EARTHQUAKE ACTIVITY IN THE YELLOWSTONE REGION

Preliminary Epicenters

January 1 – March 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 MST through 02:00 (2:00 a.m.) on March 8 and MDT 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
January 1 – March 31, 2020

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During the three-month period January 1 through March 31, 2020, the University of Utah Seismograph Stations (UUSS) located 386 earthquakes within the Yellowstone region (Figure 1). The total includes 1 earthquake in the magnitude 3 range, and 16 earthquakes in the magnitude 2 range. The largest event to occur during this period was a magnitude 3.1 earthquake on March 31. One earthquake was 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	March 31	09:36 MDT	6.0 mi N of West Yellowstone, MT

Notable Swarm Seismicity

During the report period, there were seven 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 ($-0.1 \leq M \leq 1.2$) occurred about 10.2 mi NE of West Yellowstone, MT from February 4th – 5th.
B. A swarm of 11 earthquakes ($-0.4 \leq M \leq 1.7$) occurred about 2.8 mi NNE of Norris Geyser Basin, YNP from February 5th – 6th.
C. A swarm of 38 earthquakes ($0.6 \leq M \leq 2.3$) occurred about 15.8 mi SSE of Old Faithful, YNP on February 12th.
D. A swarm of 68 earthquakes ($-0.4 \leq M \leq 2.1$) occurred about 4.9 mi W of Norris Geyser Basin, YNP from February 17th – 24th.
E. A swarm of 12 earthquakes ($0.2 \leq M \leq 1.6$) occurred about 9.9 mi NE of Old Faithful, YNP on March 4th.
F. A swarm of 17 earthquakes ($0.0 \leq M \leq 1.4$) occurred about 7.4 mi ENE of West Yellowstone, MT from March 19th – 24th.
G. A swarm of 10 earthquakes ($0.5 \leq M \leq 2.1$) occurred about 6.7 mi ENE of West Yellowstone, MT on March 29th.

These swarms are labeled in Figure 1.

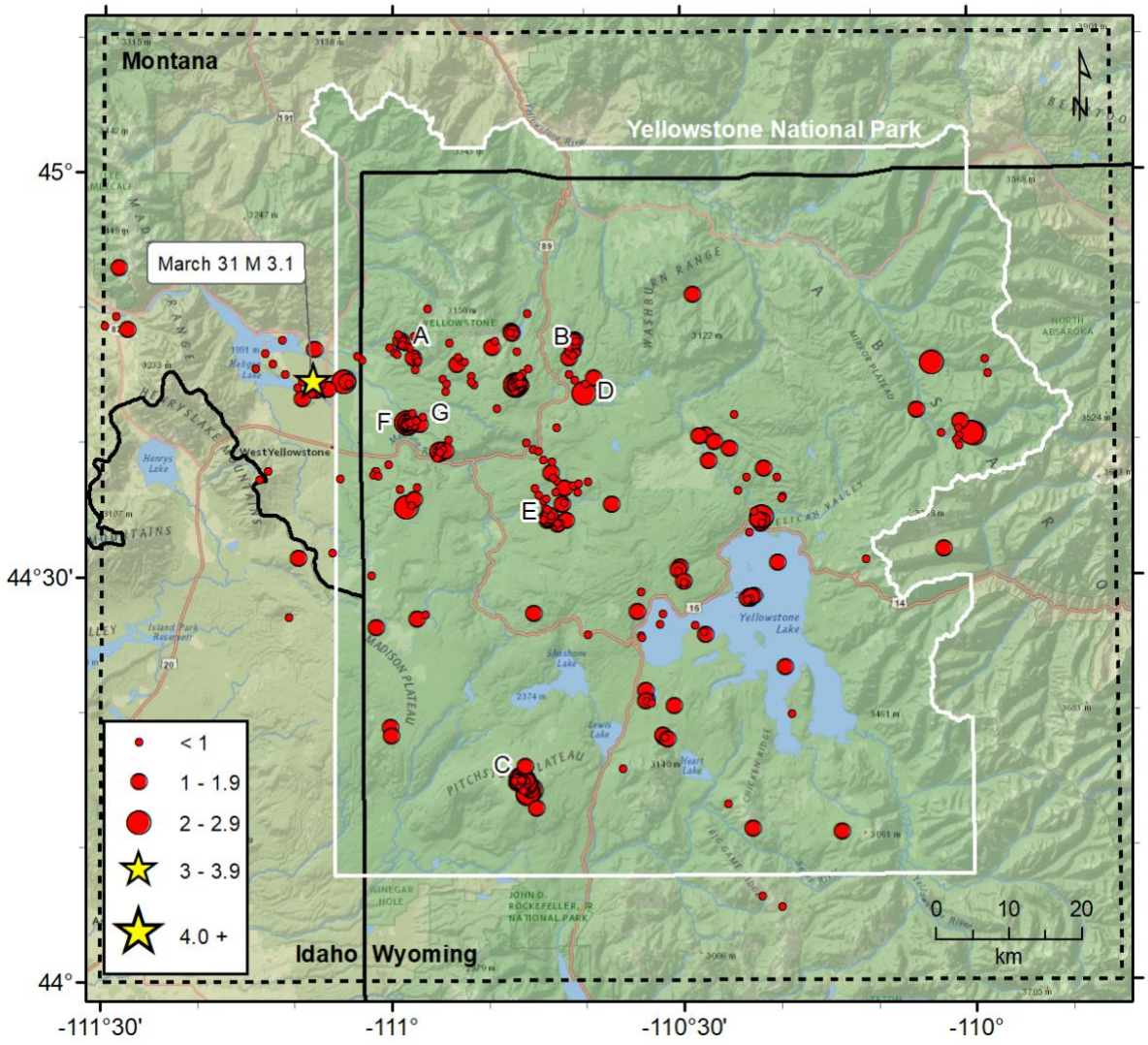

Figure 1. Epicenters of earthquakes located by the University of Utah Seismograph Stations, January 1, 2020, through March 31, 2020. Earthquake swarms (labeled A–G) are discussed in the text.

