# Supporting Information for "The Bortoluzzi Mud Volcano (Ionian Sea, Italy) and its potential for tracking the seismic cycle of active faults"

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**Additional supporting information (Files uploaded separately)**

Movie-S1-Seismofaults_BMV.mp4

Movie-S2-Seismofaults_BMV.mp4

## 1 Introduction

Supporting material contains two movie files (uploaded separately), two tables and three figures as supplement to the main text.

### 1.1 Captions for movies

**Movie-S1-Seismofaults_BMV.mp4** Mpeg4 file containing movie of a virtual flight over the Ionian seabed and the Bortoluzzi Mud Volcano (BMV).

**Movie-S2-Seismofaults_BMV.mp4** Mpeg4 file containing movie of a virtual flight over the Bortoluzzi Mud Volcano (BMV).

### 1.2 Additional supporting tables

| Date (yyyymmdd) | UTC Time (hh:mm:ss.cc) | Latitude (°N) | Longitude (°E) | Depth (km) | Md | Ml |
|---|---|---|---|---|---|---|
| 19851121 | 23:56:32.16 | 37.8955 | 16.0202 | 0.03 | 2.6 | |
| 19851229 | 12:18:00.51 | 37.6732 | 16.4792 | 11.26 | 3.0 | |
| 19860201 | 13:44:55.95 | 37.6853 | 16.0015 | 27.58 | 2.5 | |
| 19870419 | 12:30:31.97 | 37.7972 | 16.1732 | 3.07 | 3.4 | |
| 19870419 | 19:44:15.95 | 37.8780 | 16.1058 | 0.2 | 2.9 | |
| 19880603 | 12:41:43.10 | 37.6802 | 16.5248 | 31.16 | 2.5 | 2.0 |
| 19880801 | 19:28:15.68 | 37.8808 | 16.3282 | 29.51 | 3.0 | 2.2 |
| 19881023 | 13:41:54.96 | 37.9208 | 16.0888 | 0.15 | 2.4 | |
| 19890113 | 11:56:31.38 | 37.7672 | 16.2522 | 39.92 | 2.6 | 2.2 |
| 19890613 | 21:13:55.06 | 38.0547 | 16.3642 | 11.25 | 2.8 | 1.9 |
| 19890717 | 13:57:25.70 | 37.6060 | 16.4513 | 28.34 | 2.6 | 2.2 |
| 19891029 | 12:44:49.93 | 37.8642 | 16.3093 | 31.78 | 2.4 | 1.8 |
| 19900306 | 20:51:22.54 | 37.7282 | 16.2113 | 25.89 | 2.4 | 1.8 |
| 19900325 | 22:30:42.18 | 37.6903 | 16.2258 | 32.69 | 2.3 | 1.9 |
| 19901006 | 05:52:38.98 | 37.9513 | 16.0980 | 29.55 | 2.3 | |
| 19910116 | 20:18:10.45 | 37.9718 | 16.0163 | 7.37 | 2.9 | 2.8 |
| 19910716 | 00:41:36.05 | 38.0713 | 16.2038 | 10.92 | 2.4 | |
| 19911011 | 00:14:41.59 | 37.6447 | 16.3388 | 34.07 | 3.2 | 2.8 |
| 19951007 | 05:41:58.79 | 38.0785 | 16.0225 | 10.61 | 3.2 | 2.8 |
| 20021201 | 02:17:43.59 | 37.8757 | 16.1337 | 4.83 | 2.4 | |
| 20021202 | 02:22:04.57 | 37.8272 | 16.2090 | 4.47 | 2.7 | |
| 20030103 | 11:44:04.03 | 37.6185 | 16.1377 | 18.23 | 2.5 | |
| 20030312 | 05:49:22.86 | 38.0772 | 16.0022 | 5.43 | 3.0 | 2.3 |
| 20030612 | 18:51:27.04 | 37.6082 | 16.4098 | 28.63 | 3.2 | 3.5 |
| 20030709 | 22:19:17.19 | 37.9750 | 16.2527 | 14.31 | 2.6 | 1.7 |
| 20031210 | 06:38:05.47 | 37.6133 | 16.3245 | 33.01 | 2.6 | 2.6 |
| 20040704 | 06:49:17.93 | 38.0018 | 16.0557 | 5.86 | 2.4 | 2.0 |
| 20040704 | 08:46:25.71 | 37.9848 | 16.1170 | 6.92 | 2.3 | 1.9 |

