**Rupture Characteristics and the Structural Control of the 2016 Mwp 6.1 Intraplate Earthquake in the Petermann Ranges, Australia**

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**Supplementary Information**

In this electronic supplement, we provide source parameters of the aftershocks that were located using the temporary seismic network of nine stations mentioned in the main text. This information is included in Table S1.

**Table S1. Located aftershocks of the 2016 May 20th Petermann earthquake**

Date hhmm Sec Lon ±Lon Lat ±Lat Depth ±Depth ML

2016-05-26 1405 54.24 129.8951 .29 km -25.6127 .36 km 2.58 0.2 2

2016-05-26 1421 16.55 129.9592 .47 km -25.6152 .27 km 6.09 0.16 2.1

2016-05-27 1049 44.8 129.907 .33 km -25.5541 .33 km 5.33 0.54 2.1

2016-05-27 2039 28.08 129.8758 .14 km -25.5696 .25 km 4.11 0.24 3.5

2016-05-28 0120 7.16 129.7709 .2 km -25.6324 .11 km 6.02 0.12 1.5

2016-05-29 0013 27.31 129.9364 .31 km -25.6577 .19 km 3.76 0.41 2.2

2016-05-30 0502 26.77 129.9114 .08 km -25.6042 .22 km 3.37 0.2 0.3

2016-05-30 0541 24.17 129.8051 .08 km -25.5944 .13 km 2.22 0.13 -0.2

2016-05-30 0653 14.59 129.7882 .07 km -25.5974 .16 km 2.42 0.11 0.8

2016-05-30 0936 40.19 129.8600 .09 km -25.5689 .22 km 5.72 0.26 1.5

2016-05-30 1137 18.97 129.8521 .11 km -25.6080 .24 km 2.44 0.15 0.8

2016-05-30 1238 50.28 129.9119 .08 km -25.6036 .22 km 3.33 0.24 1.3

2016-05-30 1307 13.58 129.9037 .15 km -25.5968 .31 km 4.61 0.32 2.3

2016-05-30 1424 25.51 129.8214 .21 km -25.5900 .59 km 2.76 0.33 1

2016-05-30 1605 54.24 129.9203 .11 km -25.5770 .25 km 5.33 0.32 1.7

2016-05-30 1735 48.45 129.8270 .11 km -25.6666 .3 km 5.03 0.33 1.6

2016-05-30 2108 1.39 129.8096 .07 km -25.6380 .21 km 4.43 0.21 1.7

2016-05-31 0028 17.72 129.9130 .14 km -25.5598 .3 km 5.64 0.3 1.7

2016-05-31 0103 27.46 129.7804 .10 km -25.6362 .18 km 7.00 0.15 0.4

2016-05-31 1328 43.63 129.9225 .13 km -25.5534 .22 km 6.05 0.56 1.5

2016-06-01 0013 38.25 129.8202 .11 km -25.6372 .26 km 7.23 0.2 0.1

2016-06-01 1829 30.11 129.9616 .14 km -25.6300 .3 km 3.10 0.82 0.6

2016-06-01 1910 27.12 129.8748 .10 km -25.6130 .23 km 2.32 0.14 2.1

2016-06-01 2345 11.1 129.9663 .10 km -25.6166 .21 km 5.79 0.27 1.8

2016-06-03 0042 3.73 129.7962 .09 km -25.5870 .18 km 2.12 0.12 1.9

2016-06-03 0059 48.09 129.9615 .11 km -25.6247 .22 km 7.04 0.24 0.9

2016-06-03 0156 24.51 129.8346 .07 km -25.6022 .17 km 2.64 0.12 0.6

2016-06-03 0204 18.8 129.8018 .06 km -25.5782 .16 km 2.76 0.1 0.3

2016-06-03 0300 36.58 129.9025 .10 km -25.6411 .25 km 2.73 0.17 0.5

2016-06-03 0308 47.29 130.3345 .58 km -25.6785 .58 km 1.00 0.84 1.5

2016-06-03 0407 44.14 129.9002 .1 km -25.6018 .26 km 3.03 0.23 0.4

