Earthquakes, elevations and continental plateaux: An investigation into the absence of large thrust earthquakes at high elevations within fold-and-thrust belts.

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Appendix A

A1: Earthquake magnitude vs topographic elevation graphs

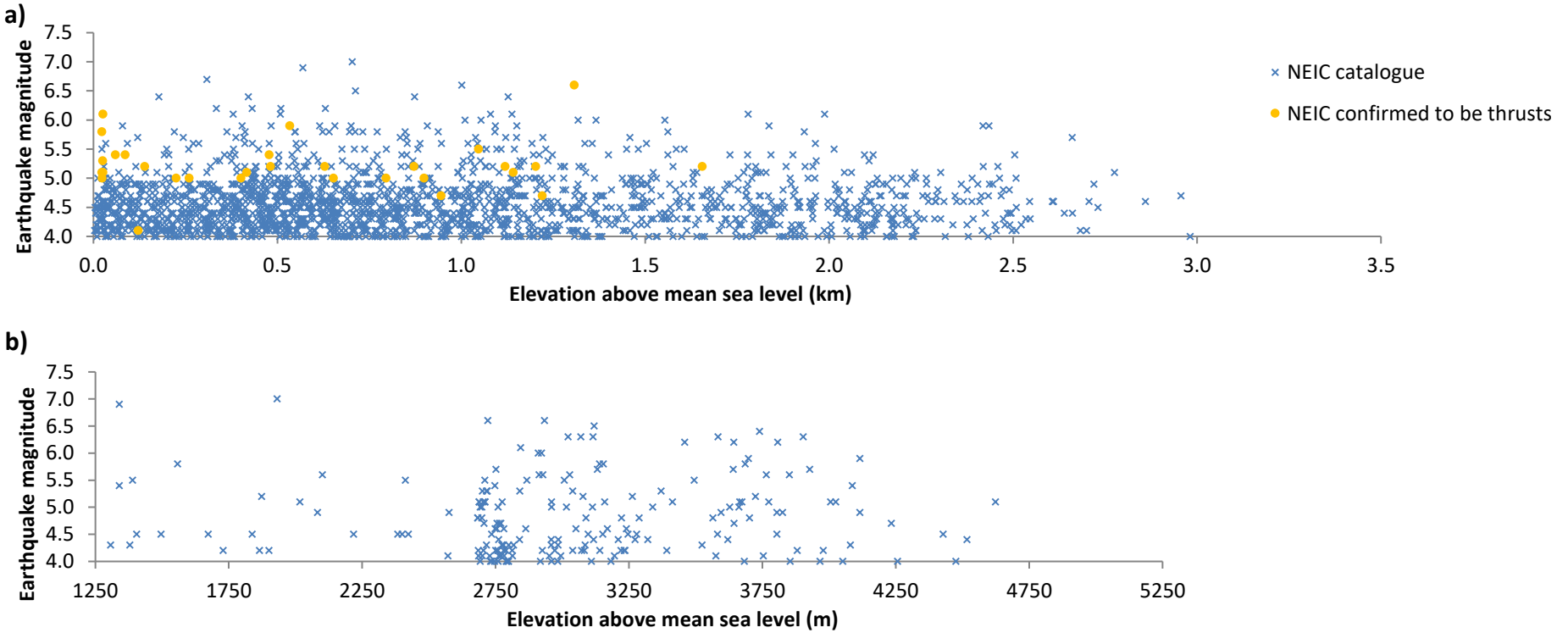


Figure A1.1: Graph showing the earthquake magnitude vs topographic elevation relationship for the whole dataset in a) the Zagros and b) the Qilian Shan prior to the identification of small 'sub-sectors'. Elevations are taken relative to mean sea level from a topography smoothed to 20 km. The majority of the data were acquired from the NEIC catalogue. Events in the NEIC cataloguer that were confirmed to be thrusts via cross-coordination with the CMT catalogue, have been plotted using their NEIC coordinates. and are labelled as 'NEIC confirmed to be thrusts'.

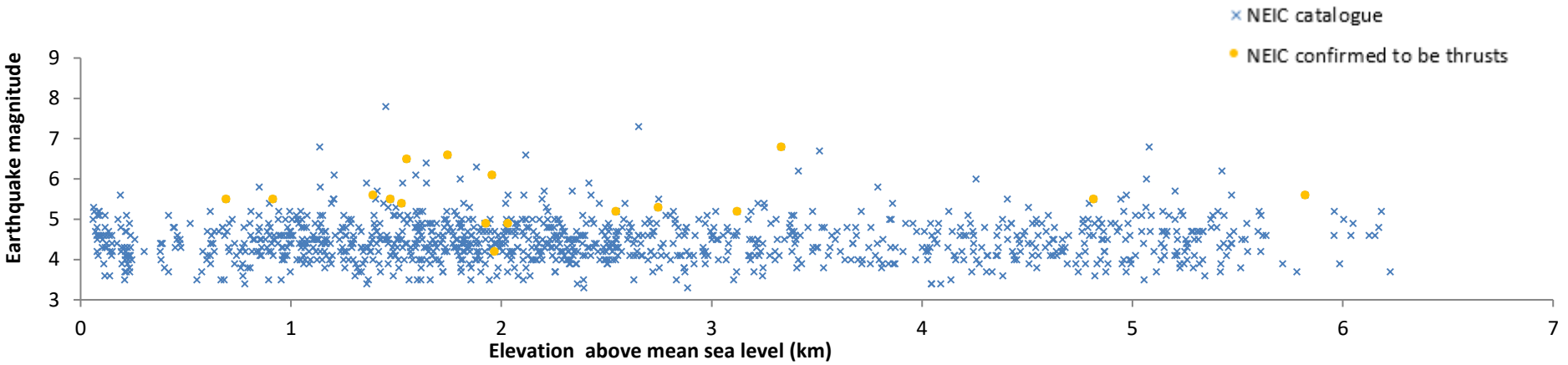


Figure A1.2: Graph showing the earthquake magnitude vs topographic elevation relationship for the whole dataset of Himalayas. Elevations are taken relative to mean sea level from a topography smoothed to 20 km. The majority of the data was acquired from the NEIC catalogue. Events in the NEIC catalogues that were confirmed to be thrusts via cross-coordination with the CMT catalogue, have been plotted using their NEIC coordinates and are labelled as 'NEIC confirmed to be thrusts'.

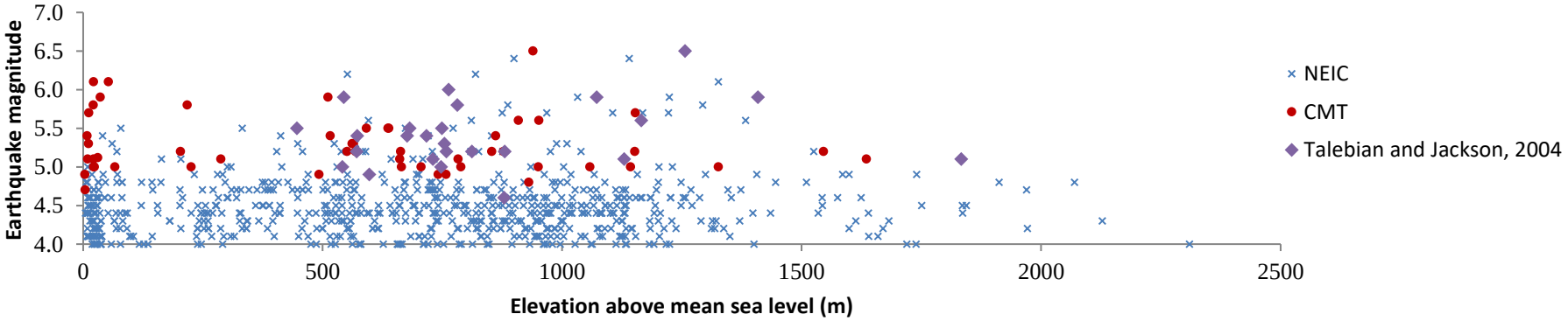


Figure A1.3: Graph showing the earthquake magnitude vs topographic elevation relationship for the small sub-sector of the Zagros. Elevations are taken with respect to mean sea level from a topography smoothed to 10 km. Data is that of Figure 2.5 but the 'NEIC confirmed to be thrusts' have been plotted with their CMT coordinate instead. Despite this M ≥ 5 earthquakes still persist above the 1250 m seismicity cut-off.

A2: Liner regression analysis

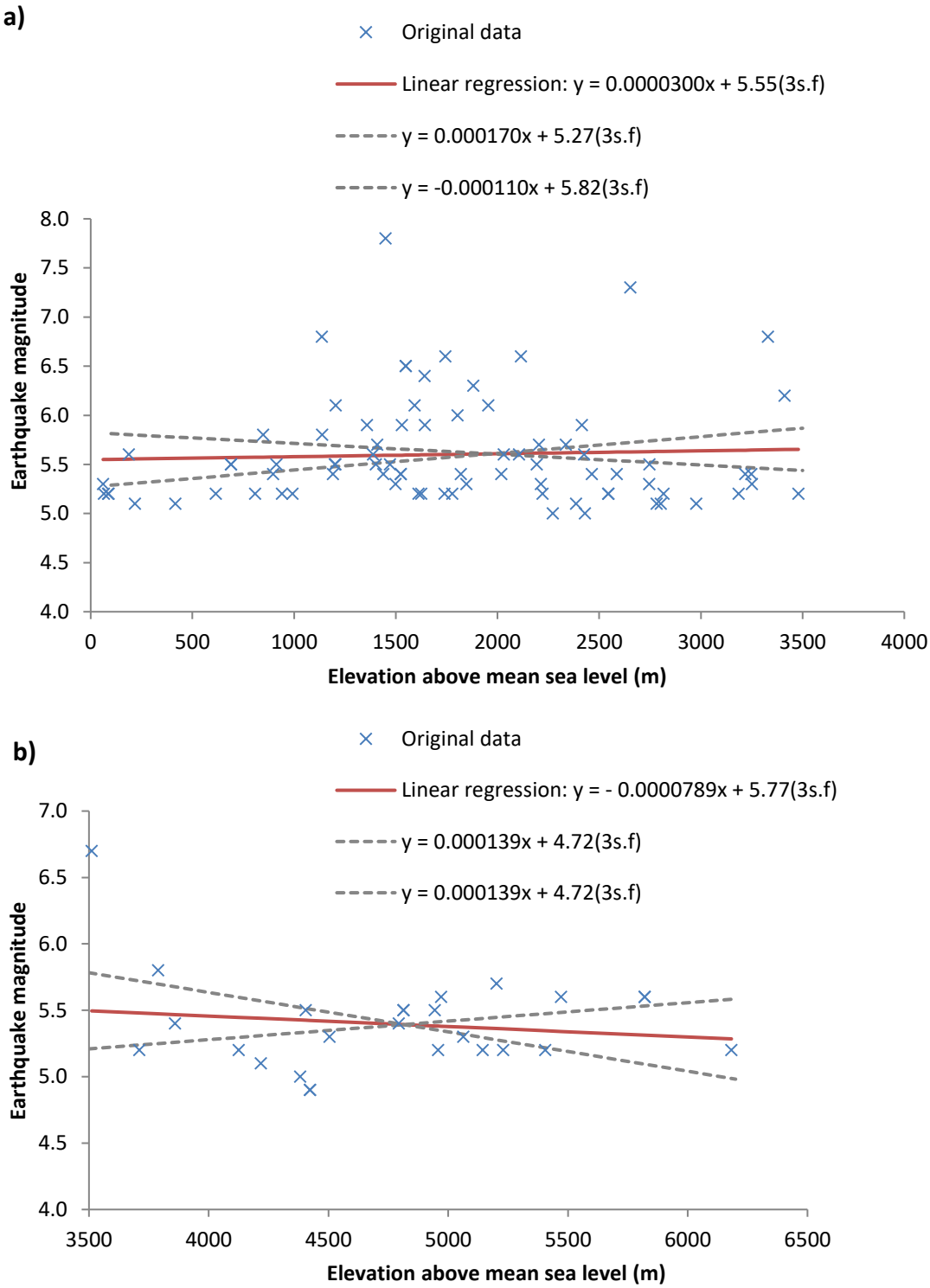
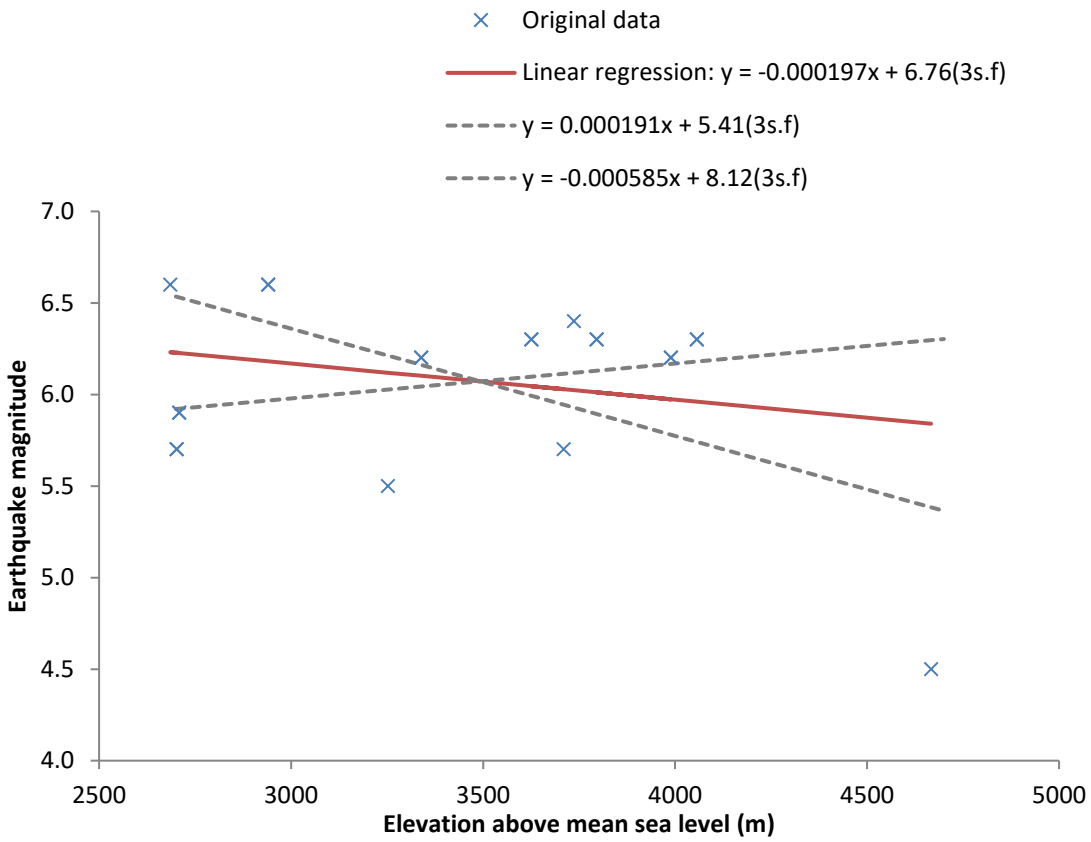


Figure A2.1: Linear regression plots for the Himalayas a) below, and b) above, the defined seismic cut-off. The significance level for (a) is 0.67131 and R^2 value is 0.00232. For (b) the significance value is 0.46257 and R^2 value is 0.02270. The bin width is 500 m and the envelope considers the top 10 % of the data. The graph additionally shows the upper and lower bounds of all the linear regression lines that would remain within the 95 % significance level. In both cases the gradient of the regression line can be seen to switch from positive to negative while remaining at 95 % significance.

a)



b)