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|---|---|---|---|---|---|---|
| 20040707 | 19:16:57.13 | 37.9955 | 16.1187 | 3.01 | 2.3 | 2.1 |
| 20040715 | 21:17:20.34 | 38.0177 | 16.0382 | 3.35 | 2.7 | 2.5 |
| 20040717 | 16:43:35.49 | 37.9212 | 16.4295 | 4.29 | 2.8 | 2.6 |
| 20040816 | 03:13:29.43 | 37.7943 | 16.2753 | 33.96 | 2.5 | 2.0 |
| 20041117 | 04:24:32.43 | 38.0408 | 16.0392 | 6.44 | 2.5 | 2.4 |
| 20050323 | 21:59:25.45 | 37.6413 | 16.2912 | 30.28 | 2.5 | 2.0 |
| 20050503 | 18:41:12.50 | 37.9628 | 16.0937 | 10.01 | 1.7 | |
| 20050503 | 19:34:49.90 | 38.0080 | 16.1682 | 9.58 | 1.6 | |
| 20050513 | 14:31:19.96 | 37.7543 | 16.1645 | 32.59 | 2.1 | |
| 20050617 | 20:53:21.97 | 38.0817 | 16.1515 | 13.11 | 2.6 | |
| 20050910 | 00:48:59.05 | 38.0958 | 16.2702 | 12.1 | 1.7 | |
| 20051002 | 01:12:32.81 | 37.7655 | 16.0492 | 34.38 | 2.2 | |
| 20060421 | 18:12:56.85 | 37.6153 | 16.2015 | 28.15 | 1.9 | |
| 20060530 | 11:30:40.54 | 37.6212 | 16.5143 | 30.02 | 4.2 | |
| 20060530 | 11:38:34.44 | 37.6163 | 16.4632 | 32.76 | 3.5 | |
| 20060530 | 13:02:51.33 | 37.6008 | 16.4608 | 31.84 | 2.4 | |
| 20060530 | 22:16:54.00 | 37.6145 | 16.4350 | 32.84 | 2.7 | |
| 20060531 | 13:56:57.70 | 37.6155 | 16.4372 | 27.1 | 2.9 | |
| 20060619 | 00:14:23.17 | 37.6525 | 16.3210 | 31.01 | 2.0 | |
| 20060720 | 03:48:05.59 | 37.6342 | 16.1395 | 27.91 | 2.1 | |
| 20060730 | 09:53:36.02 | 38.0093 | 16.2888 | 10.17 | 2.8 | |
| 20060730 | 10:04:58.24 | 38.0040 | 16.2828 | 11.95 | 1.6 | |
| 20060801 | 22:09:47.40 | 37.7652 | 16.0215 | 25.69 | 1.9 | |
| 20060830 | 07:53:55.36 | 37.6597 | 16.2517 | 27.97 | 2.8 | |
| 20061003 | 04:58:28.51 | 37.7792 | 16.2588 | 11.65 | 2.6 | |
| 20061229 | 12:24:32.87 | 37.6073 | 16.0407 | 34.82 | 2.2 | |
| 20070310 | 19:52:16.52 | 38.0255 | 16.1078 | 35.94 | 2.3 | |
| 20070421 | 06:15:43.47 | 37.6903 | 16.3018 | 30.21 | 3.0 | |
| 20070515 | 02:44:25.39 | 37.7540 | 16.1197 | 22.04 | 2.2 | |
| 20070602 | 04:33:34.97 | 37.7773 | 16.1377 | 26.16 | 2.0 | |
| 20070613 | 10:08:01.78 | 38.0175 | 16.4470 | 31.28 | 1.6 | |
| 20070619 | 12:41:06.37 | 37.6733 | 16.4775 | 26.96 | 1.9 | |
| 20070623 | 19:19:22.61 | 37.6175 | 16.2180 | 18.44 | 1.9 | |

