

## Datashare 65:

# *Regional detection and monitoring of injection-induced seismicity: Application to the 2010–2012 Youngstown, Ohio, seismic sequence*

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**Table S1.** Earthquake Catalog for the Youngstown Sequence\*

mm/dd/yyyy	UTC	Correlation	Template	ML_est
01/11/2011	21:16:49	2.994	1	1.3
01/29/2011	02:35:11	3.018	1	1.14
01/29/2011	14:00:41	2.248	1	0.9
01/30/2011	14:08:43	1.426	1	1.24
02/03/2011	02:08:46	3.115	1	1.19
02/07/2011	10:15:20	2.727	1	1.09
02/10/2011	15:02:12	1.614	1	1.48
02/17/2011	10:30:09	1.406	1	0.94
02/17/2011	23:14:07	1.477	1	1.07
02/20/2011	14:30:14	2.556	1	0.86
02/23/2011	08:08:40	3.002	1	1.14
02/23/2011	10:29:28	2.1	1	0.95
02/24/2011	07:26:59	1.683	1	0.95
02/26/2011	16:57:49	2.138	1	0.97
02/27/2011	03:56:26	2.883	1	1.05
03/02/2011	07:16:16	2.046	1	0.76
03/03/2011	07:01:20	1.453	1	0.96
03/03/2011	07:32:35	1.871	1	0.87
03/06/2011	02:30:33	1.354	1	0.78
03/06/2011	02:40:48	2.174	1	0.87
03/06/2011	09:06:51	1.533	1	0.76
03/06/2011	13:53:07	3.285	1	1.1
03/08/2011	03:28:12	1.449	1	1.06
03/11/2011	03:44:17	1.6	1	1.06
03/12/2011	00:38:04	2.845	1	1.28
03/12/2011	08:46:29	2.829	1	0.84
03/13/2011	06:18:21	4.477	1	1.17
03/13/2011	08:32:01	8.919	1	1.33
03/17/2011	03:40:33	2.247	1	1.12
03/17/2011	10:42:30	5.737	1	1.76
03/17/2011	10:53:20	1.995	1	2.3
03/19/2011	07:07:09	1.756	1	0.86
03/19/2011	09:48:02	6.696	1	1.2
03/19/2011	12:30:51	1.619	1	1.12
03/21/2011	19:14:20	1.948	1	1.51
03/24/2011	04:20:48	2.717	1	0.96
03/24/2011	05:58:32	1.496	1	0.85
03/24/2011	19:25:26	2.632	1	1.14
03/25/2011	16:39:33	1.467	1	1.14
03/25/2011	23:52:18	1.489	1	0.95
03/26/2011	03:25:04	3.045	1	0.99
03/26/2011	04:17:44	1.969	1	0.78

(continued)

**Table S1.** Continued

mm/dd/yyyy	UTC	Correlation	Template	ML_est
03/30/2011	00:04:11	1.896	1	1.09
03/30/2011	02:12:00	4.788	1	1.21
03/30/2011	02:13:52	1.421	1	0.84
04/06/2011	11:59:16	1.92	1	1.31
04/06/2011	22:15:29	1.513	1	1.14
04/07/2011	19:25:20	2.466	1	1.2
04/09/2011	00:10:07	1.709	1	0.91
04/10/2011	12:54:41	1.367	1	0.94
04/10/2011	17:04:02	4.251	1	1.33
04/15/2011	02:19:10	1.483	1	0.93
04/16/2011	06:22:49	2.806	1	1.1
04/18/2011	02:25:59	1.398	2	0.99
04/19/2011	20:18:41	1.39	1	1.06
04/20/2011	06:47:23	3.274	1	1.25
04/21/2011	00:40:17	1.476	1	0.97
04/21/2011	06:03:35	2.311	1	1.09
04/22/2011	21:26:43	1.684	3	1.22
04/23/2011	04:46:09	4.998	1	1.34
04/23/2011	14:56:53	1.798	1	1.13
04/24/2011	04:16:50	3.473	1	1.2
04/24/2011	04:29:53	1.623	1	0.72
04/24/2011	12:43:14	1.536	1	0.74
04/25/2011	23:43:07	2.211	1	1.05
04/26/2011	12:02:09	1.409	1	1.2
04/27/2011	06:24:23	2.387	1	0.83
05/01/2011	05:08:19	2.035	4	0.96
05/03/2011	11:52:59	3.211	1	1.83
05/08/2011	05:37:35	1.754	1	0.91
05/11/2011	14:10:42	2.441	1	1.3
05/12/2011	09:38:43	1.728	1	0.83
05/12/2011	15:07:41	1.777	1	1.24
05/12/2011	21:51:31	1.744	1	1.03
05/14/2011	11:41:26	1.651	4	1.1
05/14/2011	20:08:29	1.877	1	0.97
05/18/2011	08:45:02	1.623	4	0.93
05/18/2011	09:33:52	1.528	4	0.88
05/19/2011	01:26:56	2.591	1	0.93
05/22/2011	06:44:08	1.74	1	0.68
05/23/2011	02:50:48	2.57	1	1.02
05/25/2011	20:31:38	2.252	4	1.12
05/26/2011	03:08:31	2.623	1	1.15
05/26/2011	15:07:44	2.734	1	1.11
05/29/2011	05:21:39	2.677	1	0.77