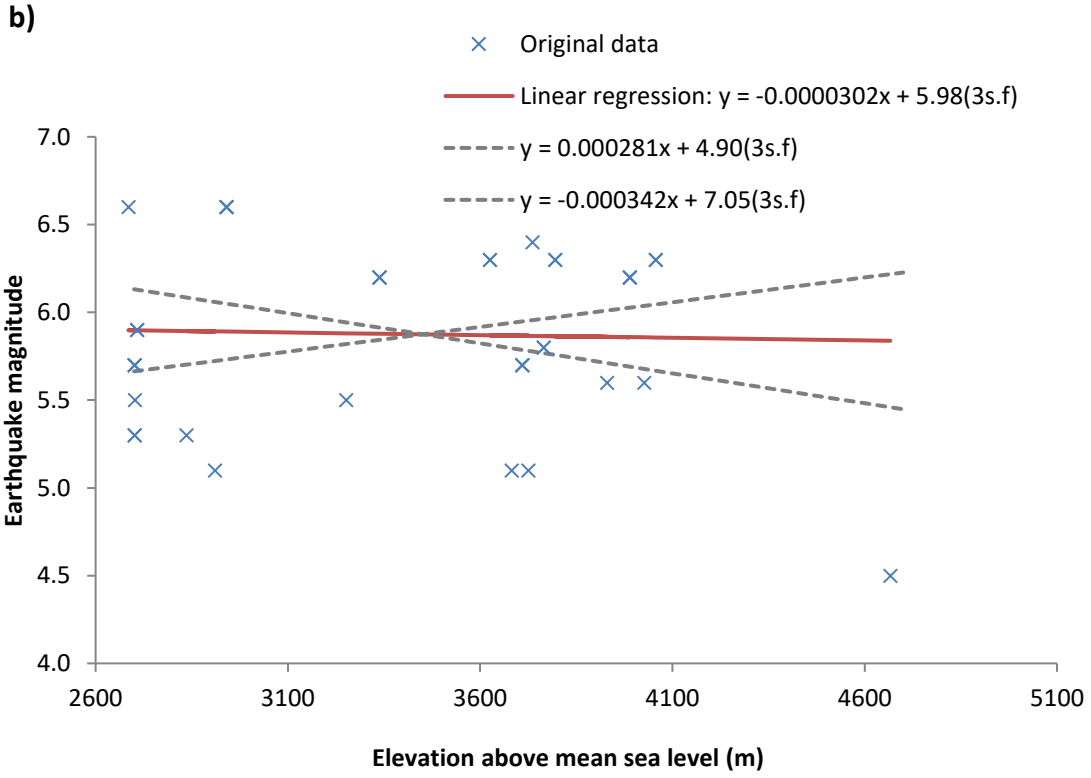
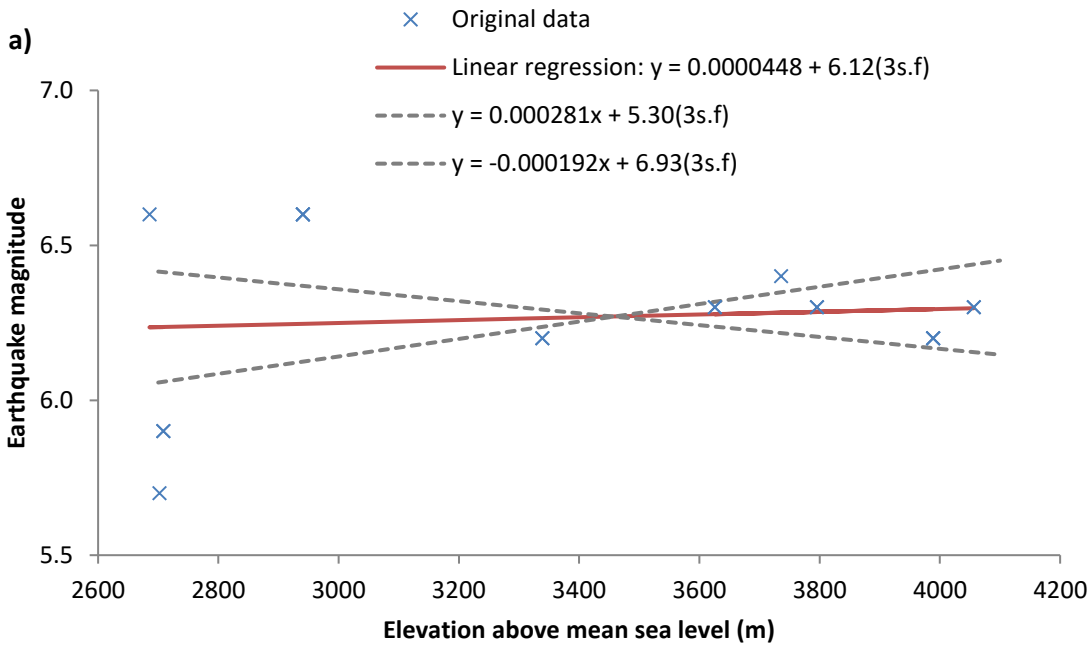


Figure A2.2: Linear regression plots for the sub-sector of the Qilian Shan. The bin width is 250 m and the enveloped considers the a) top 10 %, and b) 20 % of the data. The significance value for (a) 0.30113 and R^2 value is 0.05613. For (b) the significance value is 0.84505 and R^2 value is 0.00108. The graph additionally shows the upper and lower bounds of all the linear regression lines that would remain within the 95 % significance level. In both cases the gradient of the regression line can be seen to switch from positive to negative while remaining at 95 % significance.



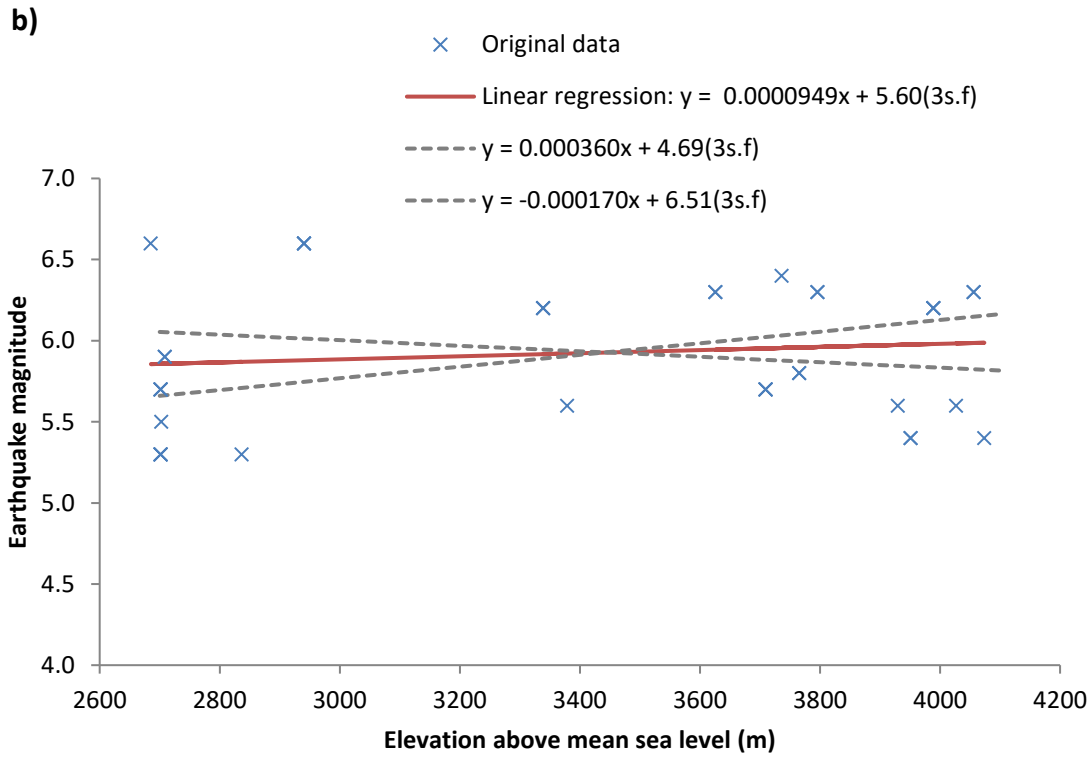


Figure A2.3: Linear regression plots for the sub-sector of the Qilian Shan. The bin width is 500 m and the enveloped considers the a) top 10 %, and b) 20 % of the data. The significance value for (a) 0.30113 and R^2 value is 0.05613. For (b) the significance value is 0.84505 and R^2 value is 0.00108. The graph additionally shows the upper and lower bounds of all the linear regression lines that would remain within the 95 % significance level. In both cases the gradient of the regression line can be seen to switch from positive to negative while remaining at 95 % significance.

A3: Earthquake Clusters in the Qilian Shan

Earthquakes within the two clusters identified in the Qilian Shan. Earthquakes that are highlighted in blue are considered to be mainshocks. Earthquakes occurring within the same day have been excised and are identified in red.

Cluster 1

Latitude	Longitude	Depth	Magnitude	Time
37.711	95.644	33	5.4	1973-06-16T07:22:48.100Z
37.72	95.607	33	4.3	1983-05-25T11:00:21.030Z
37.565	95.833	19	6.3	2008-11-10T01:22:02.570Z
37.582	95.783	10	4	2008-11-10T01:50:28.690Z
37.558	95.762	10	5	2008-11-10T03:47:23.030Z
37.519	95.749	10	4.3	2008-11-10T04:39:49.140Z
37.539	95.84	10	5.1	2008-11-11T21:56:01.840Z
37.527	95.852	10	4.5	2008-11-12T01:45:21.510Z
37.574	95.926	10	4.9	2008-11-12T12:09:31.180Z
37.66	95.905	10	4.1	2008-11-13T20:15:53.180Z
37.635	95.896	10	4.3	2008-11-13T20:16:25.670Z
37.603	95.757	10	4.9	2008-12-06T10:24:36.430Z
37.696	95.718	13	6.3	2009-08-28T01:52:06.640Z
37.646	95.709	4	5.6	2009-08-28T02:14:56.190Z
37.679	95.767	16.4	5.6	2009-08-28T02:16:08.040Z
37.663	95.792	10	4.6	2009-08-28T02:30:18.110Z
37.674	95.821	10	4	2009-08-28T02:32:19.160Z
37.629	95.77	10	4.4	2009-08-28T02:42:29.790Z
37.602	95.756	10	4.3	2009-08-28T03:15:15.660Z
37.689	95.637	10	4.5	2009-08-28T04:12:41.580Z
37.668	95.761	12.1	4.9	2009-08-28T04:28:41.760Z
37.709	95.602	10	4.6	2009-08-28T04:41:46.880Z
37.672	95.692	10	4.4	2009-08-28T04:46:07.390Z
37.751	95.728	14.6	4	2009-08-28T05:58:30.620Z
37.701	95.729	10	4.8	2009-08-28T10:13:58.700Z
37.633	95.728	10	4.1	2009-08-28T10:39:41.860Z
37.688	95.783	10	5	2009-08-28T16:28:41.230Z
37.641	95.717	10	5.2	2009-08-29T18:43:51.840Z
37.672	95.632	10	4.3	2009-08-30T04:11:24.520Z
37.692	95.605	16.7	4.5	2009-08-30T16:41:36.470Z
37.672	95.651	10	5.4	2009-08-30T17:15:50.840Z
37.606	95.831	6	5.8	2009-08-31T10:15:29.770Z
37.644	96.022	10	4.6	2009-08-31T10:26:01.060Z
37.643	95.887	10	5.3	2009-08-31T21:51:37.610Z
37.689	95.936	10	4.8	2009-08-31T22:27:51.780Z
37.511	95.91	10	4.1	2009-08-31T22:33:24.120Z

37.68	95.88	10	5	2009-09-01T00:16:05.040Z
37.684	95.625	10	4.8	2009-09-01T10:06:52.600Z
37.729	95.575	10	4.5	2009-09-02T04:13:06.300Z
37.643	95.737	10	4.3	2009-09-04T08:12:56.960Z
37.658	95.875	10	4.1	2009-09-04T09:12:44.920Z
37.644	95.883	10	4.2	2009-09-05T08:59:20.740Z
37.646	95.907	10	4.8	2009-09-10T00:20:12.130Z
37.636	95.944	10	5.1	2009-09-17T09:24:19.580Z
37.596	95.631	10.2	4.8	2009-09-18T00:43:24.600Z
37.653	95.593	5.1	5	2009-09-18T06:53:48.920Z
37.651	95.604	6.5	5.1	2009-09-18T07:02:12.070Z
37.645	95.759	3	5.1	2009-11-04T21:56:08.630Z
37.568	95.718	10	4.6	2010-04-09T04:38:49.460Z
37.607	95.7	10	4.9	2010-04-20T03:40:01.020Z
37.605	96.116	25.8	4.1	2010-06-11T08:00:29.790Z
37.66	95.69	10	5	2011-08-11T17:06:14.470Z
37.589	95.837	23.2	4.7	2012-09-27T12:38:41.570Z
37.56	95.729	10	4.8	2012-10-13T07:08:39.230Z
37.604	95.931	9	5.1	2013-06-05T00:43:36.490Z
37.558	95.804	10	4.2	2013-07-08T11:34:07.170Z
37.494	95.819	10	4.1	2013-07-08T16:25:29.650Z
37.522	96.068	12.4	4.5	2013-07-13T03:31:04.380Z
37.6792	95.8291	10	4.2	2014-06-20T03:03:58.430Z
37.6103	95.7316	32.94	4	2015-03-03T17:25:22.430Z

Cluster 2

Latitude	Longitude	Depth	Magnitude	Time
37.529	96.6	33	4.7	1980-04-04T23:41:25.600Z
37.529	96.476	14	6.4	2003-04-17T00:48:38.580Z
37.555	96.533	10	4.7	2003-04-17T02:24:38.310Z
37.594	96.683	10	4.4	2003-04-17T04:32:57.670Z
37.588	96.596	10	4.5	2003-04-17T08:41:55.260Z
37.498	96.3	10	4.6	2003-04-17T11:29:53.900Z
37.646	96.493	10	4.4	2003-04-17T15:51:26.710Z
37.517	96.473	10	4.9	2003-04-17T17:11:50.230Z
37.518	96.48	10	4.8	2003-04-19T19:41:40.820Z
37.525	96.626	10	4.3	2003-04-20T10:04:03.050Z
37.491	96.529	10	4.7	2003-04-21T05:51:26.310Z
37.516	96.729	10	4.4	2003-04-25T20:10:37.310Z
37.483	96.543	10	5.1	2003-05-03T06:12:58.650Z
37.484	96.461	10	4.4	2003-05-10T10:15:15.830Z
37.513	96.791	40.2	4.3	2004-02-18T16:30:26.630Z
37.487	96.828	41.4	5.1	2004-02-24T20:21:54.010Z
37.441	96.835	47.8	4.2	2004-02-25T16:07:58.330Z

37.651	96.716	10	4.5	2004-03-02T07:13:40.770Z
37.526	96.677	29.5	4.9	2004-03-02T12:30:23.430Z
37.463	96.73	56.8	4.4	2004-03-02T12:37:41.570Z
37.558	96.668	14.3	5.2	2004-03-16T21:23:19.860Z
37.506	96.758	13.5	5.5	2004-05-04T05:04:58.350Z
37.473	96.914	10	5.2	2004-05-04T11:36:03.030Z
37.485	96.604	10	5.6	2004-05-10T23:27:25.490Z
37.416	96.544	10	4.5	2004-05-17T03:04:53.370Z
37.657	96.704	10	4.3	2004-05-19T03:25:45.620Z
37.532	96.562	10	4.6	2004-08-25T18:45:34.070Z
37.526	96.644	10	5	2009-12-21T05:15:08.870Z
37.4662	96.5322	35	4.1	2014-01-21T02:01:52.830Z

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37.711	95.644	33	5.4	1973-06-16T07:22:48.100Z
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37.582	95.783	10	4	2008-11-10T01:50:28.690Z
37.558	95.762	10	5	2008-11-10T03:47:23.030Z
37.519	95.749	10	4.3	2008-11-10T04:39:49.140Z
37.539	95.84	10	5.1	2008-11-11T21:56:01.840Z
37.527	95.852	10	4.5	2008-11-12T01:45:21.510Z
37.574	95.926	10	4.9	2008-11-12T12:09:31.180Z
37.66	95.905	10	4.1	2008-11-13T20:15:53.180Z
37.635	95.896	10	4.3	2008-11-13T20:16:25.670Z
37.603	95.757	10	4.9	2008-12-06T10:24:36.430Z
37.696	95.718	13	6.3	2009-08-28T01:52:06.640Z
37.646	95.709	4	5.6	2009-08-28T02:14:56.190Z
37.679	95.767	16.4	5.6	2009-08-28T02:16:08.040Z
37.663	95.792	10	4.6	2009-08-28T02:30:18.110Z
37.674	95.821	10	4	2009-08-28T02:32:19.160Z
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37.689	95.637	10	4.5	2009-08-28T04:12:41.580Z
37.668	95.761	12.1	4.9	2009-08-28T04:28:41.760Z
37.709	95.602	10	4.6	2009-08-28T04:41:46.880Z
37.672	95.692	10	4.4	2009-08-28T04:46:07.390Z
37.751	95.728	14.6	4	2009-08-28T05:58:30.620Z