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|---|---|---|---|---|---|---|
| 20070702 | 23:05:24.50 | 38.0005 | 16.5470 | 38.22 | 1.6 | |
| 20070803 | 04:14:22.74 | 37.9570 | 16.3065 | 19.3 | 2.1 | |
| 20070803 | 07:17:17.05 | 37.9750 | 16.3172 | 16.32 | 2.0 | |
| 20070803 | 12:42:02.04 | 37.9415 | 16.3312 | 7.19 | 2.4 | |
| 20070803 | 16:54:20.35 | 38.0090 | 16.2393 | 27.95 | 1.7 | |
| 20070816 | 22:24:49.65 | 37.8882 | 16.4192 | 25.93 | 1.6 | |
| 20070913 | 14:45:41.50 | 37.9733 | 16.3315 | 10.85 | 1.7 | |
| 20070913 | 17:19:10.75 | 37.8937 | 16.3368 | 10.01 | 2.9 | |
| 20080110 | 09:02:57.10 | 37.6312 | 16.0713 | 27.99 | 2.2 | |
| 20080116 | 19:43:46.68 | 37.7818 | 16.2277 | 34.33 | 2.7 | |
| 20080120 | 01:50:50.97 | 38.0550 | 16.0753 | 14.64 | 1.5 | |
| 20080124 | 12:05:31.75 | 38.0537 | 16.0717 | 14.31 | 1.6 | |
| 20080201 | 19:10:23.25 | 37.9010 | 16.0245 | 5.81 | 2.1 | |
| 20080306 | 11:05:57.50 | 38.0822 | 16.2000 | 14.81 | 1.6 | |
| 20080306 | 15:53:41.33 | 38.0747 | 16.2203 | 15.79 | 2.1 | |
| 20080308 | 04:51:52.43 | 38.0873 | 16.2045 | 12 | 1.8 | |
| 20080509 | 04:34:50.80 | 37.6428 | 16.1038 | 29.12 | 1.7 | |
| 20080726 | 09:10:30.31 | 37.8418 | 16.1820 | 39.9 | 2.1 | |
| 20081020 | 09:10:31.02 | 37.8638 | 16.0417 | 5.49 | 1.7 | 2.2 |
| 20081102 | 06:46:43.72 | 37.6338 | 16.4657 | 33.11 | 3.4 | 1.7 |
| 20090128 | 00:21:49.93 | 38.0720 | 16.1932 | 7.07 | 3.0 | 2.3 |
| 20090310 | 20:33:05.37 | 38.0628 | 16.2238 | 10.25 | 2.0 | 2.3 |
| 20090311 | 04:51:56.64 | 37.8397 | 16.4040 | 29.59 | 2.0 | 3.1 |
| 20090425 | 10:15:35.96 | 37.6247 | 16.3542 | 33.06 | 3.1 | |
| 20090526 | 11:04:12.44 | 37.9940 | 16.2785 | 13.73 | 1.8 | |
| 20090528 | 02:55:53.04 | 37.9652 | 16.1055 | 6.64 | 1.2 | |
| 20090604 | 18:47:59.08 | 37.6580 | 16.2803 | 31.85 | 1.7 | |
| 20090628 | 01:31:58.47 | 37.6327 | 16.0060 | 17.54 | 1.7 | |
| 20090821 | 14:07:03.33 | 37.8625 | 16.0960 | 31.1 | 1.5 | |
| 20090930 | 19:55:56.43 | 37.9765 | 16.0303 | 7.01 | 1.0 | |
| 20091013 | 22:25:37.36 | 37.7257 | 16.1983 | 28.06 | 2.1 | |
| 20091109 | 18:45:28.58 | 38.0713 | 16.4277 | 10.16 | 1.9 | |
| 20091109 | 19:31:53.15 | 38.0772 | 16.4210 | 15.41 | 1.5 | |