Table 1

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

Date	Time†	Felt Information‡	Latitude	Longitude	Magnitude§
March 31	09:36 MDT 15:36 UTC	Yellowstone. Felt (II) at West Yellowstone, MT.	44º 44.40′	111º 08.28′	M_L 3.1

† 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
March 31, 2020

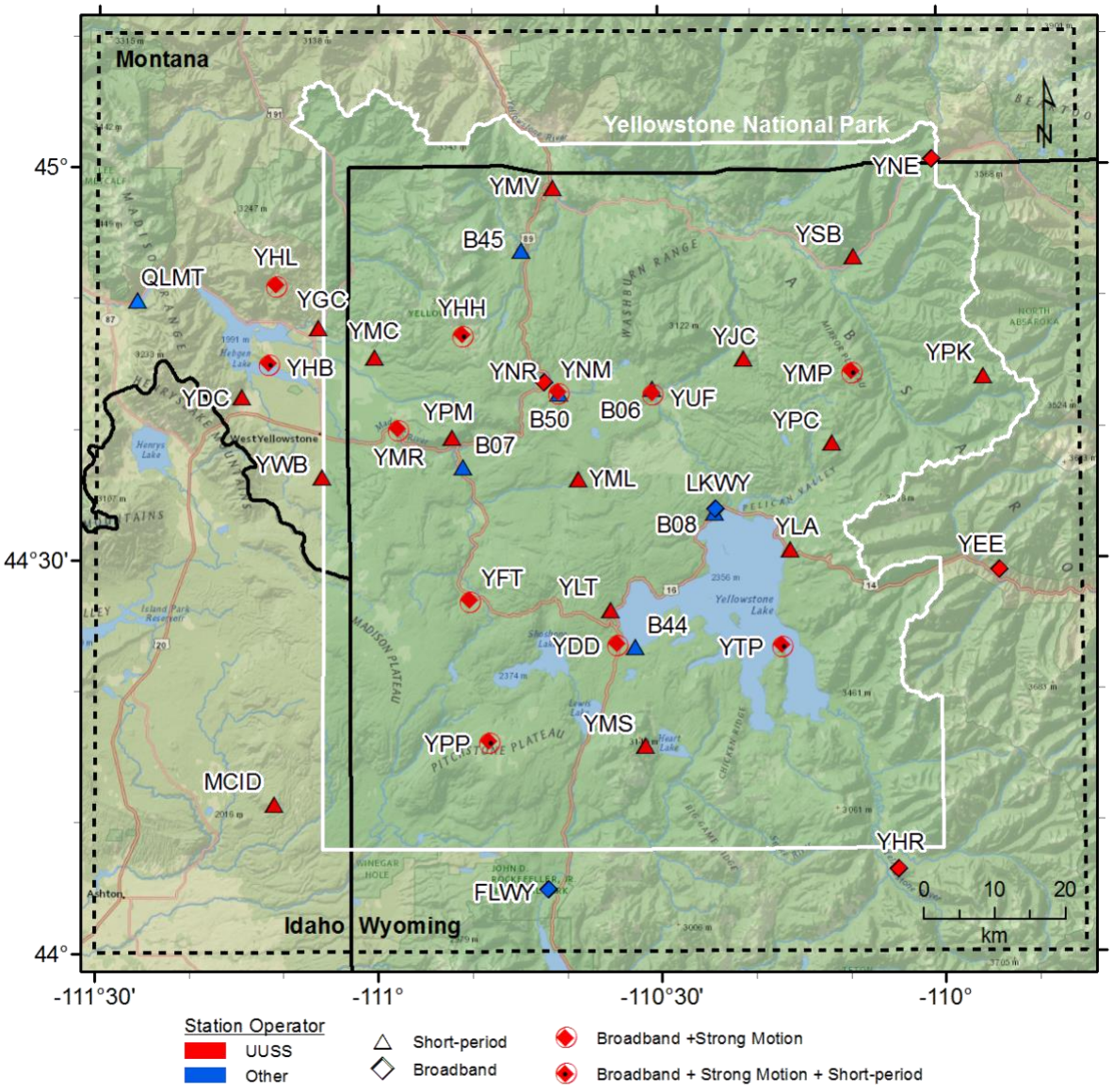

Figure 2. Seismograph stations of the Yellowstone Seismic Network as of March 31, 2020.

Table 2. Earthquakes in the Yellowstone Region: January 1–March 31, 2020

DATE	ORIGIN TIME	LATITUDE	LONGITUDE	DEPTH	MAG	NO	GAP	DMN	RMS
200102	07:36:41.01	44º15.90’	110º36.25’	9.9	0.8	11	90	6	0.10
200102	18:33:23.18	44º48.26’	110º47.68’	8.2	1.7W	25	57	5	0.17
200104	14:26:25.12	44º35.86’	110º19.67’	5.0	0.6	10	110	7	0.07
200105	14:36:30.67	44º31.04’	110º20.06’	3.6	1.5	5	139	5	0.26
200105	20:45:34.98	44º48.59’	111º29.89’	12.5	0.5	12	108	6	0.06
200106	22:03:32.77	44º43.70’	110º40.05’	1.9	2.1W	16	113	2	0.15
200107	12:42:11.30	44º40.43’	110º28.19’	4.0	1.5W	12	92	5	0.08
200108	03:03:32.63	44º50.95’	110º28.74’	4.1*	1.6W	12	114	15	0.13
200110	11:53:49.29	44º16.07’	110º46.34’	1.4	1.0	9	208	3	0.12
200110	20:05:02.81	44º40.54’	109º59.89’	14.0	2.1	17	116	9	0.26
200110	22:57:44.32	44º40.47’	109º59.62’	13.8	2.8W	25	118	9	0.25
200112	02:30:58.80	44º46.13’	111º03.17’	7.0	0.6	16	108	4	0.14
200115	10:14:47.16	44º43.95’	111º06.71’	12.0	1.0W	11	135	7	0.09
200118	16:46:01.23	44º34.90’	110º22.47’	3.1	0.4	12	167	3	0.13
200119	06:11:51.58	44º44.51’	111º04.76’	10.7	1.4W	20	107	6	0.16
200119	06:14:04.58	44º44.57’	111º05.05’	11.7	2.1W	24	66	6	0.11
200119	12:02:42.93	44º46.19’	110º57.55’	7.1	0.4	17	112	4	0.20
200119	13:13:07.05	44º48.18’	110º47.71’	6.3	0.1	10	115	5	0.13
200119	13:13:22.10	44º46.58’	110º57.61’	8.1	0.4	9	189	4	0.10
200119	13:22:03.98	44º46.38’	110º57.56’	7.5	0.4	19	114	4	0.18
200119	15:18:14.36	44º46.32’	110º57.81’	7.7	1.4W	18	106	4	0.13
200120	02:39:29.41	44º27.07’	111º10.70’	16.6	0.9	15	170	18	0.15
200120	10:07:16.60	44º48.12’	110º47.59’	5.8	1.2W	19	99	5	0.12
200120	10:24:29.31	44º48.11’	110º47.27’	5.3	0.5	11	243	5	0.11
200120	16:59:23.31	44º43.64’	111º08.37’	11.1	-0.3	8	130	5	0.12
200121	10:52:36.86	44º47.07’	111º00.27’	8.4	0.1	9	149	3	0.10
200122	01:10:21.07	44º47.08’	110º49.63’	6.6	1.0	13	103	2	0.16
200122	09:14:31.02	44º39.38’	110º44.86’	2.2	0.1	11	202	8	0.13
200122	09:20:13.80	44º38.78’	110º44.31’	4.2	0.0	11	130	9	0.12
200123	03:17:07.95	44º47.55’	110º49.38’	5.8	0.3	13	105	2	0.17
200123	03:40:49.31	44º46.40’	110º53.21’	5.4	0.7W	19	104	3	0.17
200123	07:14:25.41	44º46.17’	110º57.53’	7.3	0.6	16	112	4	0.17
200124	13:24:00.08	44º35.60’	110º42.15’	9.2	0.9W	14	78	5	0.12
200124	22:35:56.32	44º31.29’	110º10.95’	3.7	0.5	12	115	7	0.09
200125	15:15:31.80	44º37.42’	110º20.10’	6.0	0.4	10	129	8	0.12
200127	06:52:20.09	44º25.61’	110º34.17’	-0.7	0.6	8	119	2	0.05
200127	06:53:04.23	44º25.72’	110º34.27’	0.9	0.7	8	118	2	0.13
200128	16:33:25.87	44º38.04’	110º21.53’	4.6	1.6W	19	68	8	0.18
200129	13:41:34.16	44º48.37’	111º27.58’	12.9	1.2W	21	120	18	0.15
200130	18:59:44.30	44º41.41’	110º01.09’	13.9	1.1	9	99	9	0.15
200131	01:04:46.04	44º37.93’	111º12.94’	12.0	0.6	12	181	9	0.10
200131	23:07:41.84	44º45.12’	111º11.12’	7.5	-0.1	8	106	1	0.08
200201	02:51:37.39	44º40.92’	110º01.23’	12.9	0.3	7	160	10	0.14
200201	20:58:10.63	44º30.54’	110º30.47’	4.7	1.5W	11	111	10	0.10
200201	20:58:39.60	44º30.46’	110º30.44’	2.2	-0.1	9	110	10	0.14