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37.688	95.783	10	5	2009-08-28T16:28:41.230Z
37.641	95.717	10	5.2	2009-08-29T18:43:51.840Z
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37.692	95.605	16.7	4.5	2009-08-30T16:41:36.470Z
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37.606	95.831	6	5.8	2009-08-31T10:15:29.770Z
37.644	96.022	10	4.6	2009-08-31T10:26:01.060Z
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37.684	95.625	10	4.8	2009-09-01T10:06:52.600Z
37.729	95.575	10	4.5	2009-09-02T04:13:06.300Z
37.643	95.737	10	4.3	2009-09-04T08:12:56.960Z
37.658	95.875	10	4.1	2009-09-04T09:12:44.920Z
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37.636	95.944	10	5.1	2009-09-17T09:24:19.580Z
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37.653	95.593	5.1	5	2009-09-18T06:53:48.920Z
37.651	95.604	6.5	5.1	2009-09-18T07:02:12.070Z
37.645	95.759	3	5.1	2009-11-04T21:56:08.630Z
37.568	95.718	10	4.6	2010-04-09T04:38:49.460Z
37.607	95.7	10	4.9	2010-04-20T03:40:01.020Z
37.605	96.116	25.8	4.1	2010-06-11T08:00:29.790Z
37.66	95.69	10	5	2011-08-11T17:06:14.470Z
37.589	95.837	23.2	4.7	2012-09-27T12:38:41.570Z
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37.494	95.819	10	4.1	2013-07-08T16:25:29.650Z
37.522	96.068	12.4	4.5	2013-07-13T03:31:04.380Z
37.6792	95.8291	10	4.2	2014-06-20T03:03:58.430Z
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37.529	96.476	14	6.4	2003-04-17T00:48:38.580Z
37.555	96.533	10	4.7	2003-04-17T02:24:38.310Z
37.594	96.683	10	4.4	2003-04-17T04:32:57.670Z
37.588	96.596	10	4.5	2003-04-17T08:41:55.260Z
37.498	96.3	10	4.6	2003-04-17T11:29:53.900Z
37.646	96.493	10	4.4	2003-04-17T15:51:26.710Z
37.517	96.473	10	4.9	2003-04-17T17:11:50.230Z
37.518	96.48	10	4.8	2003-04-19T19:41:40.820Z
37.525	96.626	10	4.3	2003-04-20T10:04:03.050Z
37.491	96.529	10	4.7	2003-04-21T05:51:26.310Z
37.516	96.729	10	4.4	2003-04-25T20:10:37.310Z
37.483	96.543	10	5.1	2003-05-03T06:12:58.650Z
37.484	96.461	10	4.4	2003-05-10T10:15:15.830Z
37.513	96.791	40.2	4.3	2004-02-18T16:30:26.630Z
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37.441	96.835	47.8	4.2	2004-02-25T16:07:58.330Z
37.651	96.716	10	4.5	2004-03-02T07:13:40.770Z
37.526	96.677	29.5	4.9	2004-03-02T12:30:23.430Z
37.463	96.73	56.8	4.4	2004-03-02T12:37:41.570Z
37.558	96.668	14.3	5.2	2004-03-16T21:23:19.860Z
37.506	96.758	13.5	5.5	2004-05-04T05:04:58.350Z
37.473	96.914	10	5.2	2004-05-04T11:36:03.030Z
37.485	96.604	10	5.6	2004-05-10T23:27:25.490Z
37.416	96.544	10	4.5	2004-05-17T03:04:53.370Z
37.657	96.704	10	4.3	2004-05-19T03:25:45.620Z
37.532	96.562	10	4.6	2004-08-25T18:45:34.070Z
37.526	96.644	10	5	2009-12-21T05:15:08.870Z
37.4662	96.5322	35	4.1	2014-01-21T02:01:52.830Z

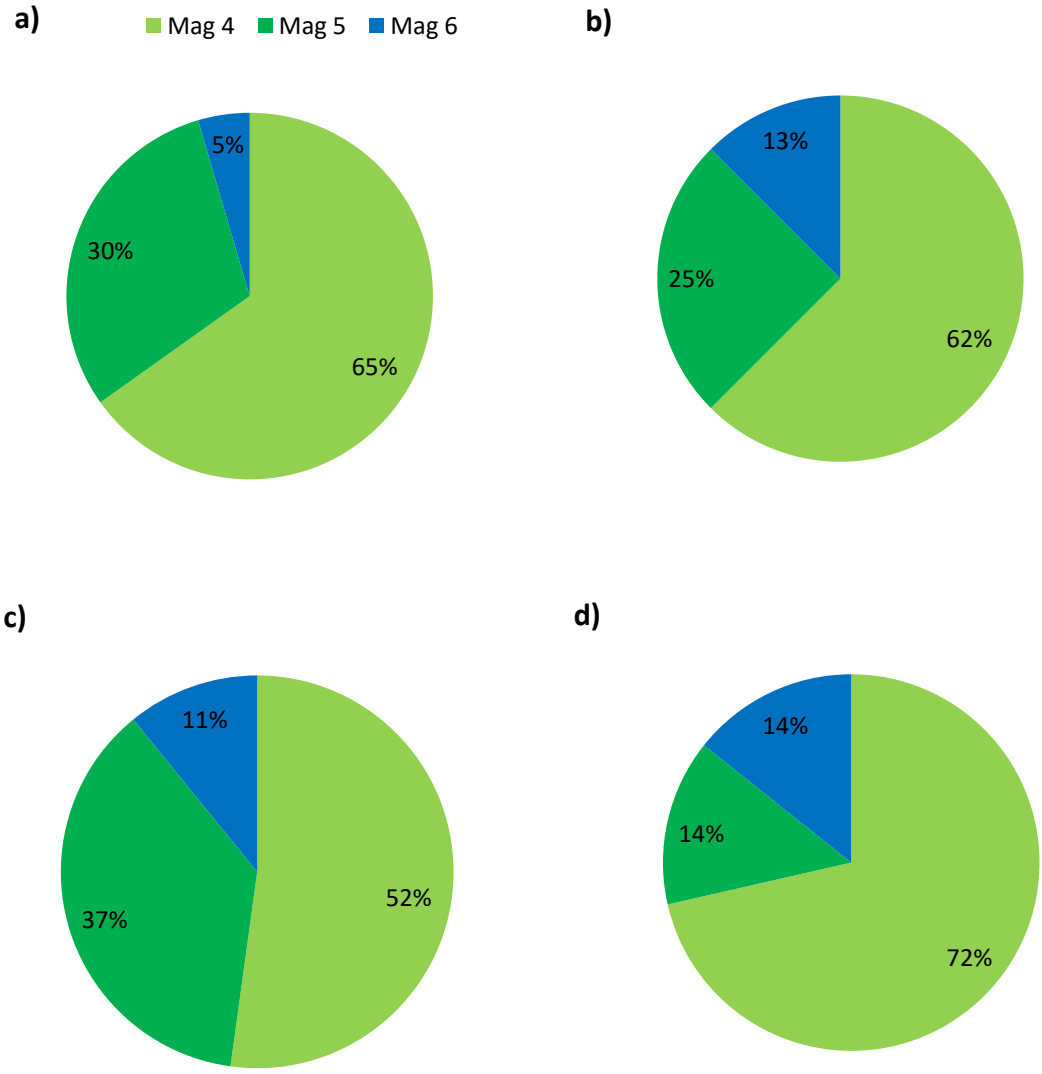

Figure A3.1: Data from the small sub-sector in the Qilian Shan. Pie charts show the area-normalised number of earthquakes at a) 2.5-3.0 km, b) 3.0-3.5 km, c) 3.5-4.0 km and d) 4.0-4.5 km after the 'aftershocks' that occurred within the same day have been removed.

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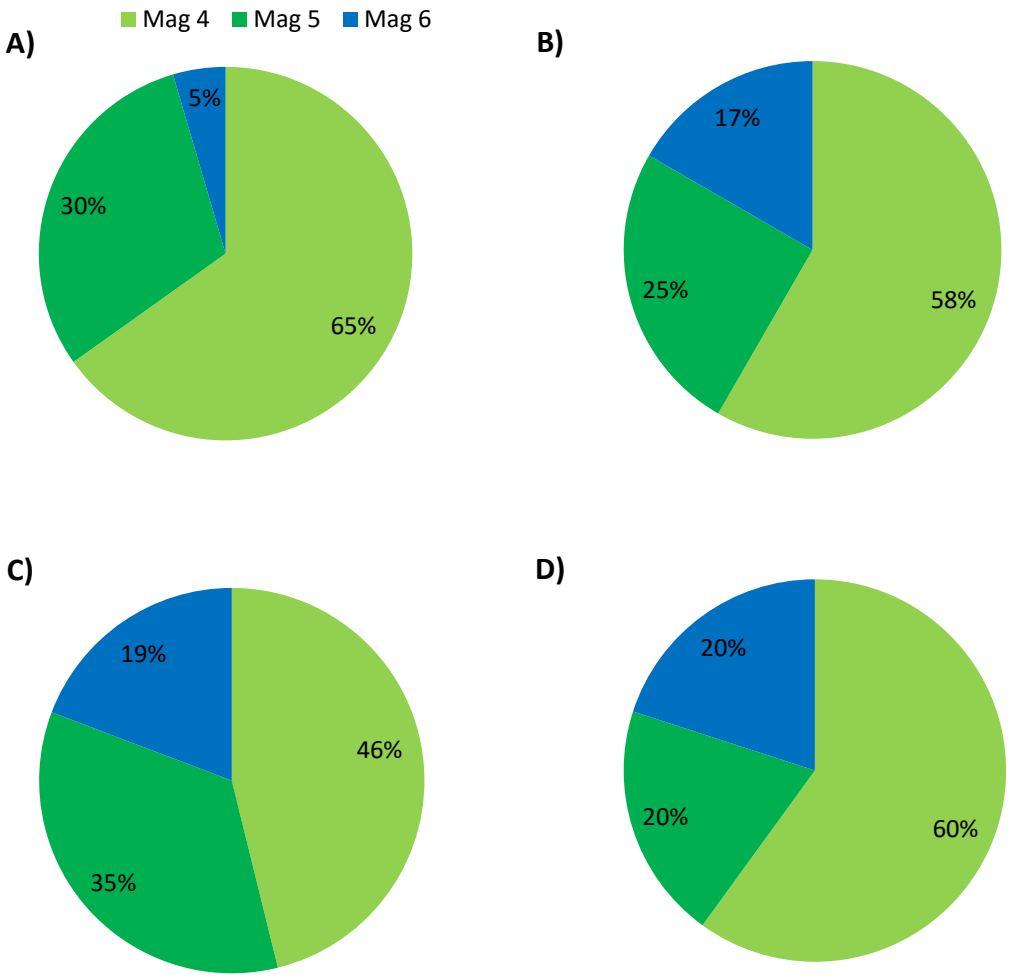
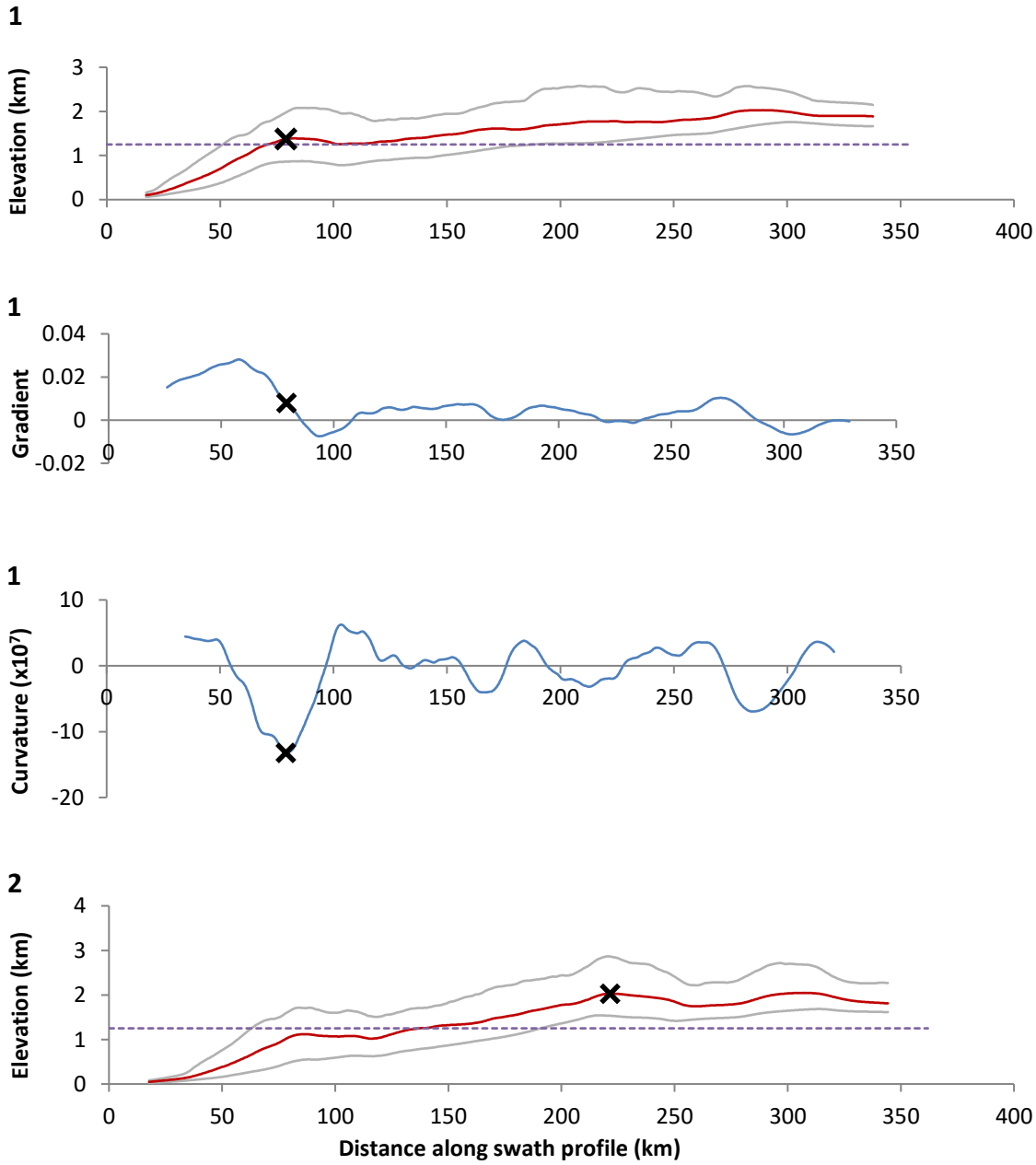


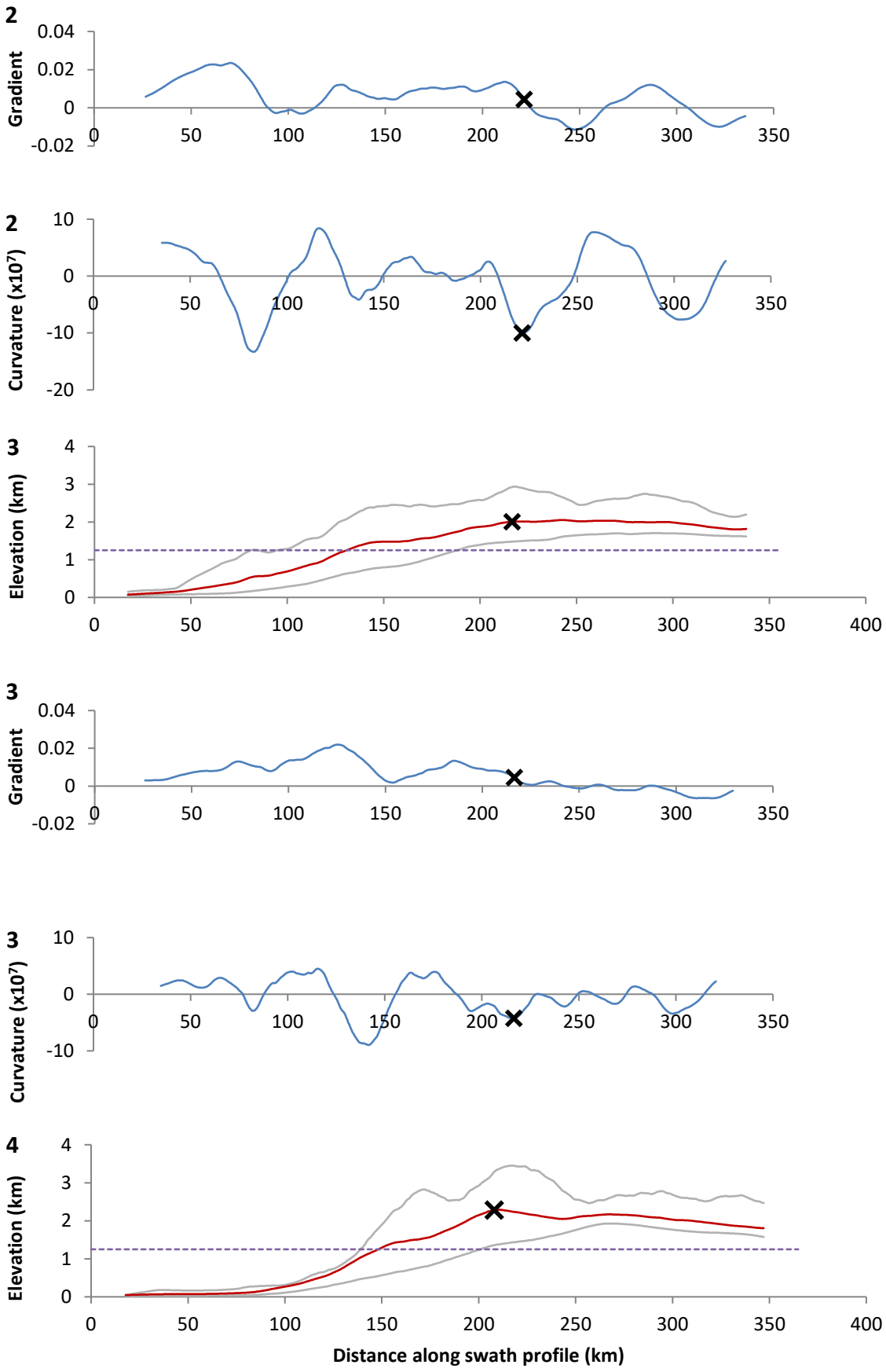
Figure A3.2: Data from the small sub-sector in the Qilian Shan. Pie charts show the area-normalised number of earthquakes at a) 2.5-3.0 km, b) 3.0-3.5 km, c) 3.5-4.0 km and d) 4.0-4.5 km after the 'aftershocks' that occurred within the same month have been removed