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|---|---|---|---|---|---|---|
| 20091110 | 04:40:25.49 | 38.0803 | 16.4190 | 9.96 | 2.7 | |
| 20091110 | 07:14:02.93 | 38.0995 | 16.4017 | 10.42 | 2.2 | |
| 20091111 | 22:51:11.81 | 38.0855 | 16.4263 | 9.27 | 2.5 | |
| 20091113 | 08:28:21.83 | 38.0543 | 16.4447 | 10.85 | 1.5 | |
| 20091116 | 14:08:10.71 | 38.0723 | 16.4315 | 12.5 | 1.6 | |
| 20091118 | 00:56:00.18 | 38.0720 | 16.4335 | 15.6 | 1.3 | |
| 20091118 | 06:56:03.25 | 38.0767 | 16.4333 | 15.7 | 1.5 | |
| 20091118 | 10:58:15.09 | 38.0885 | 16.4028 | 10.01 | 2.1 | |
| 20091118 | 15:48:31.29 | 38.1027 | 16.3968 | 4.59 | 2.6 | |
| 20091120 | 10:14:00.21 | 38.0717 | 16.4458 | 10.15 | 1.3 | |
| 20091121 | 10:27:49.12 | 38.0843 | 16.4135 | 10.25 | 2.2 | |
| 20091125 | 06:20:07.09 | 38.0593 | 16.4503 | 13.92 | 3.1 | |
| 20091211 | 06:34:17.61 | 38.0813 | 16.4310 | 12.13 | 2.0 | |
| 20091211 | 08:28:21.74 | 38.0797 | 16.4287 | 15.88 | 1.9 | |
| 20091211 | 09:02:33.58 | 38.0735 | 16.4312 | 12.44 | 2.1 | |
| 20091220 | 05:53:38.96 | 38.0760 | 16.4228 | 15.63 | 2.1 | |
| 20091223 | 02:11:59.85 | 38.0783 | 16.4107 | 9.7 | 2.7 | |
| 20091225 | 16:37:55.26 | 38.0993 | 16.4158 | 4.83 | 1.5 | |
| 20091229 | 03:31:01.45 | 37.6932 | 16.1437 | 34.97 | 2.3 | |
| 20100403 | 21:20:50.93 | 37.7162 | 16.0773 | 18.42 | 1.6 | |
| 20110527 | 08:29:23.10 | 37.9240 | 16.0108 | 33.47 | 2.0 | |
| 20110601 | 07:56:04.00 | 37.6580 | 16.1067 | 29.09 | 2.3 | |
| 20110803 | 02:44:49.90 | 37.7717 | 16.0723 | 21.64 | 1.6 | |
| 20110819 | 10:10:13.36 | 37.9337 | 16.0155 | 4.14 | 2.0 | |
| 20120422 | 08:30:52.98 | 37.7508 | 16.2737 | 37.92 | 1.8 | |
| 20120630 | 21:45:28.94 | 37.8802 | 16.2077 | 15.04 | 2.0 | |
| 20120702 | 05:02:32.47 | 38.0613 | 16.0263 | 4.6 | 2.0 | |
| 20120714 | 09:42:43.70 | 38.0565 | 16.1310 | 2.84 | 1.6 | |
| 20120717 | 11:11:15.44 | 37.9418 | 16.2212 | 15.69 | 2.4 | |
| 20120717 | 11:17:36.39 | 38.0307 | 16.2403 | 12.28 | 2.4 | |
| 20120717 | 11:19:55.25 | 38.0907 | 16.2852 | 4.98 | 2.5 | |
| 20120717 | 11:22:39.11 | 37.9877 | 16.2640 | 23.42 | 2.5 | |
| 20120718 | 01:31:50.62 | 38.0187 | 16.2615 | 17.4 | 2.4 | |