(continued)

**Table S1. Continued**

mm/dd/yyyy	UTC	Correlation	Template	MI_est
05/30/2011	09:29:28	1.318	4	0.75
06/01/2011	09:29:47	2.305	1	1.06
06/04/2011	09:42:38	1.756	4	0.82
06/04/2011	09:43:15	1.908	4	0.85
06/05/2011	13:14:53	1.51	1	0.96
06/06/2011	09:51:52	1.917	1	1.02
06/07/2011	10:26:25	1.46	1	1.19
06/07/2011	12:59:19	1.825	1	1.25
06/09/2011	00:02:17	6.225	4	1.3
06/09/2011	08:50:24	1.726	1	0.95
06/11/2011	07:44:27	1.685	4	0.73
06/12/2011	09:05:28	1.322	1	0.85
06/12/2011	13:02:01	1.381	1	1.01
06/12/2011	15:15:22	1.423	4	1.15
06/12/2011	16:17:38	1.87	1	1.01
06/14/2011	02:37:43	1.251	3	0.81
06/14/2011	19:37:21	1.542	1	1.65
06/15/2011	01:53:37	1.743	1	0.9
06/15/2011	08:53:22	2.278	1	1.03
06/19/2011	23:01:14	2.865	1	0.98
06/20/2011	08:42:04	3.548	2	1.68
06/24/2011	10:33:55	2.614	3	1.1
06/25/2011	23:47:56	3.146	4	0.84
06/26/2011	15:46:43	1.373	1	1.06
06/28/2011	08:22:28	2.765	3	1.33
06/30/2011	04:24:08	2.166	3	0.86
07/03/2011	01:43:43	1.187	4	0.83
07/03/2011	08:24:15	4.537	3	1.01
07/03/2011	08:33:11	1.917	3	0.76
07/03/2011	14:08:30	1.209	4	0.77
07/03/2011	16:14:11	1.235	3	0.88
07/04/2011	09:10:12	1.257	4	0.56
07/04/2011	16:35:01	1.872	1	1.19
07/04/2011	19:09:06	2.008	1	1.06
07/04/2011	19:58:39	1.13	4	1.04
07/04/2011	22:52:58	1.247	3	0.92
07/05/2011	01:28:38	3.238	3	0.9
07/05/2011	01:31:14	2.337	3	0.78
07/05/2011	23:34:38	1.929	4	0.86
07/06/2011	08:15:45	2.457	4	0.78
07/07/2011	18:25:03	1.859	1	1.31
07/07/2011	21:05:48	2.54	4	1.62
07/07/2011	21:38:06	1.346	3	1.01
07/09/2011	08:38:51	2.385	4	1.09
07/10/2011	09:38:05	1.512	1	0.8
07/11/2011	03:36:45	2.132	3	0.72
07/12/2011	02:59:30	1.859	1	1.03
07/12/2011	05:44:20	1.304	3	0.94
07/13/2011	03:45:14	5.539	4	1.13
07/14/2011	02:52:20	1.888	1	0.83
07/16/2011	21:28:43	2	3	1.68
07/17/2011	19:52:16	2.448	3	1.25
07/19/2011	21:25:34	4.231	2	1.24
07/20/2011	01:17:20	5.533	3	1.07