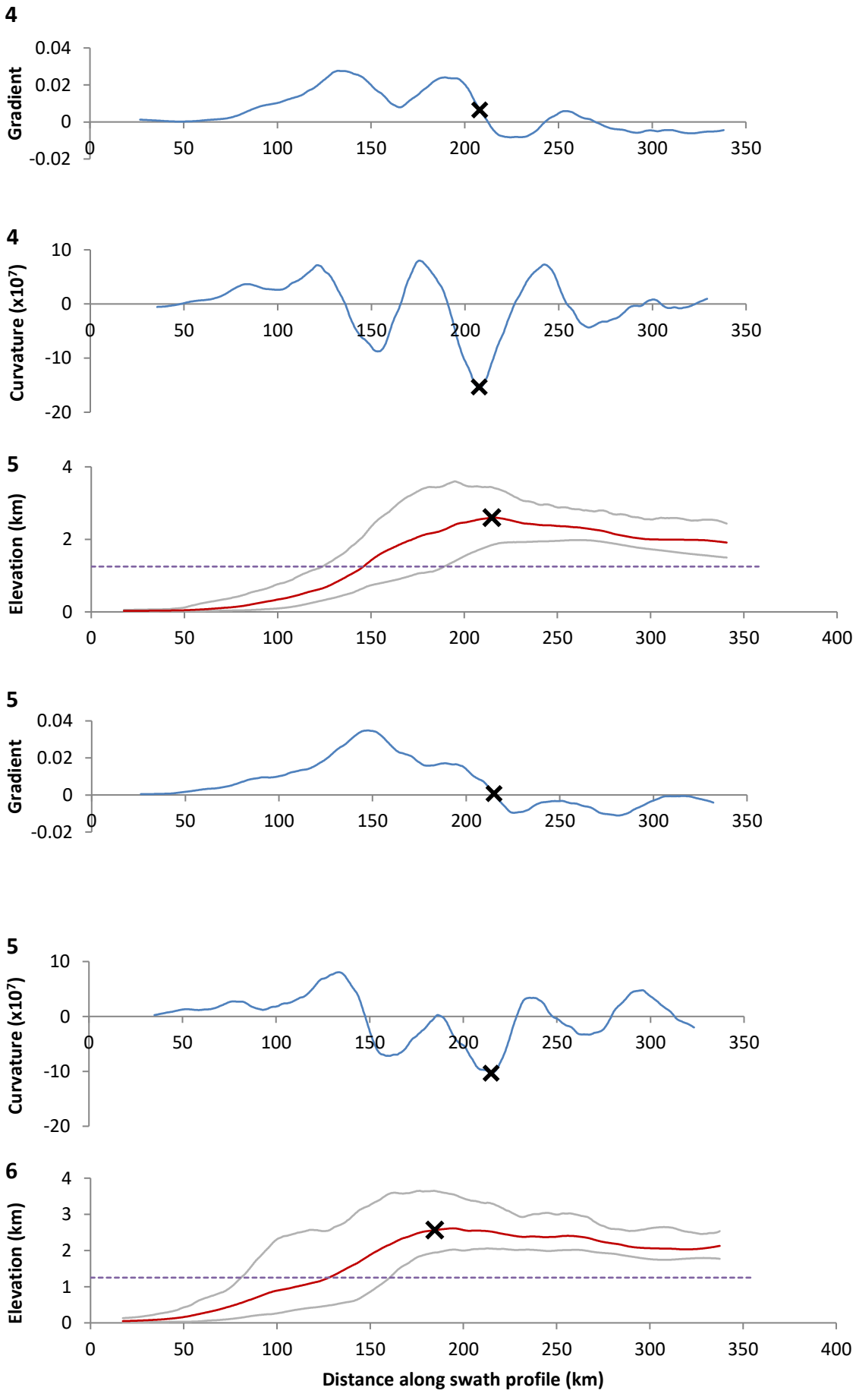
Appendix B

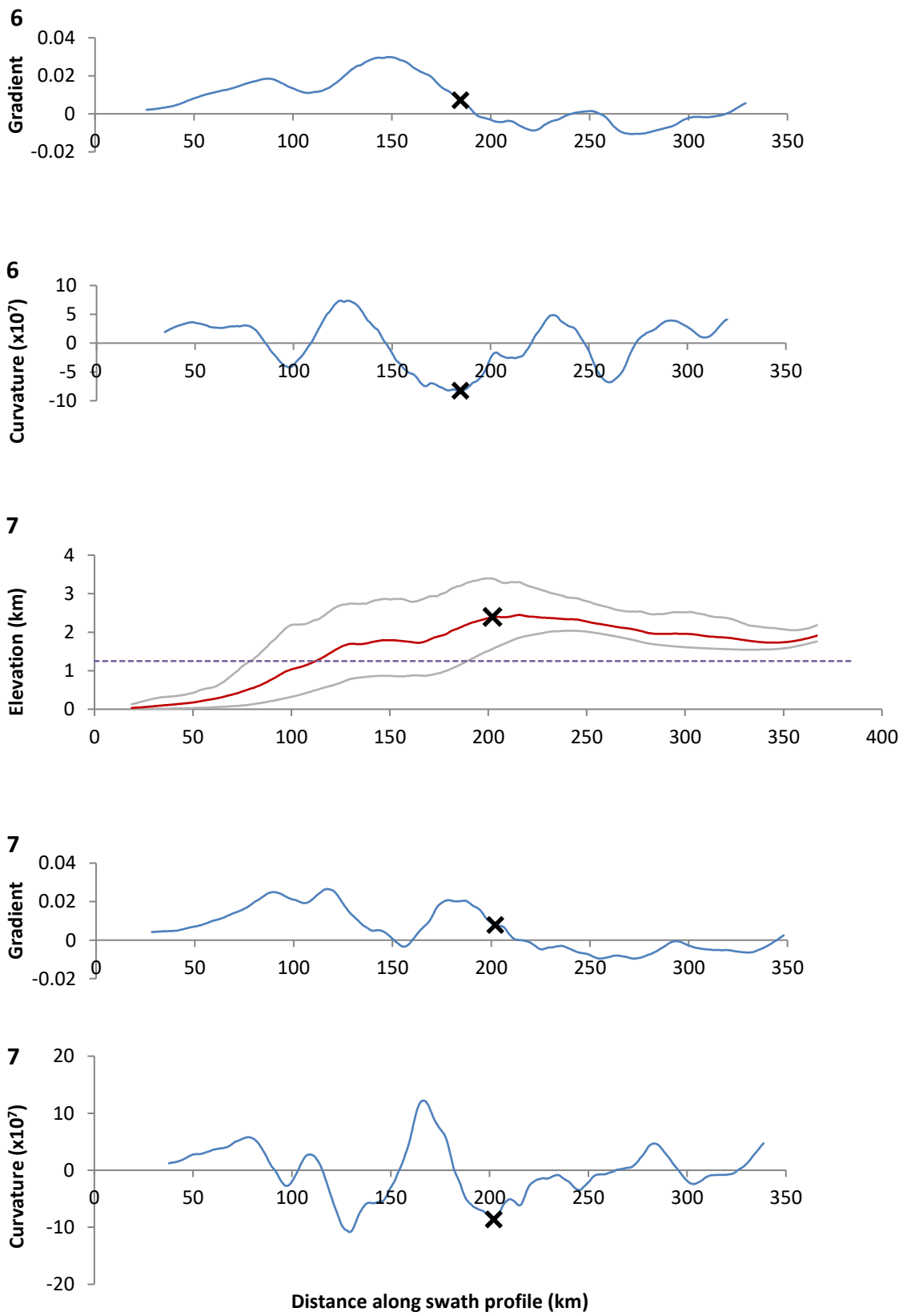
B1: The Zagros

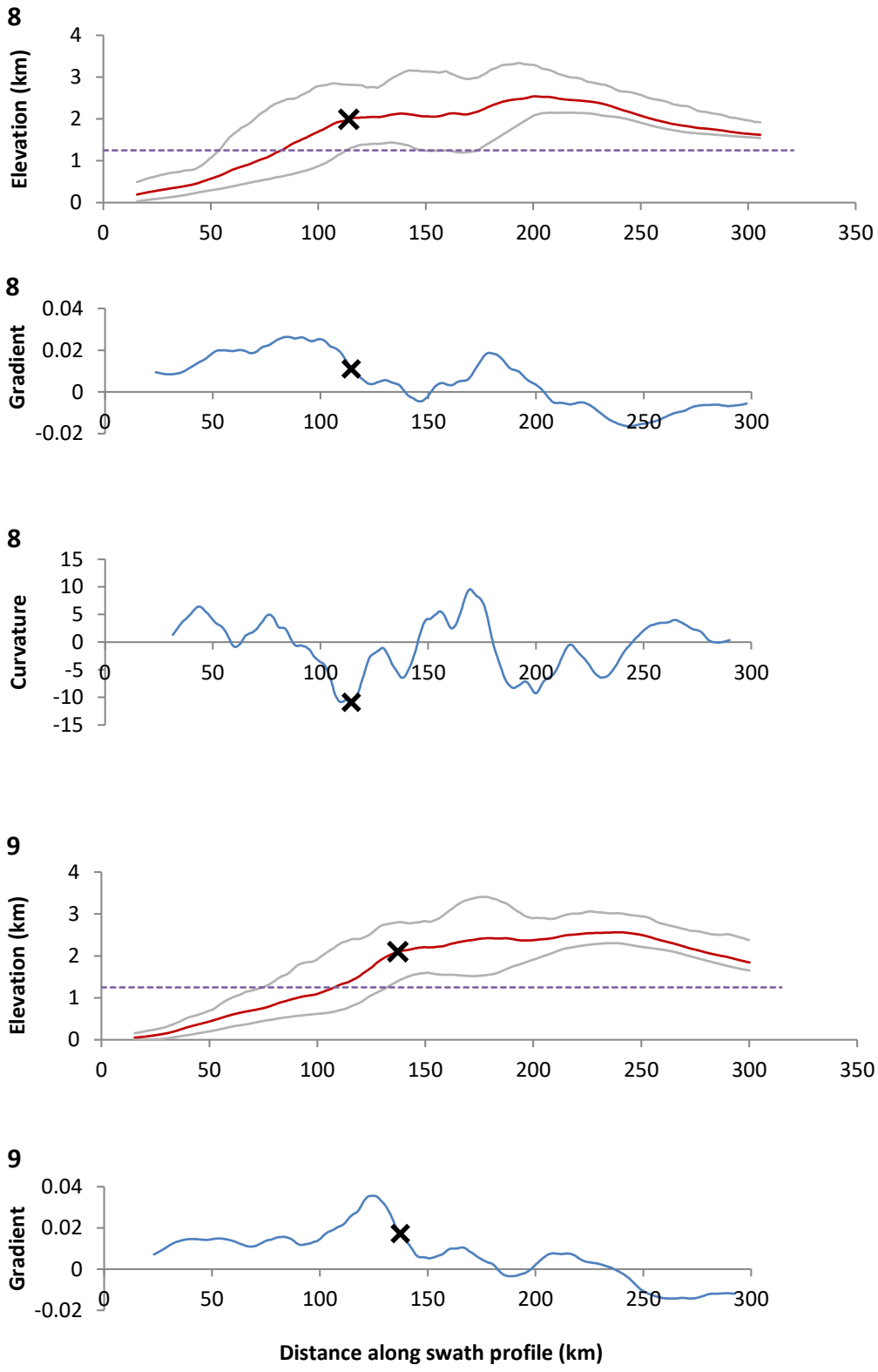
Swath profiles of 50 km width are seen below. Smoothing is undertaken by a running average of ± 50. Elevation refers to elevation above mean sea level and in all cases transects were taken from SW to NE. Each graph is labelled by a number which represents the transect the swath profile refers to. The central red line refers to the average swath profile while the grey lines above and below refers to the maximum and minimum respectively. The black X marks the calculated plateau edge and the blue dotted line represents the 1250 m contour line which has previously been associated with a cut-off in M ≥ 5 earthquakes. Both the gradient and curvature graphs are taken from the average swath profile.

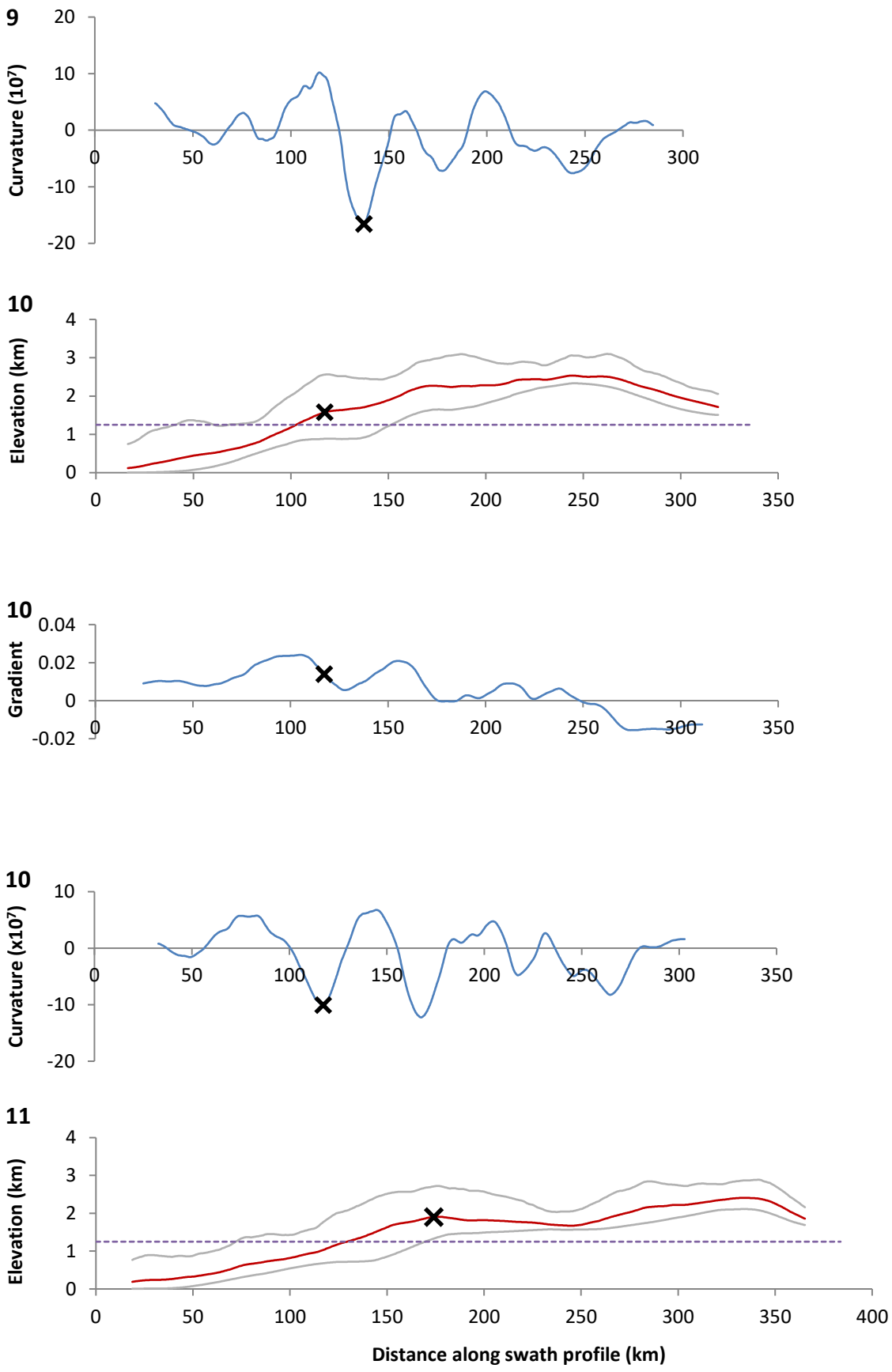


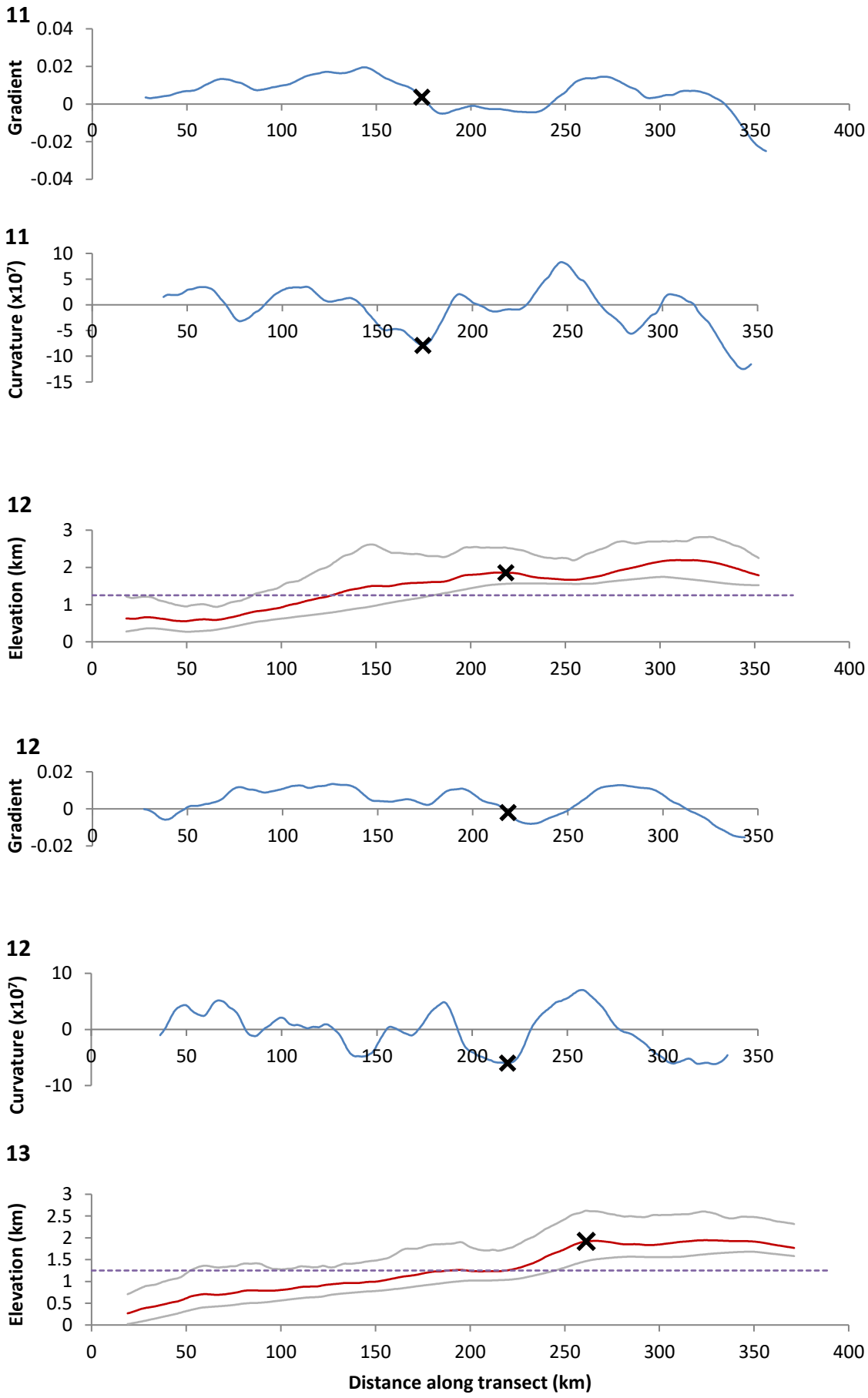

2
Gradient
0.04
0.02
0
-0.02
0
50
100
150
200
250
300
350
2
Curvature (x10⁷)
10
0
-10
-20
3
Elevation (km)
4
3
2
1
0
400
3
Gradient
3
Curvature (x10⁷)
4
Elevation (km)
Distance along swath profile (km)

