region: July 1–September 30, 2020

DATE	ORIGIN TIME	LATITUDE	LONGITUDE	DEPTH	MAG	NO	GAP	DMN	RMS
200920	11:44:18.09	44º45.93’	111º19.69’	12.3	0.4	15	241	9	0.15
200921	10:48:03.38	44º49.29’	110º57.75’	5.9	0.5	16	143	8	0.12
200921	16:20:20.00	44º21.63’	110º19.76’	9.2	1.3	14	150	5	0.19
200922	23:25:32.32	44º23.11’	110º33.81’	1.7	--	6	165	1	0.06
200922	23:25:36.15	44º23.08’	110º33.76’	2.0	1.5	8	150	2	0.11
200923	08:01:32.27	44º46.17’	111º18.10’	6.0	1.0W	17	235	8	0.19
200924	01:43:40.91	44º46.74’	111º11.28’	10.7	0.3	17	154	3	0.21
200924	19:33:32.77	44º20.24’	110º30.64’	2.3	1.0	9	226	6	0.07
200925	15:09:40.75	44º45.20’	110º47.22’	2.1	-0.4	8	168	6	0.26
200925	15:09:50.55	44º44.49’	110º47.92’	4.4	0.6	12	144	7	0.11
200925	15:10:12.83	44º44.34’	110º47.97’	2.2	0.4	9	141	7	0.11
200925	16:47:45.31	44º44.66’	111º07.28’	11.8	0.3	15	66	6	0.18
200927	05:13:44.12	44º27.05’	110º33.28’	5.5	0.5	6	194	3	0.10
200927	05:13:48.37	44º27.43’	110º32.86’	5.1	1.5	6	169	4	0.08
200928	02:08:04.22	44º24.60’	110º19.40’	6.8	0.7	9	143	4	0.12
200928	02:24:07.94	44º24.58’	110º19.69’	6.2	1.0	11	106	4	0.12
200928	19:50:16.57	44º31.18’	110º50.23’	4.7	0.2	10	176	8	0.18
200928	22:30:25.37	44º33.55’	110º24.31’	4.8	0.8	11	59	0	0.17
200929	01:43:49.44	44º22.81’	110º41.28’	3.7	0.7	7	131	9	0.04

number of earthquakes = 334
* indicates poor depth control
W indicates Wood-Anderson data used for magnitude calculation

Table 3
UNIVERSITY OF UTAH YELLOWSTONE SEISMIC NETWORK
Operating Seismograph Stations
September 30, 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 July 1–September 30, 2020

September 11, 2020: Centaur Datalogger replaced ANSS-130 at station YHB