**Table S1. Continued**

mm/dd/yyyy	UTC	Correlation	Template	MI_est
07/20/2011	02:19:59	2.712	1	0.97
07/20/2011	03:21:11	1.569	3	0.82
07/20/2011	10:42:17	2.039	4	1.1
07/20/2011	12:29:09	1.56	1	1.22
07/22/2011	04:28:47	3.487	4	0.94
07/24/2011	20:20:25	2.432	1	1.08
07/25/2011	13:32:54	1.585	1	1.04
07/26/2011	03:44:34	2.188	2	1.05
07/27/2011	22:55:32	4.403	3	1.15
07/28/2011	01:34:43	1.272	3	0.83
07/29/2011	02:28:37	1.893	2	0.87
07/29/2011	22:20:55	1.456	4	1.02
07/30/2011	06:48:29	1.557	4	1.17
07/30/2011	21:49:21	1.935	3	0.92
07/31/2011	06:12:02	6.746	3	0.96
08/04/2011	04:26:21	1.7	2	0.97
08/04/2011	23:02:01	1.826	2	1.01
08/05/2011	04:45:58	2.018	1	1
08/06/2011	05:31:36	1.431	4	0.75
08/07/2011	09:32:04	2.838	3	0.88
08/10/2011	06:04:09	1.366	2	0.85
08/10/2011	08:18:22	3.076	4	0.9
08/12/2011	04:23:19	3.35	2	0.91
08/13/2011	03:41:27	1.323	4	0.81
08/13/2011	07:26:33	1.762	1	0.77
08/16/2011	05:14:14	1.885	4	0.94
08/16/2011	21:28:28	1.678	4	1.23
08/17/2011	14:27:28	1.193	4	1.11
08/21/2011	17:03:22	2.382	3	0.74
08/22/2011	08:00:39	5.884	2	2.06
08/23/2011	06:47:22	1.536	1	0.89
08/24/2011	07:13:10	1.624	4	0.74
08/25/2011	19:44:31	0.723	4	2.08
08/25/2011	22:00:55	6.103	4	1.29
08/27/2011	06:18:52	4.04	4	1.06
08/28/2011	16:07:47	1.758	4	0.94
08/31/2011	19:53:30	1.837	4	1.26
09/01/2011	18:57:55	1.654	3	1.19
09/02/2011	21:03:36	9.479	4	2.15
09/03/2011	14:31:59	1.768	1	1.04
09/10/2011	10:10:31	6.018	4	1.04
09/11/2011	05:42:51	2.814	3	0.66
09/12/2011	09:33:00	1.623	2	0.91
09/12/2011	20:47:22	1.167	4	1.27
09/13/2011	16:45:35	1.431	4	1.32
09/14/2011	11:16:06	1.519	1	1.07
09/15/2011	01:46:24	1.846	4	0.98
09/16/2011	16:41:22	1.482	2	1.14
09/18/2011	03:45:20	1.952	1	0.82
09/18/2011	06:18:45	1.428	2	0.73
09/18/2011	19:59:50	1.701	4	0.96
09/19/2011	03:16:43	1.623	1	0.76
09/19/2011	03:33:32	1.74	2	0.8
09/20/2011	18:20:57	1.539	1	1.27