Table 2. Earthquakes in the Yellowstone Region: January 1–March 31, 2020

DATE	ORIGIN TIME	LATITUDE	LONGITUDE	DEPTH	MAG	NO	GAP	DMN	RMS
200201	21:14:04.07	44º30.73’	110º30.19’	3.8	1.5W	10	94	10	0.07
200202	08:13:48.05	44º45.52’	111º14.18’	13.2	0.5	14	115	3	0.17
200202	20:45:29.59	44º37.60’	111º01.46’	10.9	0.2	15	157	6	0.17
200203	07:35:13.34	44º29.51’	110º29.56’	2.1	0.7	16	77	10	0.10
200203	07:36:01.09	44º29.41’	110º29.82’	2.4	0.3	10	173	9	0.15
200203	07:46:52.14	44º29.68’	110º29.81’	2.2	1.3	14	88	10	0.11
200203	07:47:09.97	44º29.64’	110º29.88’	2.2	0.2	9	129	10	0.13
200203	08:21:44.49	44º38.43’	111º00.38’	11.1	0.4	14	193	5	0.16
200204	04:01:34.98	44º47.20’	110º59.12’	7.6	0.2	12	122	3	0.12
200204	07:04:23.20	44º47.54’	110º58.92’	8.0	0.2	15	159	4	0.21
200204	07:04:52.76	44º47.73’	110º58.92’	7.6	0.5	17	127	4	0.17
200204	07:05:16.37	44º47.27’	110º58.99’	8.0	-0.1	11	155	4	0.14
200204	07:05:36.74	44º46.07’	110º57.35’	2.2	-0.1	9	177	4	0.12
200204	07:05:58.97	44º47.21’	110º58.76’	6.4	-0.1	9	201	4	0.15
200204	07:06:12.69	44º47.54’	110º59.10’	7.4	0.4	10	159	4	0.09
200204	07:08:50.84	44º47.11’	110º58.70’	6.7	0.9	11	199	4	0.17
200204	07:09:40.23	44º47.55’	110º59.15’	7.6	1.2W	18	116	4	0.13
200204	07:28:16.35	44º48.03’	110º59.37’	8.2	--	9	165	5	0.09
200204	07:52:21.81	44º47.39’	110º58.99’	7.0	0.4	10	203	4	0.13
200204	08:04:41.54	44º47.87’	110º59.32’	8.0	0.2	9	163	4	0.09
200205	13:33:31.31	44º46.58’	110º59.54’	7.8	0.1	11	193	2	0.16
200205	15:30:59.21	44º25.96’	110º27.79’	3.3	-0.1	9	127	8	0.09
200205	15:31:30.92	44º25.78’	110º27.58’	4.7	1.0	12	131	8	0.10
200205	15:31:52.50	44º26.50’	110º28.71’	2.5	--	8	147	8	0.11
200205	16:37:45.49	44º46.71’	110º59.79’	9.1	0.2	11	145	2	0.08
200205	16:38:08.84	44º45.42’	110º57.66’	3.7	0.0	7	153	4	0.03
200205	23:16:21.68	44º45.06’	110º41.62’	3.8	0.4	11	118	3	0.08
200205	23:16:38.51	44º44.66’	110º41.04’	4.9	0.4	11	117	3	0.13
200206	03:04:48.57	44º26.97’	110º57.40’	12.8	1.3W	13	190	10	0.21
200206	03:07:13.03	44º26.30’	111º01.62’	5.5*	1.1W	12	126	15	0.28
200206	09:18:02.70	44º47.62’	110º41.02’	3.8	1.7W	13	201	8	0.12
200206	09:20:15.54	44º46.79’	110º40.87’	2.1	0.4	14	202	7	0.17
200206	09:20:47.01	44º46.72’	110º40.82’	2.1	-0.3	14	201	7	0.17
200206	09:24:03.27	44º46.28’	110º41.62’	5.0	1.7W	12	128	6	0.18
200206	09:27:11.08	44º47.12’	110º41.60’	2.3	0.2	11	259	7	0.18
200206	09:28:22.42	44º47.55’	110º40.90’	2.3	-0.3	7	214	8	0.12
200206	09:28:46.73	44º47.46’	110º41.10’	2.2	1.5W	10	211	8	0.08
200206	10:44:17.32	44º46.80’	110º41.25’	2.1	1.6W	17	135	6	0.15
200206	10:44:23.59	44º44.35’	110º39.94’	1.8	0.1	7	218	3	0.15
200206	10:44:33.08	44º46.47’	110º41.26’	2.6	-0.4	10	199	5	0.19
200206	18:03:12.73	44º45.48’	110º45.91’	2.9	-0.3	9	187	8	0.10
200207	00:15:50.79	44º40.00’	110º26.60’	5.6	1.7W	18	183	7	0.16
200207	06:47:25.39	44º37.95’	111º01.63’	12.1	0.3	9	103	6	0.13
200207	22:23:08.17	44º18.35’	111º00.14’	11.0	1.3	14	109	16	0.20
200208	02:22:01.17	44º18.94’	111º00.24’	7.5*	1.4W	14	111	17	0.15