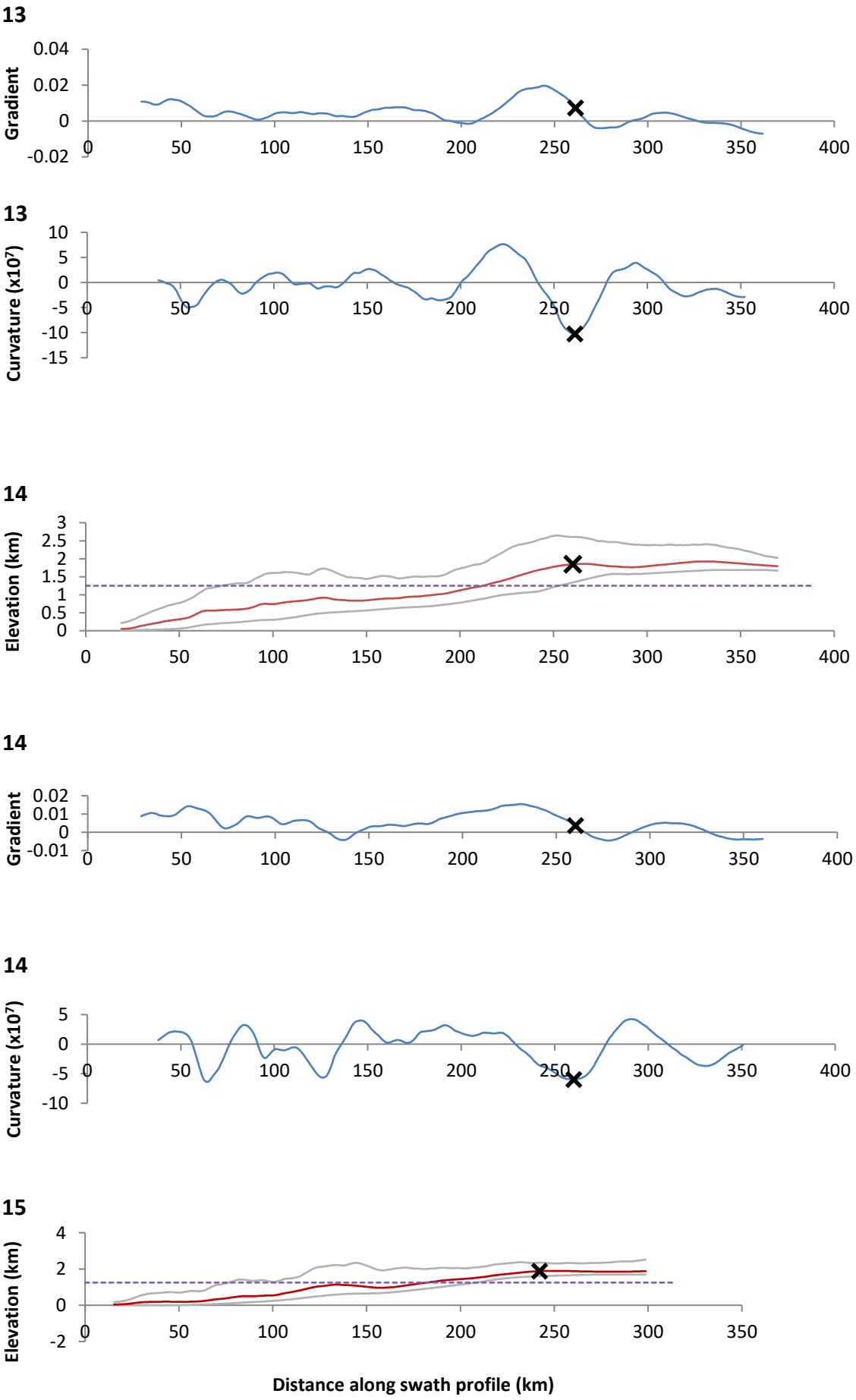

4
Gradient
0.04
0.02
0
-0.02
0
50
100
150
200
250
300
350
4
Curvature (x10⁷)
10
0
-10
-20
5
Elevation (km)
4
2
0
400
5
Gradient
6
Curvature (x10⁷)
Elevation (km)
3
1
Distance along swath profile (km)

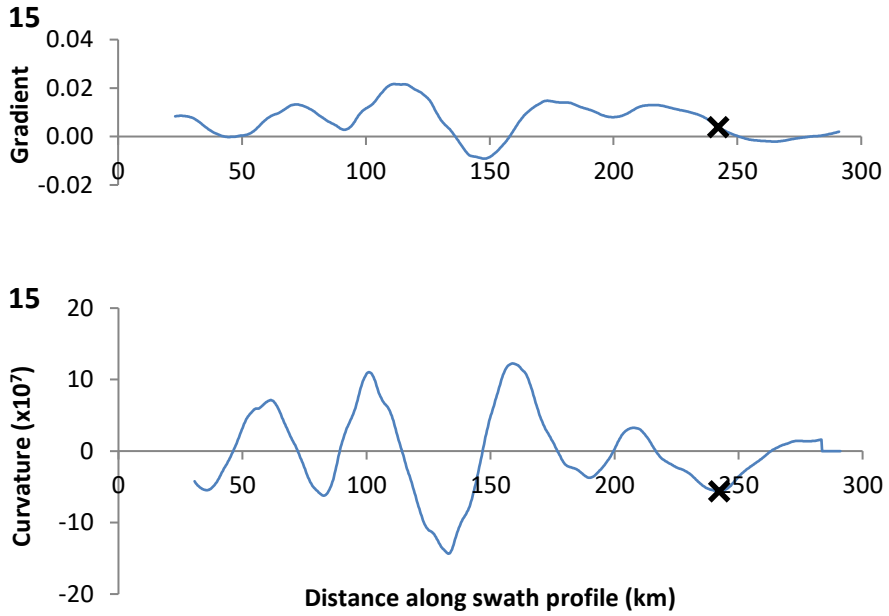

6
Gradient
0.04
0.02
0
-0.02
0
50
100
150
200
250
300
350
6
Curvature (x10⁷)
10
5
0
-5
-10
7
Elevation (km)
4
3
2
1
0
400
7
Gradient
7
Curvature (x10⁷)
20
10
-10
-20
Distance along swath profile (km)


8
Elevation (km)
4
3
2
1
0
0
50
100
150
200
250
300
350
8
Gradient
0.04
0.02
0
-0.02
0
50
100
150
200
250
300
8
Curvature
15
10
5
0
-5
-10
-15
0
50
100
150
200
250
300
9
Elevation (km)
4
3
2
1
0
0
50
100
150
200
250
300
350
9
Gradient
0.04
0.02
0
-0.02
0
50
100
150
200
250
300
Distance along swath profile (km)

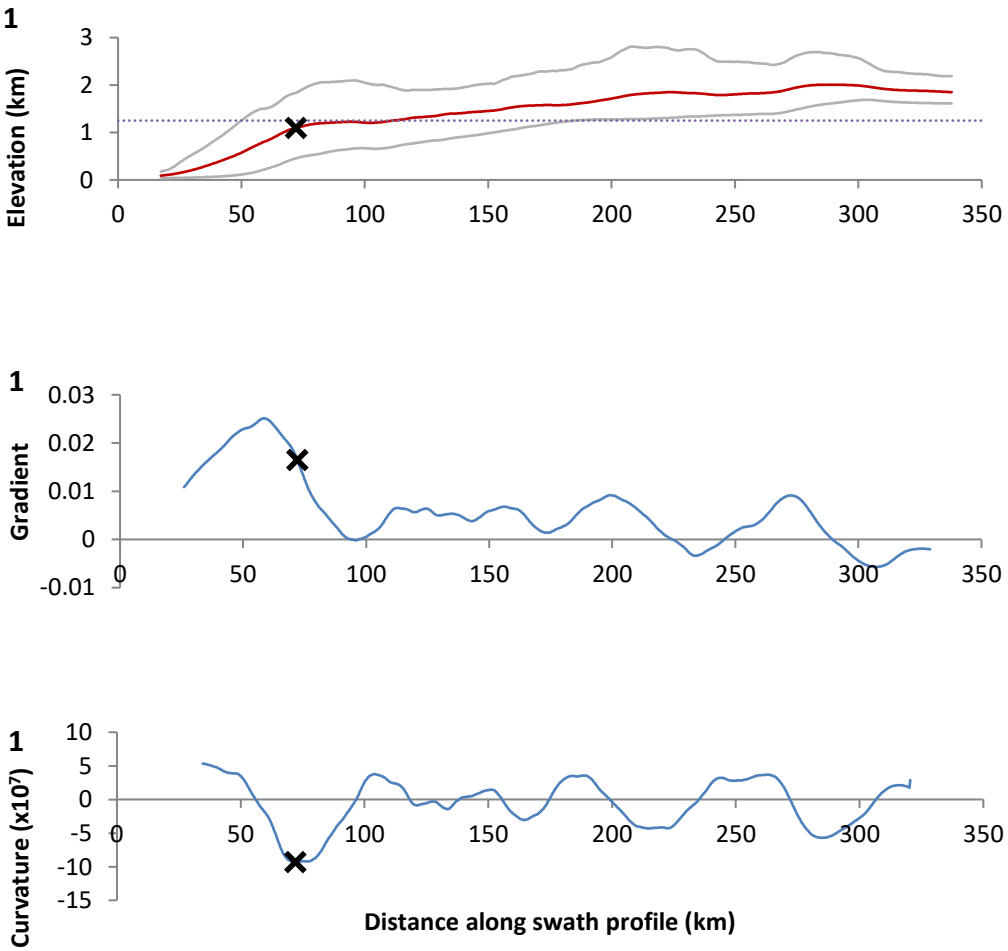

9
Curvature (10^7)
20
10
0
-10
-20
0
50
100
150
200
250
300
10
Elevation (km)
4
3
2
1
0
0
50
100
150
200
250
300
350
10
Gradient
0.04
0.02
0
-0.02
0
50
100
150
200
250
300
350
10
Curvature (x10^7)
10
0
-10
-20
0
50
100
150
200
250
300
350
11
Elevation (km)
4
3
2
1
0
0
50
100
150
200
250
300
350
400
Distance along swath profile (km)

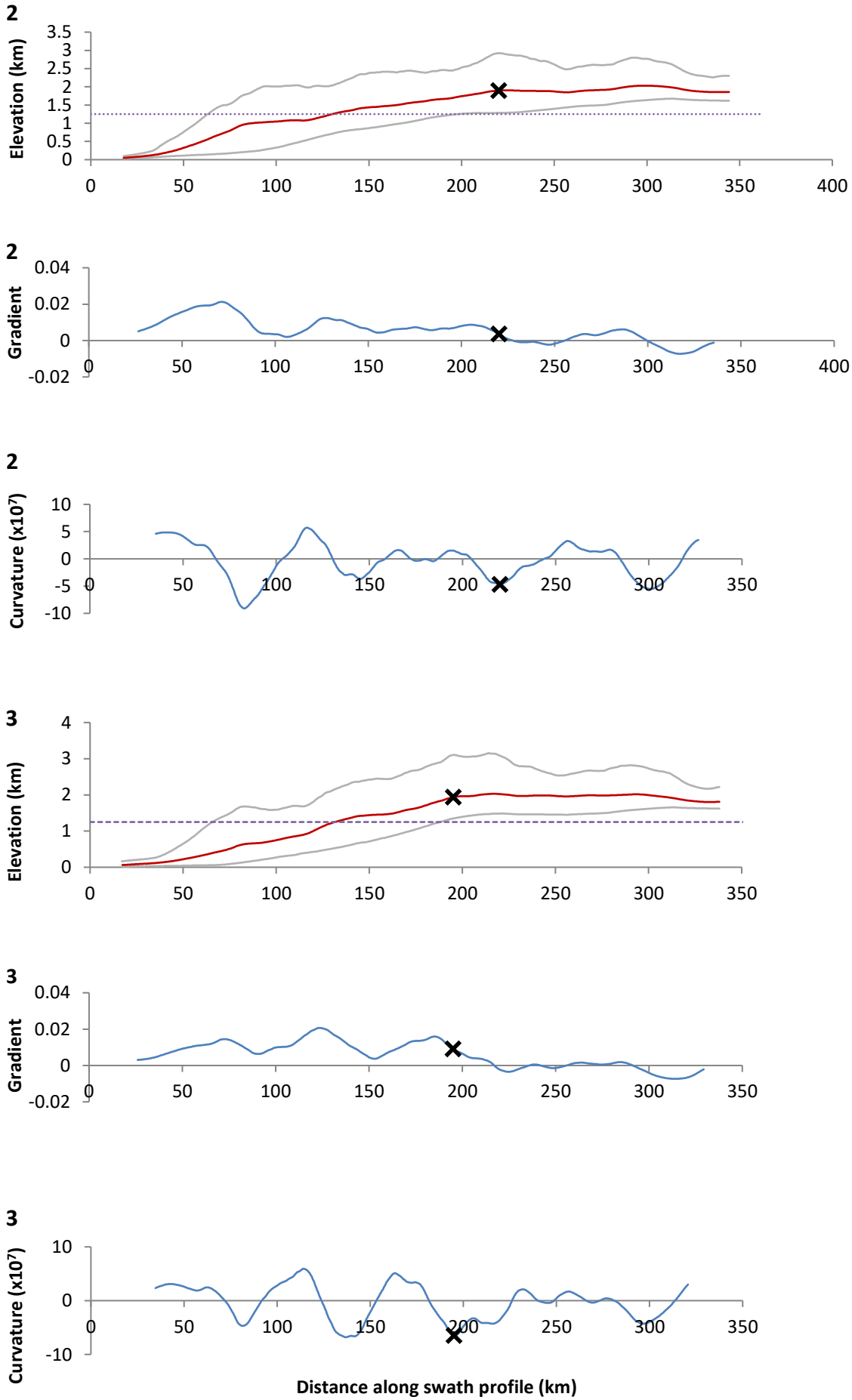

11
Gradient
0.04
0.02
0
-0.02
-0.04
0
50
100
150
200
250
300
350
400
11
Curvature (x10⁷)
10
5
0
-5
-10
-15
12
Elevation (km)
3
2
1
0
12
Gradient
0.02
0
-0.02
12
Curvature (x10⁷)
10
0
-10
13
Elevation (km)
3
2.5
2
1.5
1
0.5
0
Distance along transect (km)