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|---|---|---|---|---|---|---|
| 20120718 | 11:17:11.04 | 37.8852 | 16.1667 | 15.6 | 2.6 | |
| 20120726 | 09:53:34.12 | 37.6583 | 16.0908 | 24.03 | 1.9 | |
| 20120726 | 14:20:03.13 | 37.9168 | 16.3243 | 3.06 | 3.0 | |
| 20120731 | 07:27:30.42 | 38.0270 | 16.1970 | 22.62 | 2.1 | |
| 20120802 | 00:02:07.16 | 38.0568 | 16.2698 | 4.43 | 2.2 | |
| 20119902 | 18:00:20.34 | 38.0373 | 16.3210 | 3.98 | 2.8 | |
| 20121002 | 00:47:43.19 | 37.9760 | 16.0265 | 7.85 | 1.9 | |
| 20121003 | 04:24:34.04 | 37.9090 | 16.0355 | 8.26 | 1.8 | |
| 20121118 | 02:05:29.55 | 37.9948 | 16.2310 | 21.54 | 1.9 | |
| 20130120 | 01:30:13.39 | 37.6863 | 16.2873 | 30.95 | 2.1 | |
| 20130201 | 20:36:20.60 | 37.7533 | 16.1885 | 31.26 | 2.1 | |
| 20130312 | 13:49:42.94 | 37.7528 | 16.2953 | 28.01 | 2.4 | |
| 20130324 | 15:47:21.81 | 37.6783 | 16.4573 | 28.47 | 4.4 | |
| 20130324 | 20:37:50.10 | 37.7062 | 16.3175 | 30.54 | 3.1 | |
| 20130516 | 15:40:48.90 | 37.8337 | 16.2905 | 29.06 | 2.9 | |
| 20130721 | 23:41:15.28 | 37.7438 | 16.4678 | 31.62 | 2.0 | |
| 20130724 | 11:00:57.58 | 37.8597 | 16.5353 | 33.7 | 2.1 | |
| 20130731 | 02:30:59.02 | 37.7402 | 16.2977 | 28 | 2.1 | |
| 20130921 | 15:17:47.72 | 37.7873 | 16.3537 | 28.69 | 2.5 | |
| 20131216 | 23:08:43.28 | 38.0543 | 16.2352 | 14.59 | 2.8 | |
| 20140102 | 14:36:00.51 | 37.6815 | 16.1115 | 28.06 | 2.1 | |
| 20140118 | 06:17:41.12 | 37.8860 | 16.1418 | 33.62 | 3.1 | |
| 20140121 | 03:33:36.12 | 37.9937 | 16.1230 | 6.49 | 2.3 | |
| 20140703 | 22:55:38.30 | 37.7743 | 16.1965 | 13.65 | 2.0 | |
| 20140709 | 22:09:40.40 | 37.7048 | 16.1087 | 27.64 | 2.1 | |
| 20140721 | 01:05:18.93 | 37.8912 | 16.4278 | 33.16 | 2.4 | |
| 20140721 | 18:22:17.95 | 37.6978 | 16.3008 | 29.73 | 2.7 | |
| 20140728 | 21:57:54.99 | 37.8240 | 16.1790 | 29.79 | 2.3 | |
| 20141109 | 21:08:24.14 | 37.8610 | 16.2615 | 33.1 | 2.1 | |
| 20141112 | 06:27:41.83 | 37.6362 | 16.1432 | 25.23 | 2.1 | |
| 20150214 | 05:31:41.43 | 37.7132 | 16.1563 | 29.98 | 2.2 | |
| 20150328 | 08:21:54.39 | 37.6077 | 16.1653 | 27.99 | 3.1 | |
| 20150419 | 14:05:45.94 | 37.6068 | 16.0017 | 28.01 | 2.4 | |