Table 2. Earthquakes in the Yellowstone Region: January 1–March 31, 2020

DATE	ORIGIN TIME	LATITUDE	LONGITUDE	DEPTH	MAG	NO	GAP	DMN	RMS
200208	09:15:24.03	44º37.27’	111º13.77’	11.6	0.9	14	170	10	0.19
200208	23:49:03.61	44º27.36’	110º45.40’	2.0	1.1	10	76	6	0.11
200209	11:02:15.46	44º42.08’	110º24.50’	1.1*	0.8	12	226	21	0.15
200210	12:57:23.70	44º34.19’	110º21.76’	3.5	1.9W	21	45	3	0.13
200210	12:59:36.54	44º33.96’	110º21.88’	2.9	1.9W	21	59	3	0.14
200210	13:01:42.59	44º34.01’	110º21.70’	3.5	0.8	15	75	3	0.12
200210	13:02:25.38	44º34.21’	110º22.09’	4.2	1.1	15	75	3	0.09
200210	13:14:20.48	44º34.47’	110º21.71’	4.2	2.3W	22	61	4	0.10
200210	18:00:15.81	44º33.31’	110º23.02’	4.6	0.6	9	185	2	0.20
200210	18:41:44.34	44º18.02’	110º31.58’	8.1	1.1	15	115	4	0.12
200210	20:27:19.38	44º18.18’	110º31.88’	7.9	0.6	14	109	4	0.11
200211	09:14:54.81	44º34.00’	110º42.92’	5.2	1.6	21	91	7	0.26
200211	09:28:02.76	44º34.27’	110º42.04’	8.9	1.1W	15	103	6	0.13
200211	09:28:37.73	44º36.65’	110º45.19’	5.8	0.4	10	128	8	0.10
200211	09:29:56.42	44º33.75’	110º42.72’	7.0	0.4	12	108	7	0.18
200211	09:34:25.67	44º34.01’	110º42.84’	7.3	0.4	16	93	7	0.13
200211	09:35:48.61	44º33.98’	110º42.81’	7.6	0.6	17	93	7	0.13
200212	03:07:51.38	44º14.31’	110º45.86’	3.5	1.8W	15	99	5	0.13
200212	03:09:18.56	44º14.51’	110º46.16’	2.1	1.2	14	99	4	0.15
200212	03:10:47.17	44º14.73’	110º46.02’	1.8	1.1	16	97	4	0.18
200212	03:12:34.08	44º14.12’	110º46.02’	4.5	2.0W	18	84	5	0.27
200212	03:12:52.77	44º15.20’	110º46.52’	2.4	1.1	8	149	3	0.18
200212	03:18:01.65	44º14.97’	110º46.51’	3.7	1.3	11	98	3	0.09
200212	03:18:24.31	44º13.98’	110º45.99’	4.8	2.2W	19	85	5	0.27
200212	03:26:03.60	44º15.03’	110º46.26’	3.7	0.7	13	97	4	0.13
200212	03:26:22.11	44º14.74’	110º45.82’	1.7	1.4	16	98	4	0.13
200212	03:27:04.55	44º14.91’	110º47.01’	3.0	1.0	8	109	3	0.12
200212	03:28:16.01	44º14.32’	110º45.76’	3.3	2.1W	14	99	5	0.13
200212	03:29:06.12	44º14.85’	110º47.08’	2.0	1.0	10	109	3	0.17
200212	03:30:24.53	44º14.48’	110º45.98’	3.2	1.8	13	98	4	0.13
200212	03:33:57.54	44º15.02’	110º46.25’	3.6	1.0	13	97	4	0.13
200212	03:55:32.11	44º12.93’	110º45.14’	2.2	1.4	12	107	7	0.12
200212	03:56:02.61	44º14.67’	110º46.64’	2.6	1.1	8	111	4	0.24
200212	04:00:13.56	44º15.10’	110º46.23’	3.9	1.3	11	96	3	0.14
200212	04:09:57.86	44º35.44’	110º42.38’	5.5	1.0	9	214	5	0.09
200212	04:11:05.71	44º34.08’	110º42.93’	6.3	0.6	12	150	7	0.15
200212	04:11:53.90	44º14.91’	110º46.73’	2.0	--	8	161	3	0.16
200212	04:12:01.27	44º36.66’	110º42.17’	6.6	1.0	13	172	5	0.17
200212	04:12:08.23	44º14.85’	110º46.64’	2.8	1.0	10	112	3	0.12
200212	04:12:57.33	44º34.04’	110º42.63’	7.2	0.6	14	105	7	0.12
200212	04:14:11.45	44º14.98’	110º46.74’	2.9	1.3	9	98	3	0.11
200212	04:38:02.66	44º14.89’	110º46.05’	1.5	1.5W	15	97	4	0.16
200212	04:43:54.70	44º14.91’	110º47.10’	2.6	1.4	9	109	3	0.14
200212	04:44:06.50	44º15.07’	110º47.00’	1.9	0.8	9	109	3	0.16
200212	04:45:00.85	44º15.12’	110º46.65’	3.2	2.0	13	98	3	0.12