**Table S1. Continued**

mm/dd/yyyy	UTC	Correlation	Template	ML_est
09/21/2011	06:43:31	2.846	3	0.76
09/22/2011	10:21:18	5.197	2	1.75
09/22/2011	12:34:34	2.497	4	1.12
09/25/2011	14:39:42	1.327	2	1.06
09/25/2011	14:43:20	5.378	4	1.05
09/26/2011	01:06:17	4.79	2	2.36
09/28/2011	06:07:46	1.579	4	0.8
09/29/2011	01:50:30	2.633	4	0.95
09/30/2011	00:52:48	2	4	2.79
09/30/2011	07:06:11	1.168	4	0.79
10/01/2011	18:24:15	2.24	3	0.98
10/03/2011	02:09:20	2.957	1	1.07
10/03/2011	21:37:37	1.619	2	1.02
10/05/2011	09:36:49	1.764	4	1.2
10/05/2011	19:51:11	1.652	4	1.17
10/06/2011	04:53:43	5.032	2	1.2
10/06/2011	20:50:43	2.085	1	1.02
10/09/2011	01:20:21	2.98	2	1.32
10/09/2011	01:22:37	1.622	1	0.91
10/13/2011	07:08:48	1.452	3	1.06
10/15/2011	11:38:10	1.264	2	0.89
10/15/2011	20:40:02	1.557	4	1.19
10/20/2011	22:41:17	6.321	2	2.25
10/20/2011	23:03:23	2.591	2	1.26
10/21/2011	15:17:52	4.05	2	1.15
10/22/2011	23:23:09	2.697	3	0.92
10/23/2011	00:36:39	1.974	4	0.77
10/24/2011	02:40:37	1.795	1	0.71
10/24/2011	05:43:06	2.972	1	0.98
10/24/2011	19:12:44	1.819	2	1.15
10/26/2011	01:47:17	3.125	4	0.95
10/28/2011	02:03:45	1.494	1	0.86
10/28/2011	22:27:57	2.852	2	1.04
10/29/2011	08:43:07	2.951	3	0.88
10/29/2011	21:12:28	1.142	4	0.79
10/30/2011	21:46:47	2.188	2	0.82
11/01/2011	02:06:05	1.685	4	1.42
11/01/2011	05:44:05	1.554	2	1.06
11/06/2011	14:33:51	2.271	4	0.88
11/12/2011	16:57:04	3.112	2	0.96
11/13/2011	15:44:01	4.28	2	1.06
11/15/2011	05:33:40	2.394	1	1.03
11/17/2011	06:50:27	2.079	1	0.97
11/19/2011	14:32:01	1.832	2	1.27
11/20/2011	02:03:34	2.332	2	1.39
11/20/2011	02:50:25	2.505	1	1.25
11/20/2011	21:23:35	1.523	3	1.02
11/20/2011	21:34:32	7.089	2	1.25
11/21/2011	22:49:55	3.481	2	1.17
11/22/2011	06:01:05	1.293	4	0.95
11/22/2011	15:25:31	1.421	2	1.36
11/24/2011	05:54:58	1.435	2	0.94
11/25/2011	03:21:32	6.423	2	1.13
11/25/2011	06:47:35	1.995	2	1.99

**Table S1. Continued**

mm/dd/yyyy	UTC	Correlation	Template	ML_est
11/25/2011	10:40:56	1.375	3	0.91
11/26/2011	05:42:37	3.028	2	1.19
11/27/2011	11:44:02	3.883	2	1.4
12/03/2011	00:16:53	1.187	3	1.1
12/04/2011	11:38:22	3.674	2	1.05
12/07/2011	15:24:44	2.699	2	1.33
12/08/2011	23:42:22	1.434	3	1.01
12/11/2011	01:24:50	1.833	4	0.82
12/14/2011	01:19:47	3.214	2	1.08
12/14/2011	12:28:37	1.447	2	1.02
12/15/2011	07:27:49	1.635	4	0.96
12/15/2011	23:01:50	1.739	1	1.17
12/16/2011	18:02:53	3.797	4	1.26
12/17/2011	23:30:46	2.31	2	0.82
12/18/2011	03:52:18	5.04	2	0.98
12/21/2011	03:38:49	6.531	2	1.25
12/21/2011	17:01:43	1.45	4	1.12
12/23/2011	11:30:10	1.929	3	1.02
12/23/2011	13:19:03	2.784	3	1.12
12/24/2011	06:25:06	3.433	2	2.72
12/25/2011	02:23:17	1.251	4	0.71
12/26/2011	06:15:41	1.898	4	0.79
12/26/2011	16:25:49	1.899	3	1.02
12/28/2011	19:02:45	1.533	3	1.28
12/28/2011	23:05:36	1.103	3	0.84
12/29/2011	14:07:46	3.245	2	1.11
12/31/2011	20:05:08	5.852	2	4.08
01/06/2012	08:54:59	1.091	2	0.72
01/13/2012	22:29:42	3.242	2	1.95
01/17/2012	02:26:07	1.067	2	0.89
05/23/2012	00:03:20	1.243	4	0.85
05/29/2012	10:30:36	1.285	1	1.11
06/17/2012	10:47:43	1.682	2	0.81
07/03/2012	22:20:04	1.202	4	0.94
07/05/2012	16:30:48	3.477	4	1.5

\*ML\_est is the local magnitude estimated from the amplitude of the shear wave arrivals and scaled to the solutions arrived at by the ODNR for the larger events. "Correlation" describes the level of correlation, with the maximum being 12. "Template" describes the template to which it is most closely matched. UTC time is relative to the arrival of seismic phases at station N54A, not the earthquake origin time.

(continued)