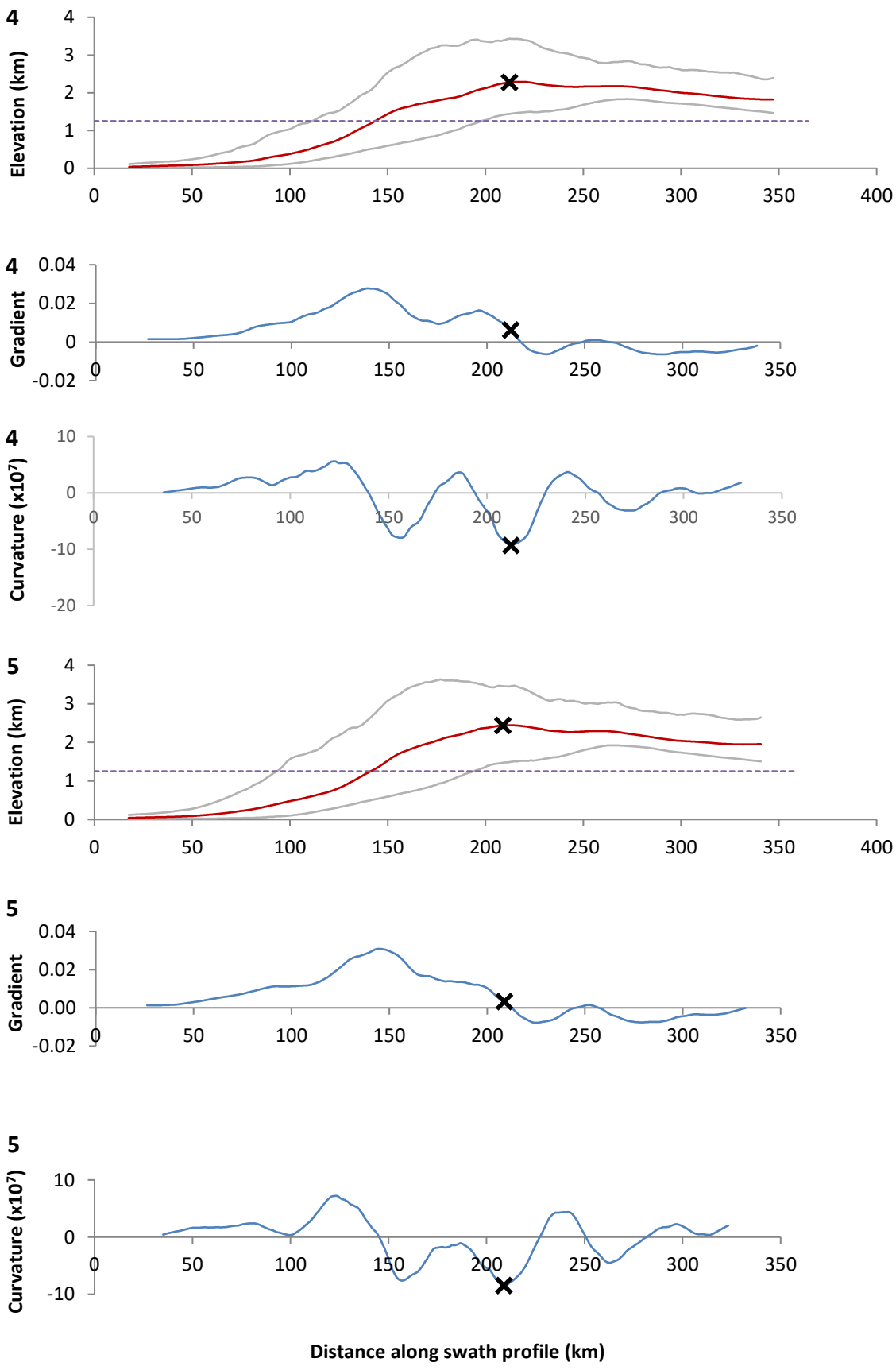

13
Gradient
0.04
0.02
0
-0.02
0
50
100
150
200
250
300
350
400
13
Curvature (x10⁷)
10
5
0
-5
-10
-15
14
Elevation (km)
3
2.5
2
1.5
1
0.5
0
14
Gradient
0.02
0.01
0
-0.01
14
Curvature (x10⁷)
5
0
-5
-10
15
Elevation (km)
4
2
0
-2
Distance along swath profile (km)

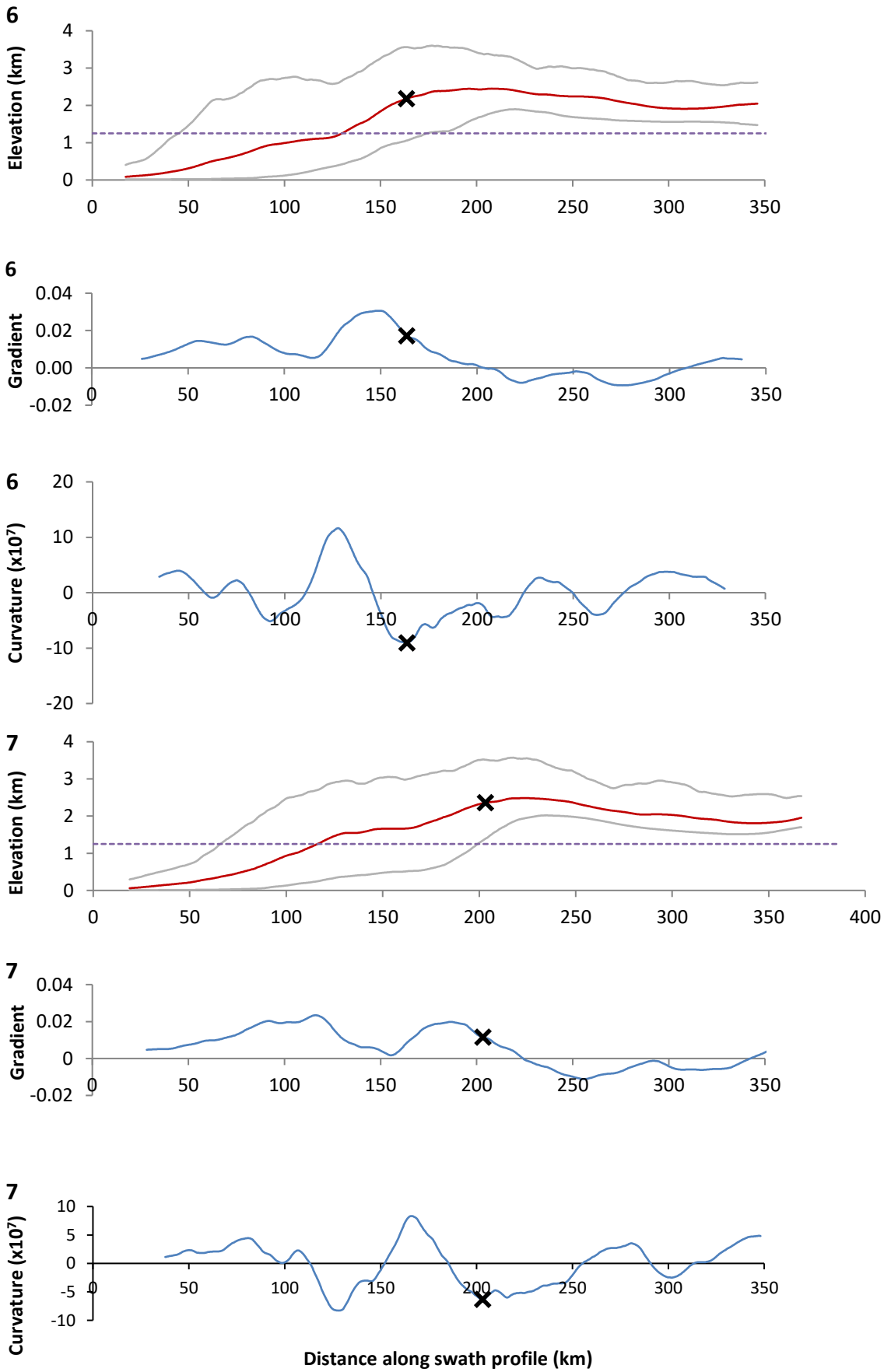


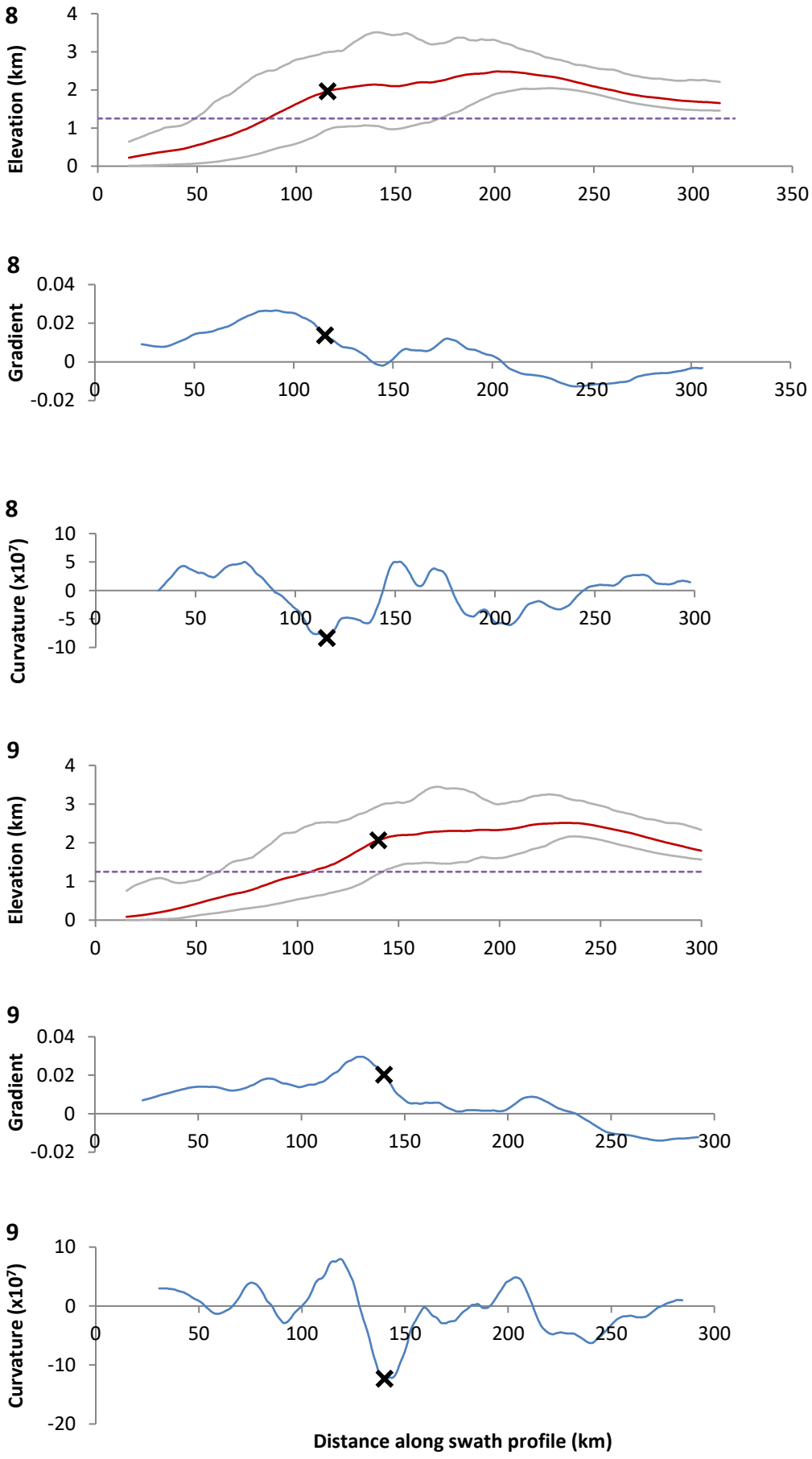
Swath profiles with a 100 km width are seen below. The conditions are the same as those for the 50 km swath widths.

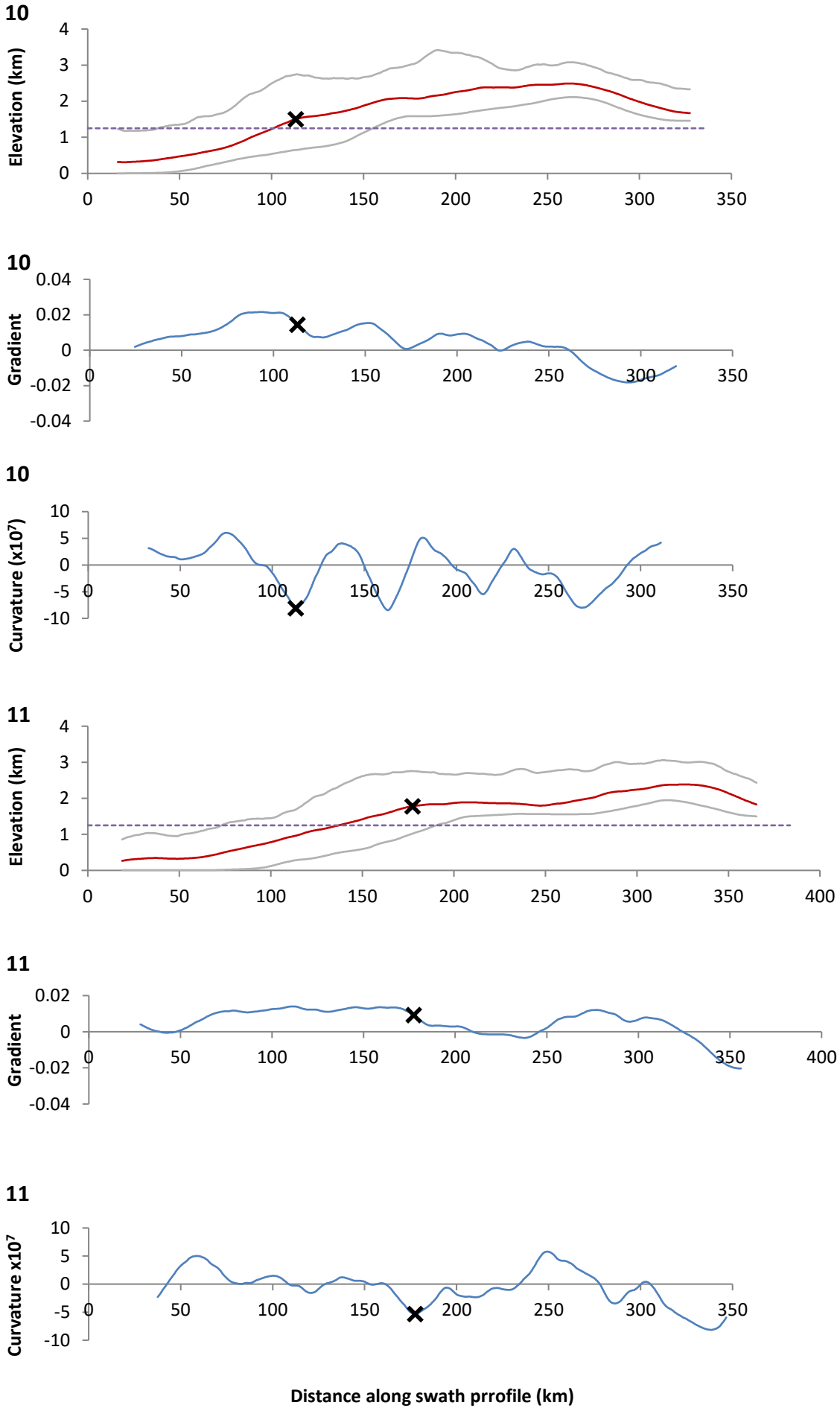


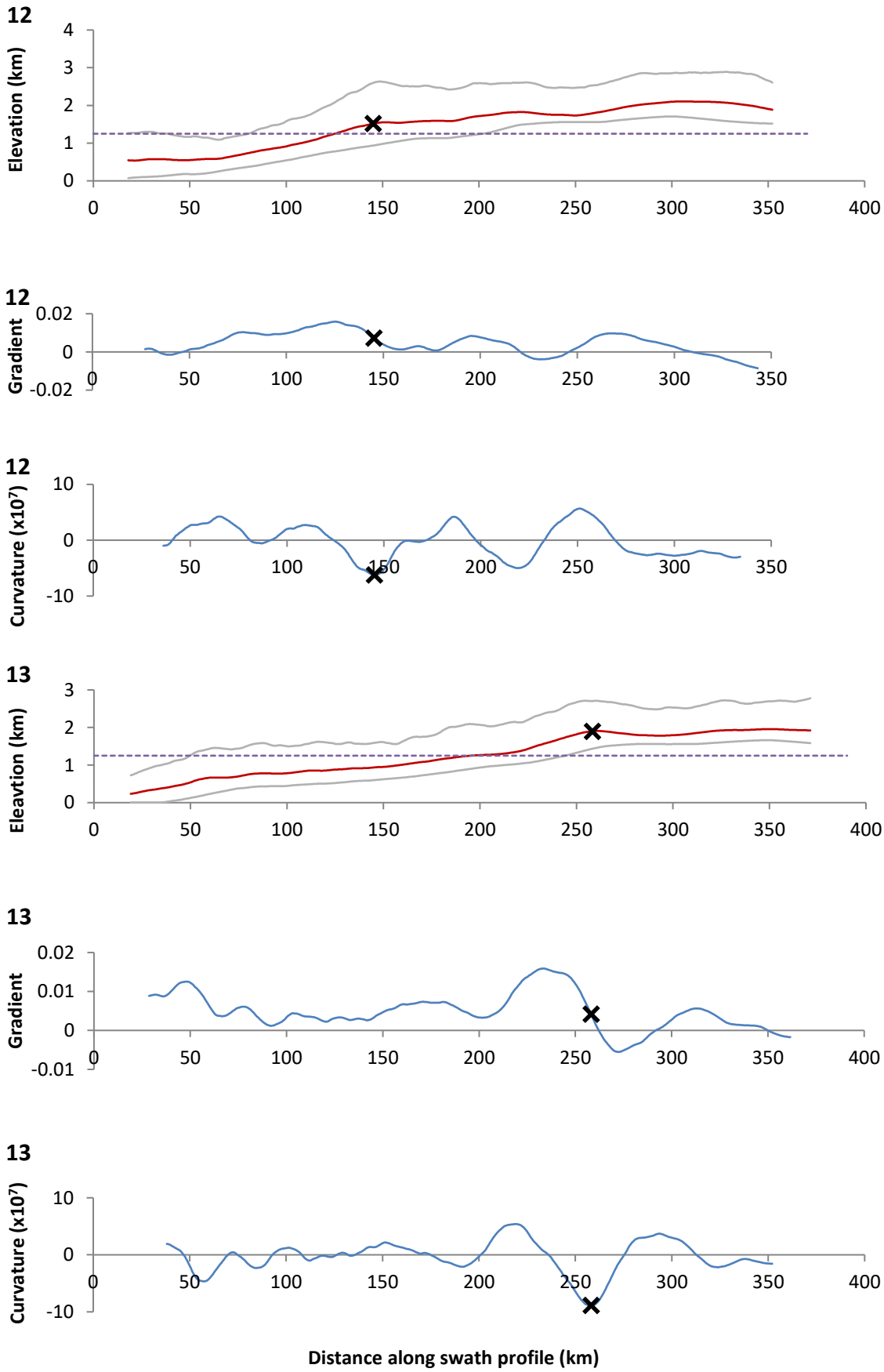

2
Elevation (km)
3.5
3
2.5
2
1.5
1
0.5
0
0
50
100
150
200
250
300
350
400
2
Gradient
0.04
0.02
0
-0.02
0
50
100
150
200
250
300
350
400
2
Curvature (x10⁷)
10
5
0
-5
-10
0
50
100
150
200
250
300
350
3
Elevation (km)
4
3
2
1
0
0
50
100
150
200
250
300
350
3
Gradient
0.04
0.02
0
-0.02
0
50
100
150
200
250
300
350
3
Curvature (x10⁷)
10
0
-10
0
50
100
150
200
250
300
350
Distance along swath profile (km)