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DATE	ORIGIN TIME	LATITUDE	LONGITUDE	DEPTH	MAG	NO	GAP	DMN	RMS
200212	04:45:19.72	44º15.22’	110º46.17’	2.2	1.1	8	142	3	0.14
200212	04:49:40.44	44º14.64’	110º46.47’	1.7	1.3	12	99	4	0.19
200212	04:49:57.78	44º14.98’	110º47.37’	1.9	0.6	6	112	3	0.17
200212	05:15:09.68	44º15.08’	110º46.66’	2.9	--	11	98	3	0.14
200212	05:15:15.96	44º14.95’	110º46.41’	2.9	2.3W	17	97	3	0.17
200212	05:15:37.69	44º15.27’	110º46.76’	1.8	1.9	10	152	3	0.17
200212	05:15:59.78	44º15.30’	110º46.83’	2.0	1.2	10	152	3	0.20
200212	05:16:18.87	44º14.90’	110º46.98’	2.8	1.2	11	100	3	0.14
200212	05:16:39.93	44º15.18’	110º47.32’	1.9	0.8	7	169	2	0.15
200212	05:17:00.86	44º14.92’	110º46.57’	1.6	1.4	10	98	3	0.10
200212	05:21:21.61	44º14.88’	110º47.20’	3.0	1.4	12	100	3	0.08
200212	05:27:54.77	44º14.85’	110º46.59’	2.8	1.3	15	99	3	0.14
200212	07:33:09.18	44º14.98’	110º46.59’	2.7	0.7	14	98	3	0.11
200212	14:42:25.58	44º14.27’	110º46.50’	1.3	0.9	11	101	4	0.26
200212	16:56:50.64	44º37.66’	111º01.93’	11.2	0.2	12	101	6	0.13
200212	19:55:43.02	44º31.45’	111º09.76’	15.4	1.0W	18	146	10	0.14
200212	22:23:19.45	44º20.50’	110º30.93’	7.7	1.3	18	114	6	0.16
200212	23:13:53.86	44º37.90’	111º01.76’	10.1	0.4	13	100	6	0.15
200214	02:32:08.66	44º44.37’	111º04.49’	9.9	0.6W	20	77	6	0.15
200214	16:39:20.39	44º11.40’	110º22.85’	14.0	1.2	16	147	24	0.15
200214	19:17:21.38	44º18.20’	110º32.01’	7.8	1.5	15	111	4	0.09
200214	19:18:46.53	44º18.31’	110º32.05’	7.7	1.2	17	109	5	0.12
200214	19:53:51.57	44º44.52’	111º09.34’	5.1	0.2	11	79	3	0.12
200215	04:06:13.65	44º41.15’	110º42.93’	5.8	0.2	12	111	4	0.11
200216	14:29:51.89	44º31.86’	111º06.15’	13.2	0.4	13	142	8	0.12
200216	19:01:41.31	44º49.96’	110º56.31’	8.3	0.3	10	241	9	0.08
200217	01:54:00.17	44º21.64’	110º33.83’	3.9	1.1	13	83	4	0.10
200217	09:04:02.94	44º47.50’	110º59.15’	7.9	0.5	14	158	4	0.13
200217	10:30:44.30	44º11.15’	110º13.66’	11.1*	1.0	13	216	23	0.12
200217	15:46:52.23	44º44.47’	110º47.20’	4.7	0.6W	9	151	7	0.08
200217	16:44:02.47	44º44.55’	110º47.16’	4.7	0.4	8	154	7	0.06
200218	00:45:33.96	44º44.32’	110º46.90’	6.2	1.4W	15	98	8	0.16
200218	00:45:43.14	44º44.23’	110º46.99’	2.3	1.2	10	96	8	0.15
200218	02:31:02.47	44º37.42’	110º43.36’	1.8	0.2	11	83	7	0.26
200218	02:31:31.91	44º36.37’	110º43.09’	5.8	0.7W	20	87	6	0.18
200218	02:38:53.89	44º37.18’	110º42.96’	5.0	0.2	12	165	6	0.11
200218	03:13:50.07	44º39.31’	110º55.12’	8.3	-0.2	8	168	4	0.12
200218	03:14:04.04	44º38.91’	110º55.36’	9.8	0.2	11	101	4	0.13
200218	06:53:33.27	44º39.28’	110º55.23’	9.6	0.6	16	81	4	0.13
200218	08:49:51.98	44º44.51’	110º47.02’	4.0	0.1	9	154	7	0.08
200218	16:24:02.07	44º44.92’	110º46.81’	8.2	0.6W	11	165	7	0.14
200218	16:48:35.70	44º44.48’	110º46.50’	8.3	0.9	14	154	6	0.18
200218	22:01:29.04	44º44.53’	110º47.10’	4.3	0.9W	10	150	7	0.09
200218	22:02:44.48	44º44.20’	110º47.04’	2.8	1.0W	14	95	8	0.11
200218	22:33:00.14	44º44.31’	110º46.95’	2.8	0.7	10	151	8	0.11

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DATE	ORIGIN TIME	LATITUDE	LONGITUDE	DEPTH	MAG	NO	GAP	DMN	RMS
200218	22:42:09.02	44º44.15’	110º47.44’	5.3	-0.1	7	143	8	0.18
200218	22:45:24.11	44º44.43’	110º47.14’	4.6	0.8W	11	98	7	0.07
200218	22:45:44.12	44º44.51’	110º47.14’	4.8	1.3W	11	105	7	0.08
200218	22:46:19.41	44º44.79’	110º47.04’	6.2	-0.2	8	160	7	0.05
200218	22:48:15.82	44º44.47’	110º46.86’	4.7	0.9W	15	100	8	0.11
200218	22:53:49.85	44º44.43’	110º46.85’	2.5	0.3	11	155	8	0.12
200218	23:14:34.02	44º44.64’	110º47.01’	4.8	0.4	11	157	7	0.10
200218	23:25:36.96	44º44.66’	110º46.66’	7.7	0.9W	13	161	8	0.14
200219	02:24:40.16	44º44.32’	110º47.19’	4.7	2.0W	21	86	7	0.14
200219	03:07:54.77	44º44.69’	110º47.01’	5.1	0.7W	11	158	7	0.18
200219	03:12:28.07	44º44.42’	110º47.09’	4.8	1.3W	19	87	7	0.12
200219	03:14:46.68	44º44.16’	110º47.00’	3.7	1.0W	12	141	6	0.11
200219	03:21:57.07	44º44.24’	110º46.67’	8.0	1.3W	17	87	6	0.10
200219	03:23:40.18	44º44.37’	110º46.96’	5.4	1.6W	21	87	8	0.17
200219	03:27:37.62	44º44.22’	110º47.09’	2.2	0.1	11	147	8	0.11
200219	03:30:45.48	44º44.50’	110º47.28’	3.3	0.1	7	151	7	0.05
200219	03:31:00.06	44º45.15’	110º46.45’	2.4	-0.3	8	174	7	0.13
200219	03:32:04.43	44º44.49’	110º47.12’	4.3	0.6W	8	152	7	0.06
200219	03:47:21.51	44º44.55’	110º47.05’	4.8	0.6W	8	154	7	0.04
200219	03:49:17.54	44º44.56’	110º46.82’	4.8	-0.3	7	157	8	0.04
200219	03:52:42.06	44º44.32’	110º47.17’	4.1	1.0W	16	93	7	0.11
200219	03:58:09.71	44º44.45’	110º47.16’	3.2	0.2	7	151	7	0.06
200219	03:58:25.48	44º44.37’	110º47.03’	2.5	-0.2	7	151	8	0.07
200219	03:58:45.17	44º44.68’	110º46.99’	2.0	-0.1	7	158	7	0.06
200219	04:00:06.74	44º44.52’	110º47.10’	4.8	0.7W	11	99	7	0.08
200219	04:00:50.45	44º44.31’	110º47.05’	4.7	0.1	10	150	8	0.09
200219	04:01:46.21	44º44.51’	110º46.94’	4.7	0.5	9	155	7	0.05
200219	04:02:18.06	44º44.46’	110º47.02’	4.3	0.5	9	153	7	0.07
200219	04:16:33.98	44º44.34’	110º47.21’	3.1	0.5W	8	149	7	0.08
200219	04:16:52.65	44º44.42’	110º46.99’	1.7	-0.3	7	152	8	0.06
200219	04:45:15.77	44º44.41’	110º47.16’	4.4	0.4	8	150	7	0.07
200219	04:45:58.60	44º44.41’	110º47.20’	4.0	0.2	8	150	7	0.06
200219	06:49:12.09	44º46.47’	111º03.64’	11.0	0.3	17	132	4	0.12
200219	08:28:00.34	44º44.51’	110º47.19’	5.3	0.6W	14	152	7	0.16
200219	08:50:19.87	44º44.48’	110º46.81’	2.1	-0.3	11	155	8	0.12
200219	08:50:39.00	44º44.52’	110º47.12’	2.1	0.2	13	153	7	0.14
200219	12:02:22.42	44º44.51’	110º47.10’	4.0	0.7W	11	154	7	0.10
200219	15:42:59.45	44º44.55’	110º47.20’	3.4	0.3	10	153	7	0.10
200219	17:58:55.80	44º44.39’	110º47.32’	4.2	0.4	12	149	7	0.08
200219	18:05:32.29	44º44.32’	110º47.21’	2.5	-0.2	10	148	7	0.15
200219	18:45:21.50	44º44.28’	110º47.16’	2.8	1.0W	12	148	8	0.12
200220	02:17:04.93	44º44.35’	110º46.92’	5.6	0.4	8	151	8	0.05
200220	12:08:15.24	44º40.34’	110º01.21’	12.9	0.7	10	105	10	0.13
200220	12:14:04.90	44º44.23’	110º47.15’	5.9	2.1W	29	51	7	0.17
200220	13:27:28.84	44º44.27’	110º47.03’	4.8	1.8W	22	85	6	0.13