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|---|---|---|---|---|---|---|
| 20150604 | 08:49:48.55 | 37.7353 | 16.1658 | 31.22 | 2.3 | |
| 20150708 | 13:43:21.89 | 37.7795 | 16.2287 | 32.72 | 2.7 | |
| 20150721 | 10:00:46.67 | 37.6920 | 16.3807 | 28.85 | 2.0 | |
| 20150930 | 03:26:47.68 | 37.7982 | 16.3145 | 23.01 | 2.0 | |
| 20151004 | 17:08:08.98 | 37.6908 | 16.4070 | 29.2 | 2.2 | |
| 20151121 | 17:53:12.98 | 37.6332 | 16.1707 | 28.08 | 2.1 | |
| 20151122 | 10:02:59.11 | 37.6590 | 16.4327 | 28.03 | 2.5 | |
| 20151124 | 22:29:23.54 | 37.6287 | 16.3213 | 28.19 | 2.2 | |
| 20160103 | 23:55:20.58 | 37.7265 | 16.1963 | 37.06 | 2.4 | |
| 20160111 | 01:07:40.45 | 37.8003 | 16.0587 | 15.26 | 2.3 | |
| 20160112 | 05:24:28.71 | 37.7713 | 16.4463 | 28.04 | 2.5 | |
| 20160228 | 01:11:45.33 | 37.6797 | 16.0725 | 35.49 | 2.1 | |
| 20160509 | 15:50:16.29 | 37.6307 | 16.3672 | 33.72 | 2.5 | |
| 20160514 | 10:47:18.20 | 37.6343 | 16.4138 | 30.91 | 2.6 | |
| 20160821 | 21:27:42.58 | 37.8805 | 16.0333 | 33.3 | 2.4 | |
| 20160927 | 07:16:29.18 | 37.7863 | 16.2637 | 22.9 | 2.5 | |
| 20161101 | 04:32:27.48 | 37.6427 | 16.4178 | 27.98 | 2.4 | |
| 20170211 | 00:04:30.95 | 37.6813 | 16.2428 | 27.7 | 2.2 | |

Table S1: Data for earthquakes in the BMV area shown as epicenters in Figs. 1 and 2(a) and as hypocenters in Fig. 2b. Data are from the public database of INGV Centro Nazionale Terremoti (http://cnt.rm.ingv.it/).

| N° | Date (yyyymmdd) | UTC Time (hh:mm:ss.cc) | Latitude (°N) | Longitude (°E) | Depth (km) | Strike (°) | Dip (°) | Rake (°) | Mw |
|---|---|---|---|---|---|---|---|---|---|
| 6 | 20060730 | 09:53:35.90 | 37.99 | 16.31 | 6.0 | 292 | 64 | -7 | 2.70 |
| 15 | 20090316 | 00:28:05.90 | 37.67 | 15.96 | 28.0 | 34 | 60 | -24 | 3.00 |
| 20 | 20091125 | 06:20:07.30 | 38.05 | 16.45 | 16.0 | 341 | 62 | -43 | 3.20 |
| 29 | 20120726 | 14:20:03.00 | 37.90 | 16.34 | 16.0 | 134 | 83 | -19 | 3.10 |
| 2b | 20130324 | 15:47:22.00 | 37.76 | 16.50 | 30.0 | 257 | 87 | 178 | 4.56 |

Table S2: Data for the earthquake focal mechanisms shown in Figs. 1 and 2. Data are from the European-Mediterranean Regional Centroid-Moment Tensors (RCMT) catalog (http://rcmt2.bo.ingv.it/) (red beach ball in Figs. 1 and 2) and from previous papers (blue beach balls in Figs. 1 and 2) by Orecchio et al. (2014) and Polonia et al. (2016). N° refers to the numbers shown in Figs. 1 and 2 close to each focal mechanism.