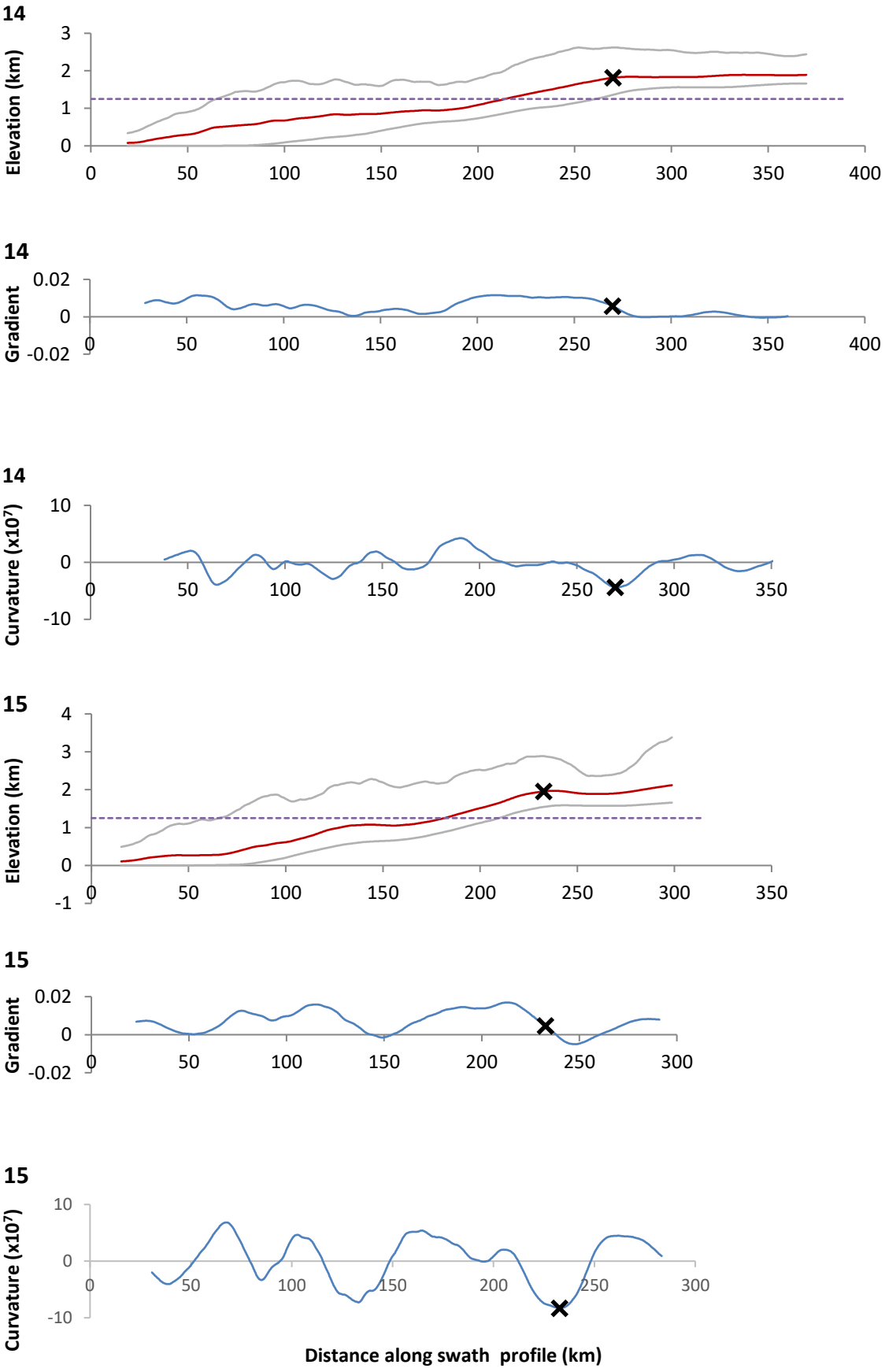

4
Elevation (km)
4
3
2
1
0
0
50
100
150
200
250
300
350
400
4
Gradient
0.04
0.02
0
-0.02
0
50
100
150
200
250
300
350
4
Curvature (x10⁷)
10
0
-10
-20
0
50
100
150
200
250
300
350
5
Elevation (km)
4
3
2
1
0
0
50
100
150
200
250
300
350
400
5
Gradient
0.04
0.02
0.00
-0.02
0
50
100
150
200
250
300
350
5
Curvature (x10⁷)
10
0
-10
0
50
100
150
200
250
300
350
Distance along swath profile (km)


6
Elevation (km)
4
3
2
1
0
0
50
100
150
200
250
300
350
6
Gradient
0.04
0.02
0.00
-0.02
6
Curvature (x10⁷)
20
10
0
-10
-20
7
Elevation (km)
400
7
Gradient
7
Curvature (x10⁷)
10
5
0
-5
-10
Distance along swath profile (km)


8
Elevation (km)
4
3
2
1
0
0
50
100
150
200
250
300
350
8
Gradient
0.04
0.02
0
-0.02
0
50
100
150
200
250
300
350
8
Curvature (x10⁷)
10
5
0
-5
-10
0
50
100
150
200
250
300
9
Elevation (km)
4
3
2
1
0
0
50
100
150
200
250
300
9
Gradient
0.04
0.02
0
-0.02
0
50
100
150
200
250
300
9
Curvature (x10⁷)
10
0
-10
-20
0
50
100
150
200
250
300
Distance along swath profile (km)

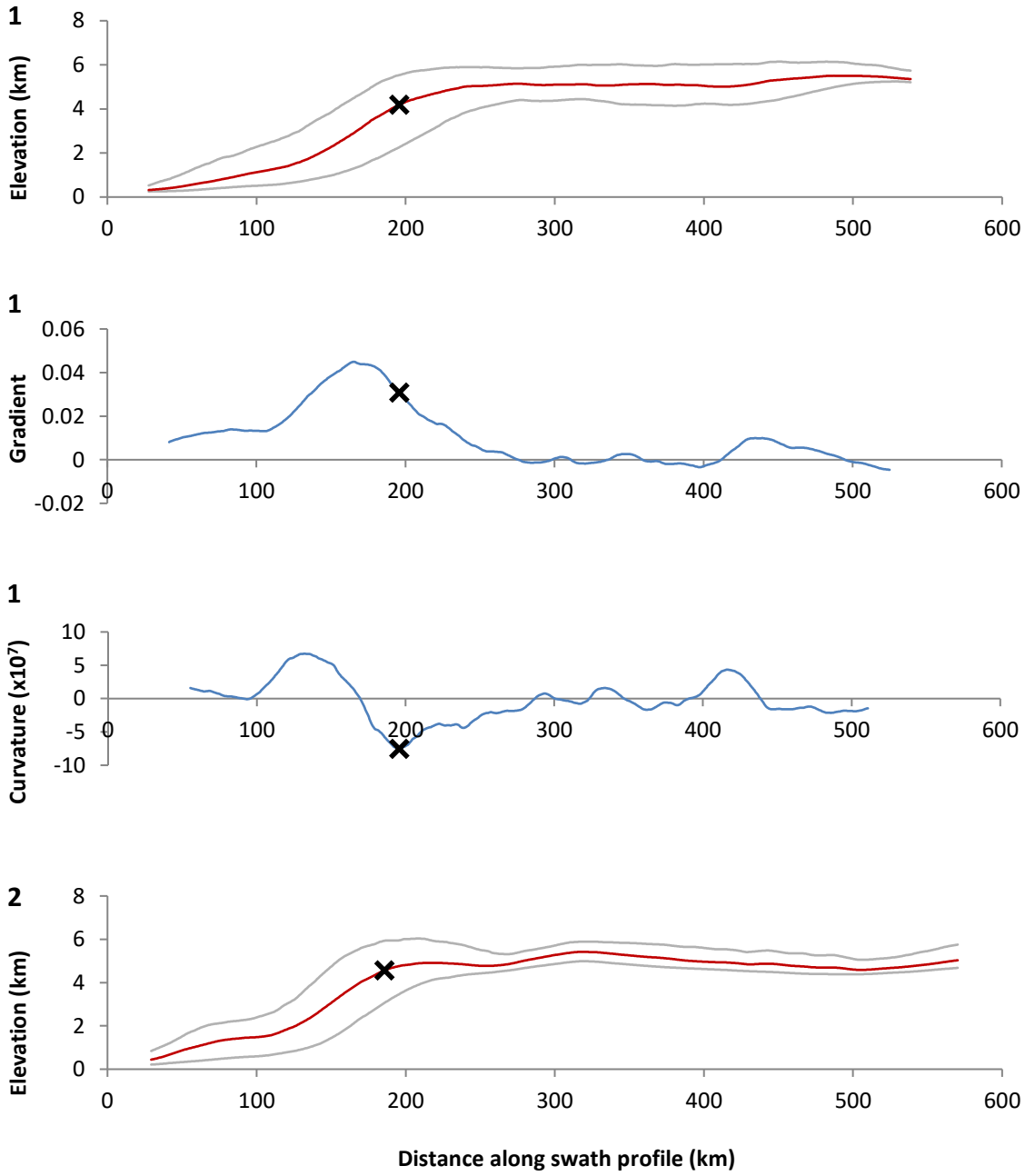

10
Elevation (km)
4
3
2
1
0
0
50
100
150
200
250
300
350
10
Gradient
0.04
0.02
0
-0.02
-0.04
0
50
100
150
200
250
300
350
10
Curvature (x10⁷)
10
5
0
-5
-10
0
50
100
150
200
250
300
350
11
Elevation (km)
4
3
2
1
0
0
50
100
150
200
250
300
350
400
11
Gradient
0.02
0
-0.02
-0.04
0
50
100
150
200
250
300
350
400
11
Curvature x10⁷
10
5
0
-5
-10
0
50
100
150
200
250
300
350
Distance along swath prrofile (km)

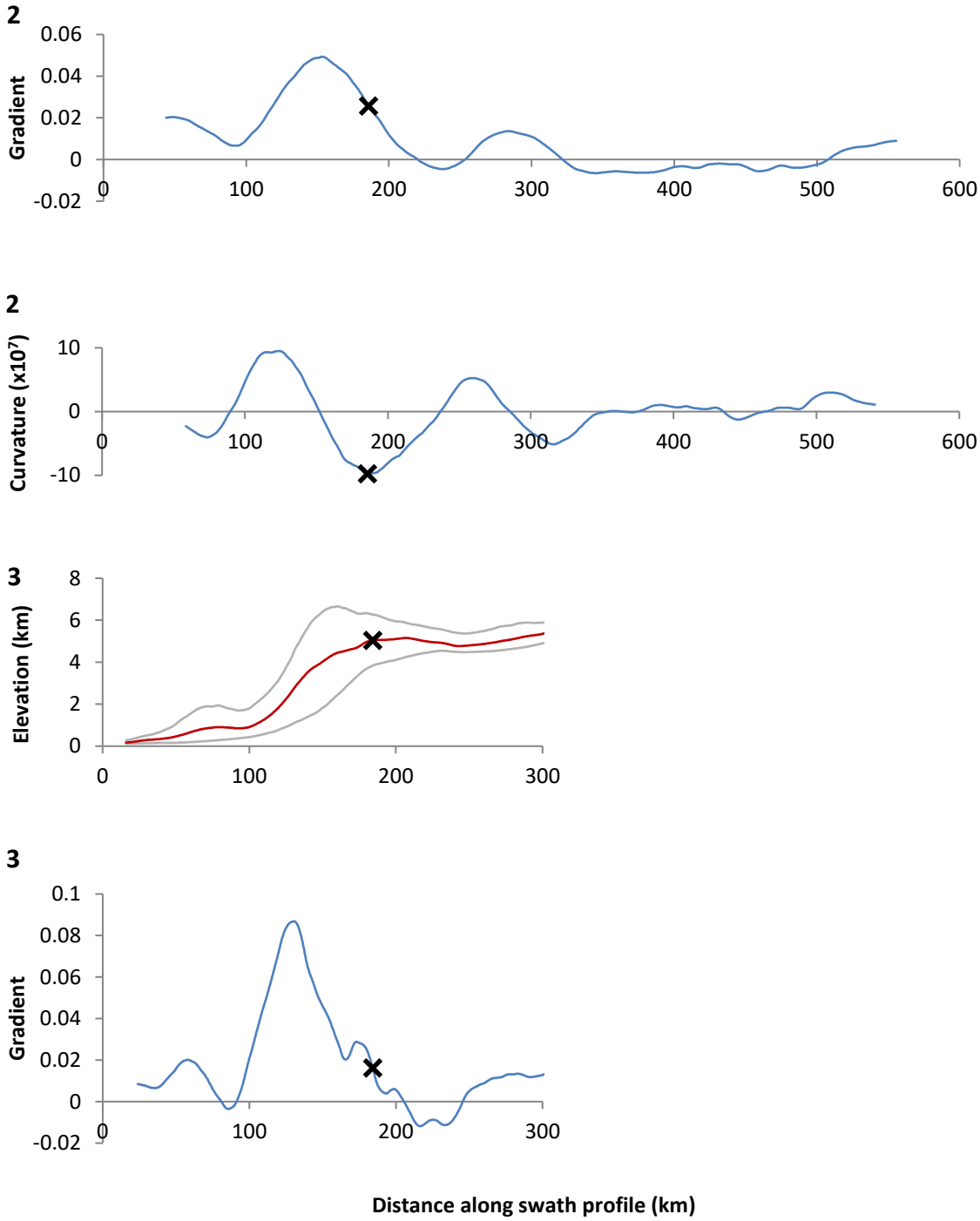

12
Elevation (km)
4
3
2
1
0
0
50
100
150
200
250
300
350
400
12
Gradient
0.02
0
-0.02
0
50
100
150
200
250
300
350
12
Curvature (x10⁷)
10
0
-10
0
50
100
150
200
250
300
350
13
Eleavtion (km)
3
2
1
0
0
50
100
150
200
250
300
350
400
13
Gradient
0.02
0.01
0
-0.01
0
50
100
150
200
250
300
350
400
13
Curvature (x10⁷)
10
0
-10
0
50
100
150
200
250
300
350
400
Distance along swath profile (km)