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DATE	ORIGIN TIME	LATITUDE	LONGITUDE	DEPTH	MAG	NO	GAP	DMN	RMS
200220	13:35:54.48	44º44.36’	110º47.03’	4.7	1.4W	20	86	7	0.10
200220	13:55:25.16	44º42.58’	110º49.20’	6.7	0.9W	14	93	7	0.15
200220	15:18:32.06	44º44.43’	110º46.95’	2.5	0.3	12	153	8	0.11
200220	15:46:44.16	44º44.20’	110º47.28’	2.5	0.7	12	139	7	0.14
200220	15:55:23.07	44º43.81’	110º47.26’	0.4	0.4	8	137	8	0.06
200220	15:56:23.09	44º44.98’	110º46.79’	7.5	-0.4	8	167	7	0.06
200220	15:58:00.85	44º44.32’	110º47.14’	2.1	-0.2	7	148	8	0.05
200220	15:58:26.64	44º44.30’	110º47.11’	2.8	0.8W	9	143	7	0.07
200220	16:24:37.11	44º44.23’	110º47.15’	4.1	0.2	8	146	8	0.05
200220	16:25:05.57	44º44.27’	110º47.17’	3.5	0.3	8	148	8	0.06
200220	17:58:06.68	44º44.36’	110º47.23’	3.5	0.4	12	149	7	0.09
200221	02:58:29.36	44º44.41’	110º47.11’	1.8	0.0	7	152	7	0.08
200221	07:08:55.35	44º27.34’	110º56.58’	4.6	0.6	9	173	9	0.08
200221	10:35:54.37	44º44.58’	111º07.32’	12.7	0.4	16	65	6	0.14
200222	08:29:55.64	44º44.96’	109º58.16’	12.3	0.7	6	123	4	0.03
200222	14:00:59.03	44º47.91’	110º57.71’	8.4	0.9W	13	129	6	0.11
200222	19:09:35.24	44º44.55’	110º47.03’	4.8	-0.2	7	154	7	0.05
200223	03:38:28.75	44º37.40’	111º05.40’	11.7	0.7W	10	105	2	0.12
200223	06:10:50.25	44º44.13’	111º09.86’	13.5	0.9W	19	63	3	0.12
200223	14:15:35.51	44º15.12’	110º46.93’	2.0	0.9	14	99	3	0.11
200224	03:43:09.41	44º19.86’	110º18.78’	7.2	0.9	12	147	7	0.14
200224	04:44:30.76	44º44.25’	110º47.26’	5.3	1.7W	24	80	7	0.15
200224	04:48:23.04	44º44.33’	110º47.08’	2.9	0.1	7	150	8	0.09
200224	04:50:07.59	44º43.80’	110º54.52’	3.1	-0.2	5	123	8	0.08
200224	11:35:58.10	44º23.32’	110º19.37’	7.9	0.9	12	139	3	0.05
200224	18:48:09.63	44º39.41’	110º54.84’	10.7	1.6W	14	52	4	0.14
200224	21:09:35.52	44º43.90’	111º07.91’	12.3	1.7W	15	70	6	0.14
200224	21:17:41.58	44º44.35’	111º07.44’	9.5	0.2	10	79	6	0.12
200225	17:20:30.38	44º36.86’	110º41.28’	4.6	--	13	79	4	0.18
200225	17:20:30.44	44º36.99’	110º40.75’	4.4	--	9	112	3	0.18
200225	17:20:32.62	44º37.80’	110º43.55’	2.7	1.8W	5	202	10	0.10
200225	17:20:32.83	44º38.64’	110º43.42’	1.9	0.6	6	124	8	0.22
200225	17:21:42.49	44º36.39’	110º40.85’	6.1	--	12	93	3	0.12
200226	16:27:03.27	44º39.43’	110º55.29’	9.6	0.7	12	89	4	0.15
200227	18:31:09.37	44º39.56’	110º54.79’	9.2	0.7	15	80	4	0.13
200228	12:06:45.80	44º43.25’	111º09.40’	12.7	1.6W	26	77	5	0.10
200228	18:48:12.41	44º44.77’	110º39.07’	4.1	1.6W	17	129	4	0.10
200229	05:44:49.21	44º39.27’	110º55.10’	9.8	0.6	13	91	4	0.12
200229	17:00:58.00	44º39.27’	110º54.94’	10.2	1.5W	21	50	4	0.11
200302	09:19:38.99	44º46.00’	109º58.45’	8.2	0.2	7	138	6	0.08
200302	14:29:55.59	44º35.41’	110º37.28’	2.9	1.3W	15	68	2	0.14
200303	14:31:34.09	44º40.03’	110º46.14’	2.5	-0.7	11	176	8	0.12
200303	14:31:56.70	44º39.50’	110º45.47’	6.8	0.3	13	117	8	0.14
200304	05:30:35.29	44º35.85’	110º44.04’	2.1	0.3	8	202	7	0.10
200304	05:32:31.04	44º35.13’	110º43.95’	3.5	0.2	7	221	7	0.03