## 1.3 Additional supporting figures

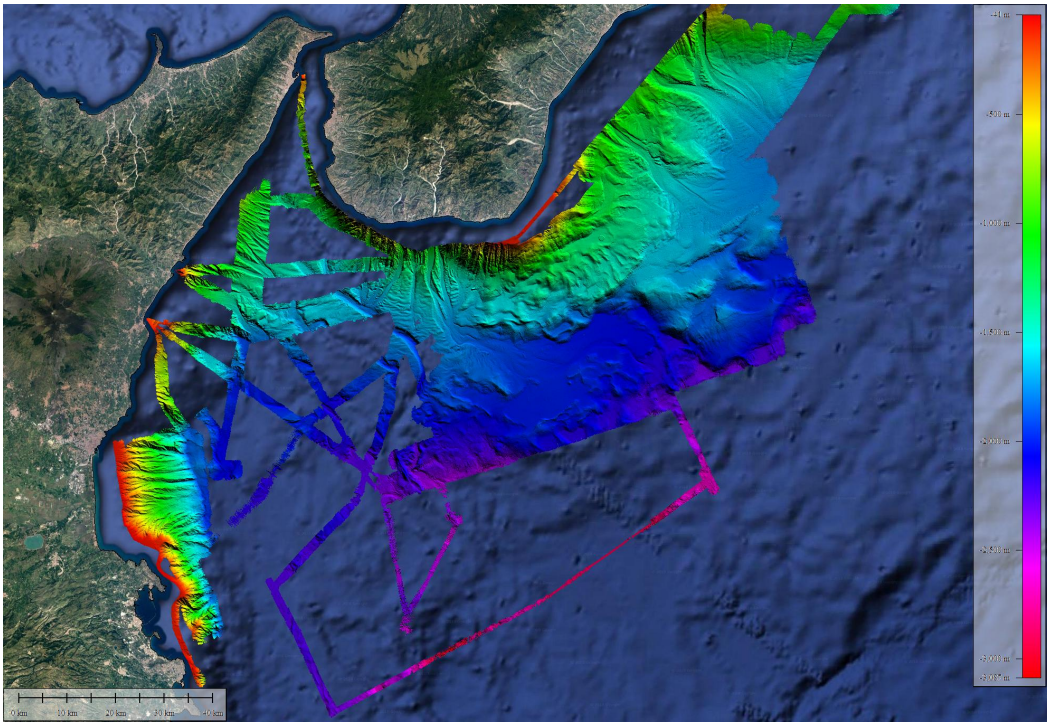

**Figure S1.** High-resolution multibeam bathymetry of the Ionian Sea acquired during the Seismofaults 2017 cruise. Note that, with this work, we will freely release the raw numerical data for 4970 km$^2$ of newly-acquired high-resolution bathymetric data (graphically shown in this figure) for the Ionian Sea including the BMV.

