



Local Monitoring of Underground Mining Explosions

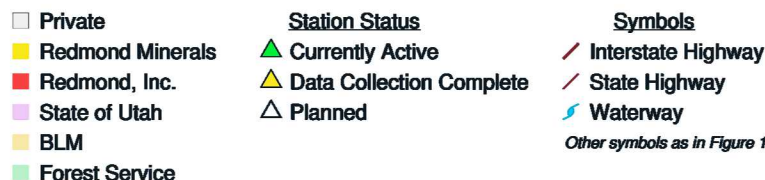
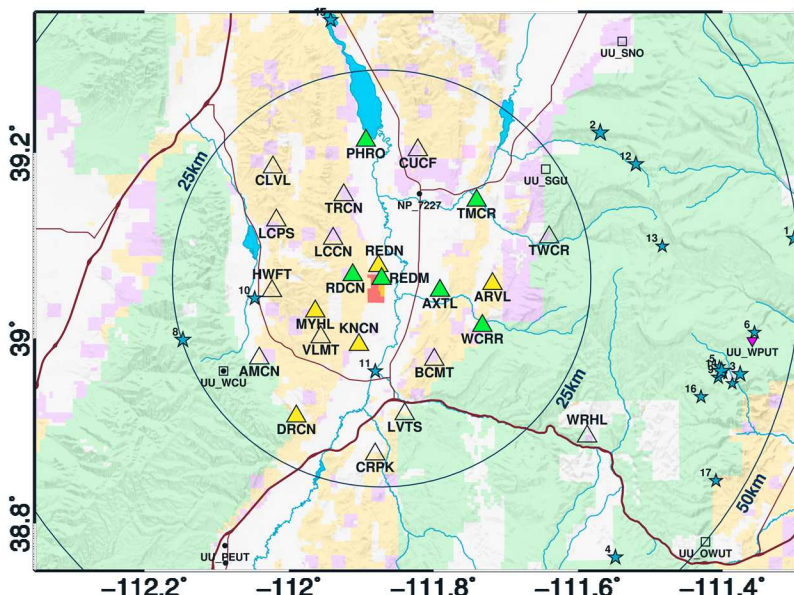


Table of Earthquakes since Oct. 2017

Depth(km)	Mag.	Date(UTC)	Time(UTC)
2.75	1.35	2017/10/05	07:04:47.800
16.89	1.78	2017/10/27	21:13:28.400
6.68	1.52	2017/11/12	04:16:25.630
10.33	1.40	2017/11/15	11:45:02.880
-0.92	0.75	2017/12/03	00:38:01.130
-2.02	0.95	2017/12/05	04:14:33.970
14.55	0.77	2017/12/10	11:20:24.710
0.70	1.53	2018/01/14	06:35:32.720
1.94	1.10	2018/01/15	11:39:22.580
3.35	1.26	2018/03/17	15:38:07.820
15.17	1.26	2018/03/29	07:55:16.030
1.94	1.44	2018/03/29	17:03:00.300
2.56	0.95	2018/04/07	08:42:53.330
3.04	1.86	2018/04/07	11:04:18.340
5.47	1.38	2018/04/12	08:44:40.020
2.98	1.02	2018/04/25	06:58:00.470
13.74	1.05	2018/05/03	09:31:41.260



Broadband and nodal monitoring of mining explosions and earthquakes

- Near-local distances (<30km) to examine monitoring methods at near offsets
 - Waveform correlation
 - Noise & travel time tomography
 - Discrimination
- Redmond Salt Mine blasts 4-6 times per week in an underground tunnel complex
 - Typical size is 0.5 tonne TNT equiv.
 - Short duration, 0.1s total.
- Data collection is 1/3 complete, finishing Q2, 2019

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