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200304	05:41:22.80	44º34.57’	110º43.66’	5.4	1.0	9	148	7	0.07
200304	06:16:24.88	44º34.63’	110º43.59’	4.2	0.4	9	152	7	0.12
200304	06:17:30.19	44º34.58’	110º43.71’	7.7	1.2	18	85	7	0.14
200304	06:33:16.55	44º35.15’	110º44.12’	5.0	0.4	8	220	8	0.08
200304	06:50:12.55	44º34.49’	110º43.96’	5.4	1.6W	22	80	8	0.13
200304	06:52:47.84	44º35.72’	110º44.34’	4.1	0.9	10	206	8	0.07
200304	07:11:41.12	44º34.38’	110º43.83’	5.9	1.2W	17	79	8	0.10
200304	09:58:31.34	44º34.28’	110º43.94’	4.2	1.2W	13	88	8	0.13
200304	09:59:05.76	44º34.34’	110º44.37’	5.5	0.7	8	146	8	0.14
200304	11:45:37.58	44º36.13’	110º44.83’	6.2	0.8	11	185	8	0.14
200304	16:58:35.36	44º20.87’	110º33.84’	1.7	1.0	12	99	5	0.12
200304	17:27:21.72	44º20.73’	110º33.25’	1.7	0.6	11	141	5	0.12
200304	19:09:24.44	44º20.99’	110º33.71’	2.1	1.2	10	124	5	0.11
200304	20:58:42.65	44º05.63’	110º19.93’	8.2*	0.8	11	197	29	0.19
200305	01:01:49.62	44º20.86’	110º33.75’	2.1	0.6	8	124	5	0.10
200305	07:08:48.82	44º39.65’	110º01.19’	5.8	-0.3	6	172	11	0.13
200305	11:52:17.70	44º45.77’	110º53.32’	3.9	1.6W	18	100	4	0.16
200305	16:00:21.05	44º45.93’	110º57.45’	7.4	0.5	13	110	4	0.15
200305	18:18:59.25	44º39.39’	110º55.24’	10.1	1.0	17	88	4	0.15
200306	04:30:46.59	44º40.23’	110º54.20’	6.3	0.6	11	126	3	0.10
200307	05:08:29.68	44º52.94’	111º28.46’	7.4	1.1	14	295	7	0.13
200307	08:14:04.29	44º39.37’	110º55.36’	9.8	0.8	14	82	4	0.15
200307	09:10:37.23	44º39.51’	110º54.86’	9.0	1.1W	17	74	4	0.16
200307	17:34:54.25	44º46.11’	110º52.89’	3.4	0.9	9	142	3	0.12
200308	03:24:31.47	44º13.23’	110º25.42’	10.8	0.8	15	139	10	0.17
200308	03:56:53.77	44º45.98’	110º52.49’	3.6	0.8	11	132	3	0.13
200308	07:16:51.65	44º39.30’	110º55.16’	9.1	0.9	18	81	4	0.14
200309	04:43:58.98	44º39.48’	110º55.16’	9.7	0.4	11	76	4	0.11
200309	06:16:23.86	44º39.22’	110º55.13’	10.2	1.1W	15	79	4	0.13
200309	09:19:04.90	44º39.29’	110º55.03’	10.0	0.8	16	90	4	0.16
200309	16:38:06.38	44º36.63’	110º59.25’	12.7	0.4	15	122	7	0.10
200310	23:03:57.53	44º39.39’	110º54.49’	9.8	1.0	11	84	3	0.10
200311	07:19:48.42	44º39.57’	110º54.79’	8.3	0.1	9	81	4	0.09
200312	08:51:35.38	44º39.45’	110º55.04’	10.2	1.7W	18	51	4	0.15
200312	15:00:11.76	44º37.39’	110º23.27’	4.4	0.8	11	122	7	0.07
200313	00:52:44.06	44º47.34’	110º58.55’	4.8	0.7	17	124	4	0.17
200313	10:19:13.86	44º40.10’	110º01.48’	12.4	0.6	11	104	11	0.19
200314	00:02:42.55	44º39.32’	110º55.07’	9.5	0.5	13	77	4	0.12
200314	01:10:03.81	44º39.54’	110º55.12’	9.1	0.2	13	84	4	0.16
200314	01:20:28.43	44º39.79’	110º55.00’	8.3	0.1	9	115	4	0.09
200314	07:23:50.00	44º42.29’	110º05.58’	8.6	1.2	12	72	6	0.15
200314	10:07:31.89	44º39.50’	110º55.34’	9.5	0.5	10	87	4	0.13
200314	14:39:47.19	44º47.40’	110º58.70’	4.7	0.9	15	124	4	0.15
200314	14:39:58.40	44º47.09’	110º58.18’	3.5	0.6	11	121	4	0.13
200314	14:42:07.16	44º47.57’	110º58.58’	4.7	0.4	11	160	4	0.15