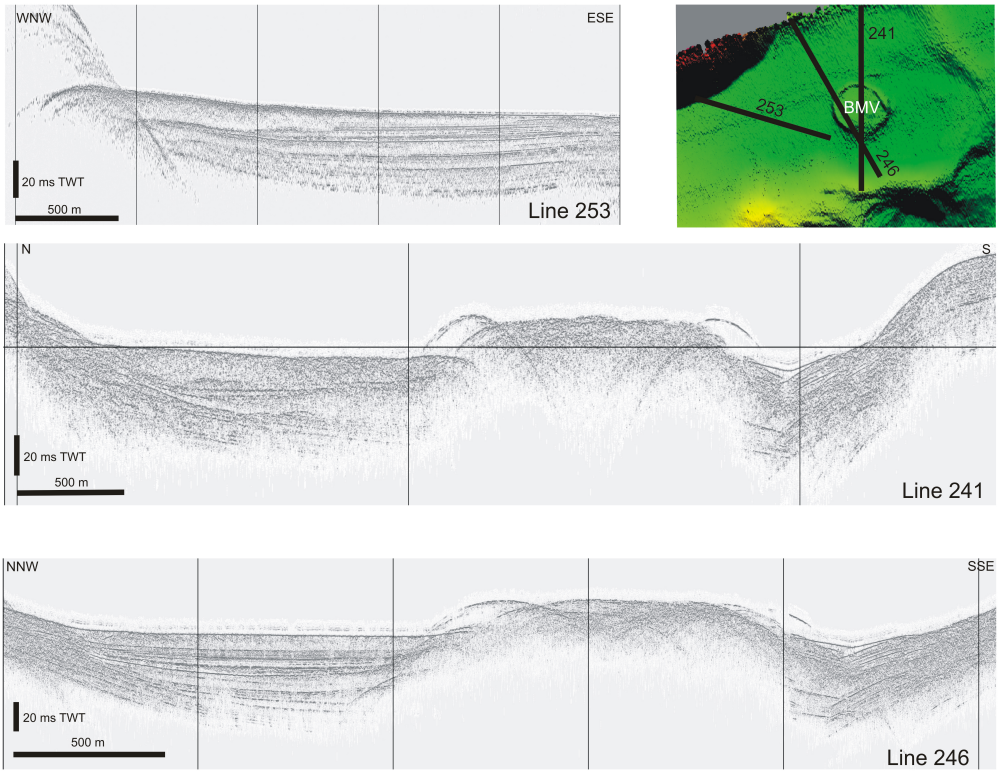


**Figure S2.** Non-interpreted high-resolution version of Fig. 7 of the main text.

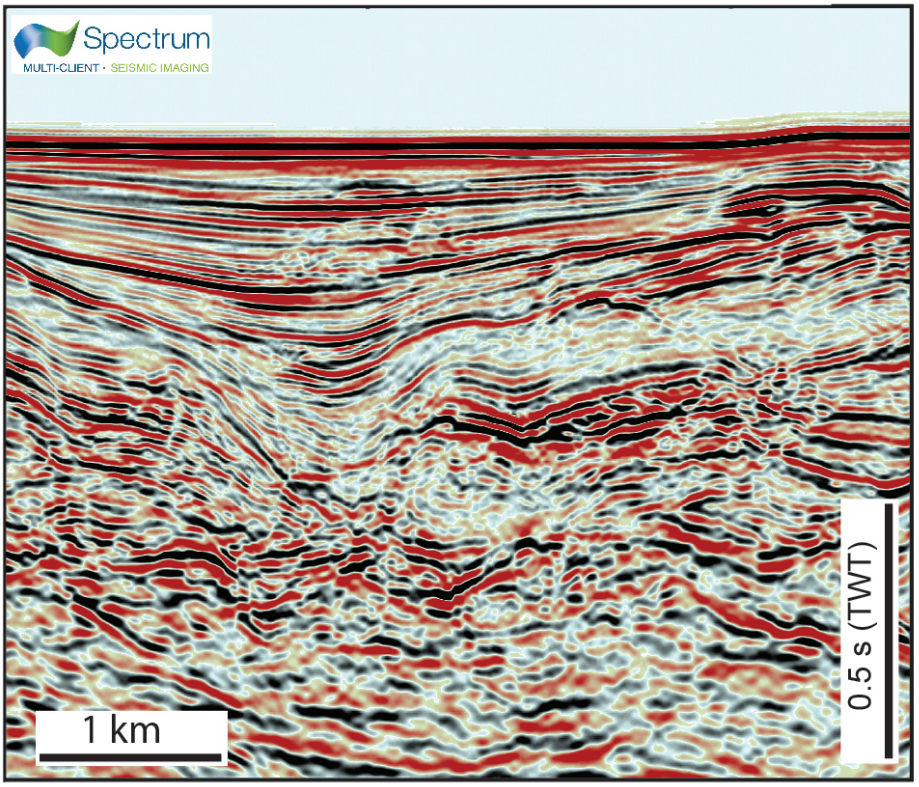


**Figure S3.** Non-interpreted high-resolution seismic reflection image shown in Fig. 10(e) of the main text.