2016-06-03 0413 43.12 130.3282 .35 km -25.6808 .38 km 3.25 0.79 1.3

2016-06-03 0646 47.07 130.3127 .89 km -25.9371 .89 km 2.80 2.3 1.8

2016-06-03 0717 57.63 129.9069 .13 km -25.6512 .39 km 2.93 0.41 0.2

2016-06-03 0818 53.63 129.8018 .07 km -25.5787 .17 km 2.71 0.1 0.2

2016-06-03 0906 20.5 129.9205 .09 km -25.5502 .19 km 6.14 0.25 2.3

2016-06-03 1003 26.68 129.8973 .07 km -25.5653 .18 km 5.01 0.19 1.9

2016-06-03 1146 53.03 129.9441 .14 km -25.6342 .38 km 4.47 0.43 -0.5

2016-06-03 1147 24.95 129.7824 .12 km -25.6008 .18 km 2.38 0.12 0.1

2016-06-03 1236 26.11 129.8118 .07 km -25.5731 .19 km 2.43 0.12 0.4

2016-06-03 1450 22.61 129.9646 .15 km -25.6322 .32 km 3.10 1.02 0.6

2016-06-03 1733 56.21 129.8634 .11 km -25.6574 .25 km 4.89 0.21 1.4

2016-06-03 1819 18.3 129.8467 .07 km -25.5570 .26 km 5.38 0.31 1.6

2016-06-03 1949 29.66 129.8786 .11 km -25.6266 .31 km 2.32 0.16 0.6

2016-06-03 2059 5.65 129.8196 .06 km -25.5728 .15 km 2.70 0.11 0.1

2016-06-03 2157 20.87 129.9648 .15 km -25.6242 .34 km 4.64 0.49 1.5

2016-06-03 2233 51.33 129.8899 .06 km -25.5836 .15 km 4.46 0.14 0.6

2016-06-05 0803 46.74 129.8941 .08 km -25.5940 .22 km 4.82 0.17 2.6

2016-06-05 1239 7.81 129.9396 .09 km -25.5496 .22 km 6.38 0.19 3.1

2016-06-06 1545 51.43 129.8769 .08 km -25.5773 .19 km 3.78 0.22 3

2016-06-08 0937 26.56 129.8348 .12 km -25.6289 .25 km 5.31 0.29 1.7

2016-06-08 1058 24.9 129.8264 .09 km -25.6310 .22 km 5.07 0.17 1.2

Date hhmm Sec Lon ±Lon Lat ±Lat Depth ±Depth ML

2016-06-14 0805 45.17 129.8882 .38 km -25.5490 .6 km 4.91 0.8 3.1

2016-07-08 2251 17.29 129.8536 .14 km -25.5939 .2 km 2.83 0.36 3.2

2016-07-10 0038 4.97 129.8515 .14 km -25.5924 .21 km 2.86 0.44 1.7

2016-07-21 1754 6.91 129.9024 .17 km -25.6175 .24 km 2.69 0.13 3.2

2016-07-22 0020 51.63 129.8253 .08 km -25.5939 .1 km 2.64 0.11 1.3

2016-07-22 0101 51.04 130.1991 .92 km -25.9053 .94 km 6 3.36 0.8

2016-07-22 0107 18.15 129.8443 .09 km -25.6092 .15 km 2.4 0.12 1

2016-07-22 2122 7.99 129.8349 .07 km -25.6009 .15 km 2.54 0.13 0.8

2016-08-06 2116 34.75 129.8618 .08 km -25.588 .15 km 3.45 0.24 3.3

2016-08-12 0922 48.09 129.8775 .11 km -25.5597 .23 km 4.92 0.3 2.5

2016-08-15 0916 38.71 129.9135 .15 km -25.6383 .21 km 2.85 0.23 2.4

2016-08-19 1439 23.06 129.8388 .08 km -25.6095 .17 km 2.33 0.16 3.4

2016-08-22 1142 59.25 129.8678 .12 km -25.6221 .34 km 2.12 0.27 2.2

2016-08-22 1144 35.73 129.9043 .82 km -25.6394 1.19 km 2.57 0.57 2

2016-09-10 0218 35.79 129.9354 .14 km -25.6174 .29 km 2.3 0.26 2.5

2016-12-02 0541 14.75 129.8918 .51 km -25.6007 .49 km 5.4 1.09 3.2

2016-12-03 1618 17.3 129.8457 .78 km -25.5964 .49 km 2.37 0.34 2.9