Table 2. Earthquakes in the Yellowstone Region: January 1–March 31, 2020

DATE	ORIGIN TIME	LATITUDE	LONGITUDE	DEPTH	MAG	NO	GAP	DMN	RMS
200315	00:28:01.31	44º40.60’	110º03.03’	11.6	0.7	8	92	11	0.12
200315	03:27:24.65	44º46.62’	111º13.20’	13.6	0.8W	16	98	3	0.15
200315	03:28:35.15	44º45.84’	111º12.45’	10.7	0.5W	14	168	2	0.16
200318	07:23:18.49	44º47.44’	110º58.80’	5.1	0.7	13	158	4	0.13
200318	20:59:15.16	44º35.98’	110º19.55’	5.2	0.7	11	111	7	0.12
200319	01:37:02.08	44º44.56’	110º51.77’	1.4	0.3	9	90	5	0.04
200319	01:37:25.46	44º44.95’	110º51.77’	5.9	0.6W	18	77	4	0.15
200319	01:37:51.93	44º44.30’	110º51.47’	2.1	0.4	10	95	6	0.15
200319	17:18:48.59	44º41.30’	110º57.76’	5.9	0.6	10	106	2	0.17
200319	20:40:01.22	44º36.73’	110º57.48’	9.5	0.4	10	105	6	0.07
200320	12:11:35.54	44º30.16’	111º02.15’	15.1	0.2	9	149	13	0.12
200320	16:13:19.27	44º47.44’	110º54.11’	4.8	0.8W	15	120	4	0.13
200321	00:56:48.63	44º28.40’	110º22.97’	3.2	1.3	10	96	10	0.08
200321	01:03:08.68	44º28.58’	110º23.09’	2.0	1.4	12	94	9	0.27
200321	01:30:32.52	44º28.39’	110º23.02’	3.1	0.9	10	95	10	0.09
200321	01:42:23.68	44º28.59’	110º22.57’	7.2	1.1	10	93	9	0.10
200321	07:14:19.71	44º28.42’	110º23.26’	2.0	1.3	12	97	10	0.24
200321	09:19:18.49	44º41.51’	110º58.36’	6.0	0.4	14	90	3	0.19
200321	09:43:27.10	44º41.63’	110º57.50’	4.6	0.1	7	135	3	0.16
200321	09:43:55.64	44º42.21’	110º57.88’	7.1	0.5	10	89	4	0.29
200321	11:24:16.59	44º49.34’	111º28.71’	13.2	0.9	16	156	4	0.13
200321	12:57:26.20	44º41.67’	110º57.96’	5.2	0.3	10	109	3	0.21
200321	15:13:35.46	44º28.58’	110º22.92’	7.2	0.9	13	94	9	0.13
200321	16:06:34.85	44º37.16’	110º39.76’	6.0	0.4	16	85	2	0.13
200321	18:07:00.00	44º41.53’	110º58.16’	5.1	0.2	9	141	3	0.18
200321	19:04:33.79	44º41.91’	110º57.89’	8.3	0.6	14	88	8	0.14
200321	19:41:41.07	44º41.76’	110º57.65’	5.5	0.6	9	117	3	0.18
200322	03:54:58.36	44º36.44’	110º24.17’	2.8	0.5	14	60	5	0.20
200322	14:00:42.92	44º28.31’	110º23.30’	3.2	-0.3	8	97	10	0.12
200322	19:53:50.32	44º41.72’	110º57.86’	4.9	0.8	15	108	3	0.21
200323	06:34:43.85	44º35.81’	110º57.72’	9.0	1.7W	17	74	8	0.13
200323	13:31:18.73	44º41.62’	110º58.09’	6.0	0.3	11	118	3	0.18
200323	18:07:26.82	44º40.56’	110º27.53’	2.7	1.7W	11	116	6	0.15
200323	20:57:00.71	44º41.34’	110º57.62’	5.7	0.8	11	118	2	0.16
200323	20:57:05.23	44º41.38’	110º57.11’	4.4	1.0	8	110	3	0.15
200324	00:39:31.45	44º41.49’	110º58.19’	5.8	1.0W	11	112	3	0.22
200324	08:04:45.24	44º06.38’	110º21.96’	8.0*	0.6	13	189	27	0.14
200324	11:04:50.64	44º41.55’	110º58.60’	6.6	1.4W	15	79	3	0.15
200324	12:20:40.42	44º41.34’	110º58.74’	6.0	0.7	12	92	3	0.16
200324	14:51:45.88	44º41.44’	110º58.66’	5.6	0.7	9	147	3	0.19
200324	18:11:35.80	44º41.93’	110º56.80’	2.1	0.0	7	121	4	0.14
200325	01:04:10.60	44º38.61’	110º27.18’	4.2	1.3W	11	123	9	0.10
200325	12:49:47.86	44º47.61’	111º11.41’	8.2	0.0	11	162	5	0.17
200325	17:52:09.03	44º44.41’	110º54.39’	2.3	0.0	8	113	7	0.08
200327	23:34:27.62	44º46.75’	110º47.10’	4.5	0.0	12	183	5	0.12

Table 2. Earthquakes in the Yellowstone Region: January 1–March 31, 2020

DATE	ORIGIN TIME	LATITUDE	LONGITUDE	DEPTH	MAG	NO	GAP	DMN	RMS
200329	03:29:43.89	44º41.48’	110º58.30’	6.0	1.5W	21	54	3	0.15
200329	04:03:27.87	44º41.55’	110º58.53’	9.0	2.1W	26	49	3	0.20
200329	04:06:54.85	44º41.51’	110º58.48’	6.2	0.8	17	56	3	0.19
200329	04:11:30.59	44º41.41’	110º58.43’	6.8	2.1W	21	53	2	0.15
200329	04:16:14.10	44º41.52’	110º58.48’	5.3	0.6	11	115	3	0.13
200329	10:13:09.96	44º41.56’	110º58.51’	5.3	0.8	17	91	3	0.19
200329	10:24:39.11	44º41.57’	110º58.41’	6.9	0.8	17	54	3	0.17
200329	10:30:27.07	44º41.60’	110º58.52’	5.2	1.4W	17	53	3	0.18
200329	10:41:07.85	44º41.39’	110º58.66’	7.1	1.9W	18	51	3	0.15
200329	13:17:12.60	44º44.75’	110º54.75’	10.0	0.8	11	124	7	0.10
200329	14:24:24.13	44º41.36’	110º58.58’	5.7	0.5	10	117	2	0.17
200330	08:18:34.16	44º46.90’	111º08.10’	9.7	1.3W	13	99	3	0.14
200330	16:51:55.34	44º27.46’	110º34.66’	3.0	1.0	8	143	2	0.06
200330	21:48:49.67	44º39.51’	110º25.00’	5.4	1.8W	14	187	10	0.06
200331	05:14:23.24	44º49.60’	110º46.02’	2.3	0.8	13	124	8	0.13
200331	08:45:28.16	44º35.26’	110º58.51’	14.7	2.9W	26	81	9	0.14
200331	08:55:32.02	44º35.41’	110º57.99’	13.5	0.8W	12	149	9	0.17
200331	13:18:37.34	44º32.02’	110º02.91’	10.5	1.7	14	118	13	0.16
200331	15:36:45.24	44º44.68’	111º08.16’	9.3	3.1W	30	64	5	0.14
200331	15:49:28.13	44º45.81’	110º03.95’	15.2	2.2W	16	50	8	0.13
200331	18:44:06.56	44º44.28’	111º08.07’	6.5	0.2	9	131	5	0.14
200331	18:44:13.22	44º43.79’	111º08.05’	5.8	0.3W	9	139	5	0.17
200331	23:57:46.94	44º27.34’	110º32.01’	2.8	--	7	157	5	0.25
200331	23:58:02.60	44º28.95’	110º34.23’	2.3	--	6	221	5	0.11
200331	23:59:09.35	44º25.82’	110º39.76’	0.6	--	7	161	6	0.04

number of earthquakes = 386
* indicates poor depth control
W indicates Wood-Anderson data used for magnitude calculation

Table 3
UNIVERSITY OF UTAH YELLOWSTONE SEISMIC NETWORK
Operating Seismograph Stations
March 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	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	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 January 1–March 31, 2020

None