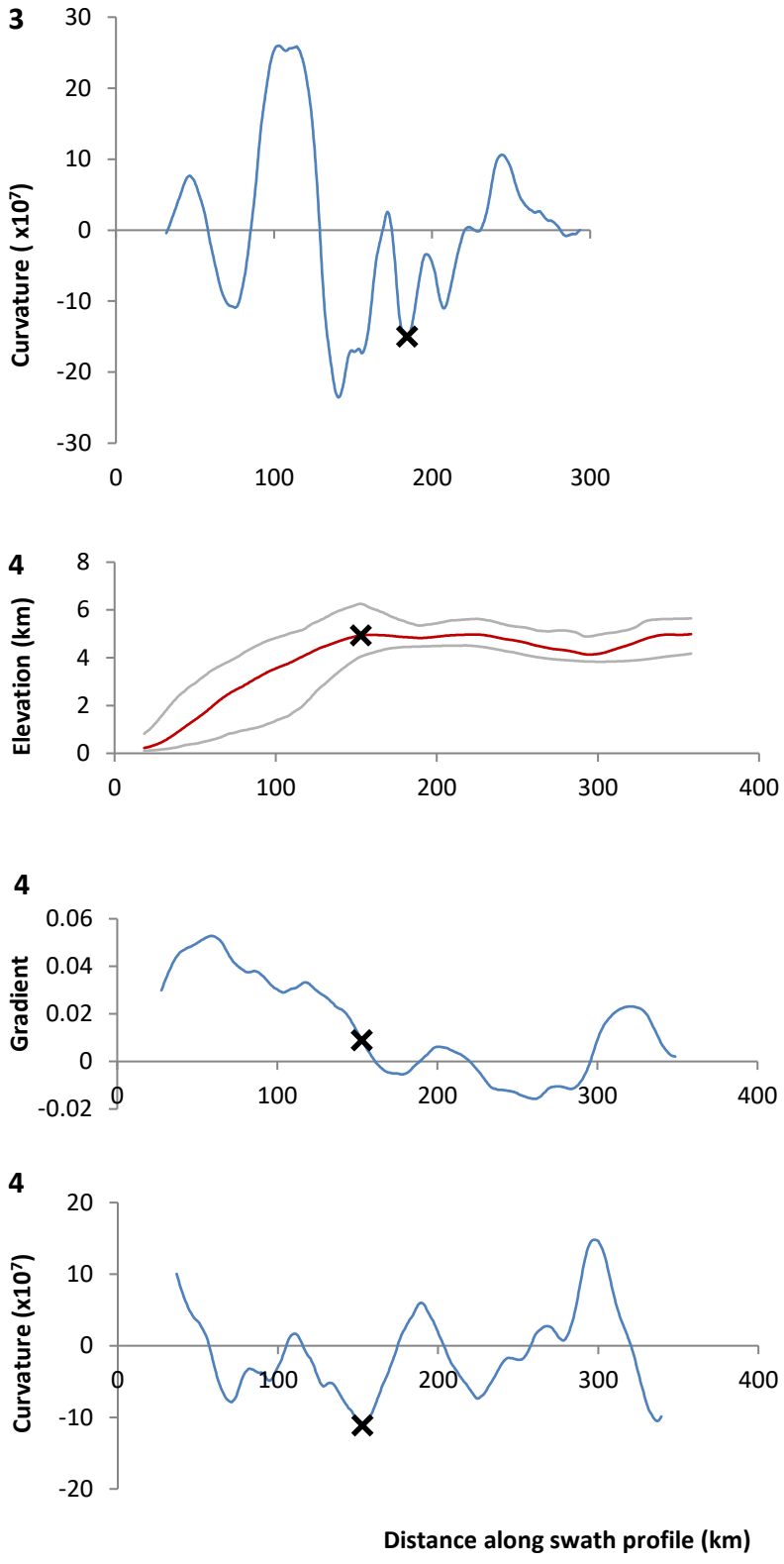

14
Elevation (km)
3
2
1
0
0
50
100
150
200
250
300
350
400
14
Gradient
0.02
0
-0.02
0
50
100
150
200
250
300
350
400
14
Curvature (x10⁷)
10
0
-10
0
50
100
150
200
250
300
350
15
Elevation (km)
4
3
2
1
0
-1
0
50
100
150
200
250
300
350
15
Gradient
0.02
0
-0.02
0
50
100
150
200
250
300
15
Curvature (x10⁷)
10
0
-10
0
50
100
150
200
250
300
Distance along swath profile (km)

B2: The Himalayas

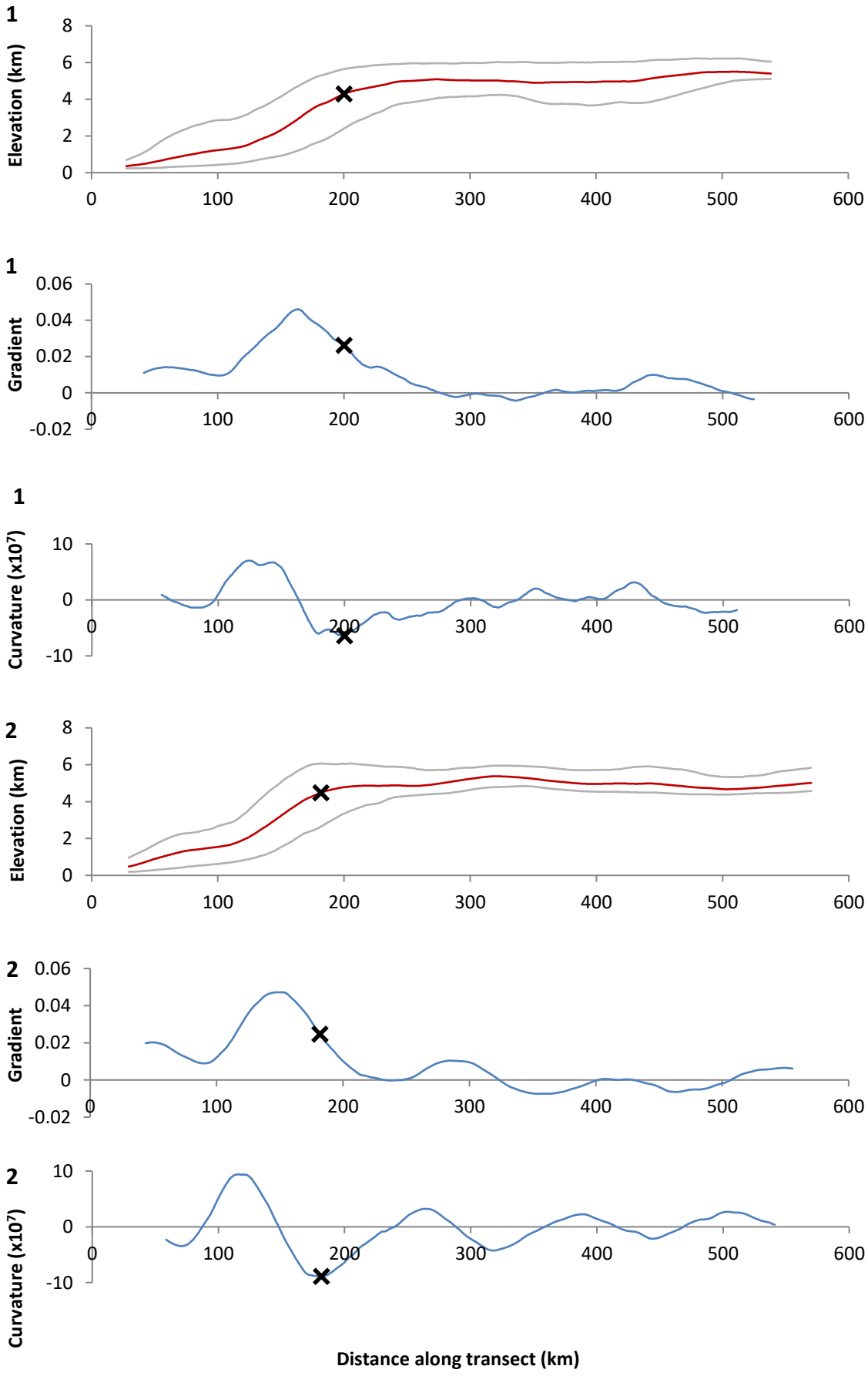
Swath profiles of 50 km width are seen below. Smoothing is undertaken by a running average of ±50. Elevation refers to elevation above mean sea level and in all cases transects were taken from S to N. Each graph is labelled by a number that represents the swath profile the graph is in reference to. The central red line refers to the average swath profile while the grey lines above and below refers to the maximum and minimum respectively. The black X marks the calculated plateau edge. Both the gradient and curvature graphs are taken from the average swath profile.

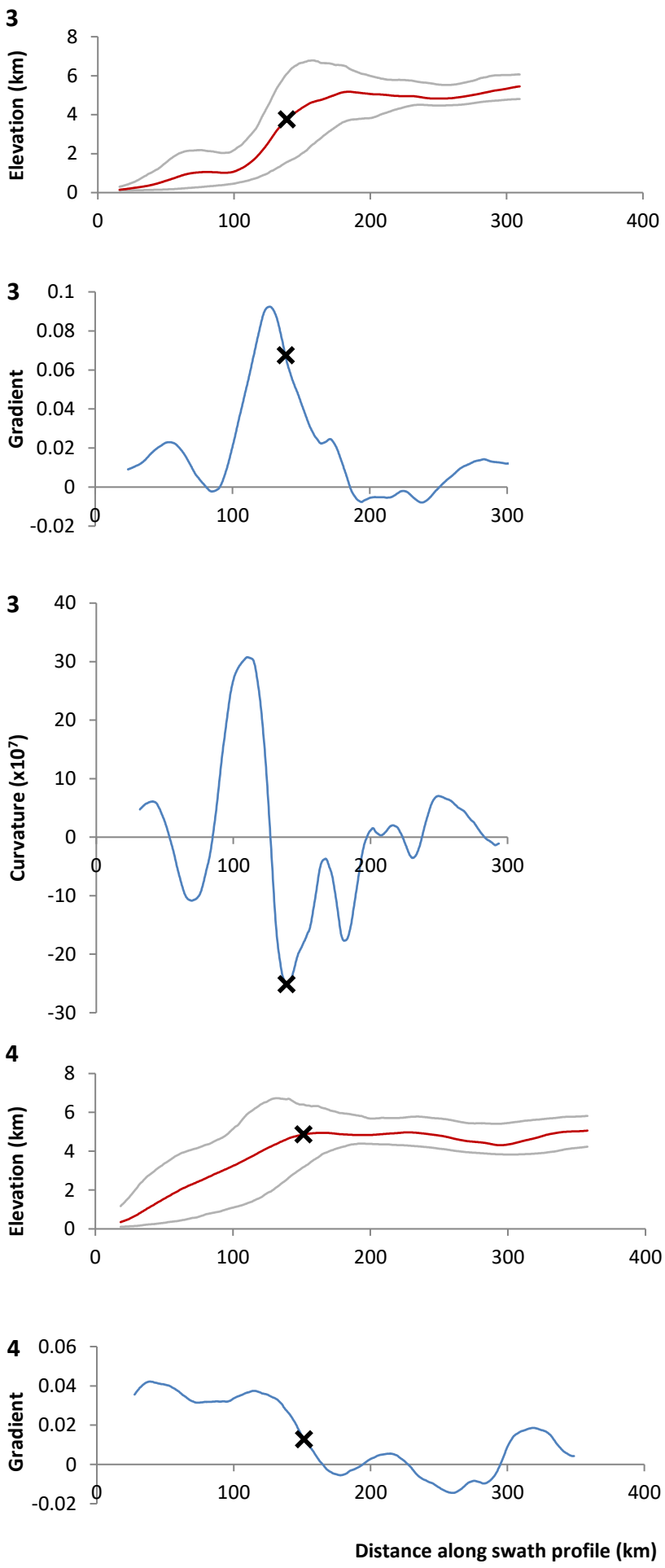



2
Gradient
0.06
0.04
0.02
0
-0.02
0
100
200
300
400
500
600
2
Curvature (x10⁷)
10
0
-10
0
100
200
300
400
500
600
3
Elevation (km)
8
6
4
2
0
0
100
200
300
3
Gradient
0.1
0.08
0.06
0.04
0.02
0
-0.02
0
100
200
300
Distance along swath profile (km)

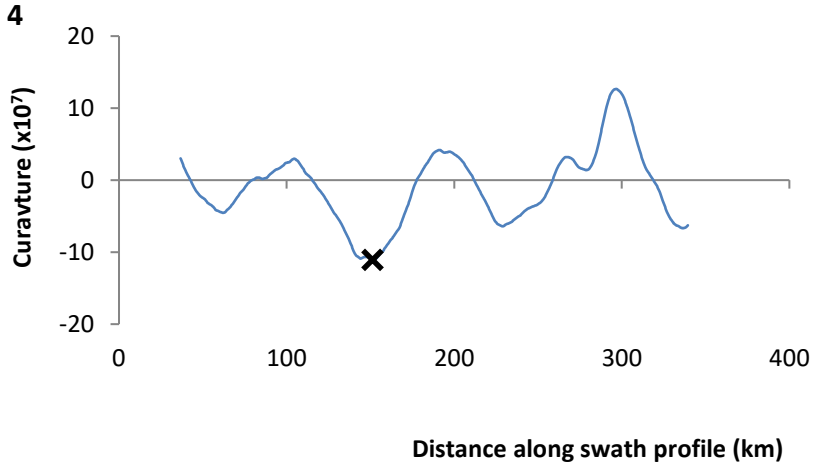

3
Curvature (x10⁷)
30
20
10
0
-10
-20
-30
0
100
200
300
4
Elevation (km)
8
6
4
2
0
0
100
200
300
400
4
Gradient
0.06
0.04
0.02
0
-0.02
0
100
200
300
400
4
Curvature (x10⁷)
20
10
0
-10
-20
0
100
200
300
400
Distance along swath profile (km)

Swath profiles with a 100 km width are seen below. The conditions are the same as those for the 50 km swath widths.



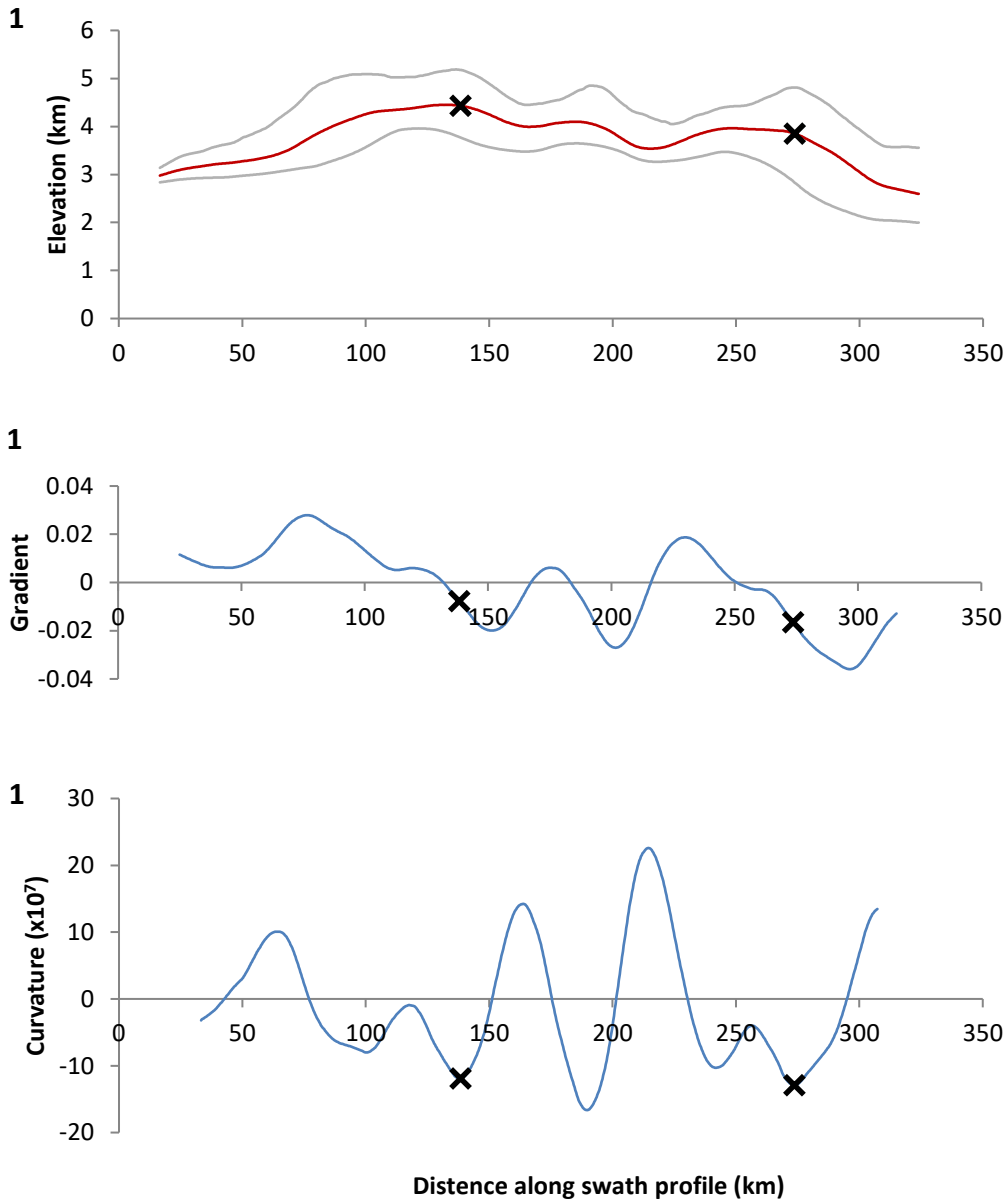

3
Elevation (km)
8
6
4
2
0
0
100
200
300
400
3
Gradient
0.1
0.08
0.06
0.04
0.02
0
-0.02
0
100
200
300
3
Curvature (x10⁷)
40
30
20
10
0
-10
-20
-30
0
100
200
300
4
Elevation (km)
8
6
4
2
0
0
100
200
300
400
4
Gradient
0.06
0.04
0.02
0
-0.02
0
100
200
300
400
Distance along swath profile (km)

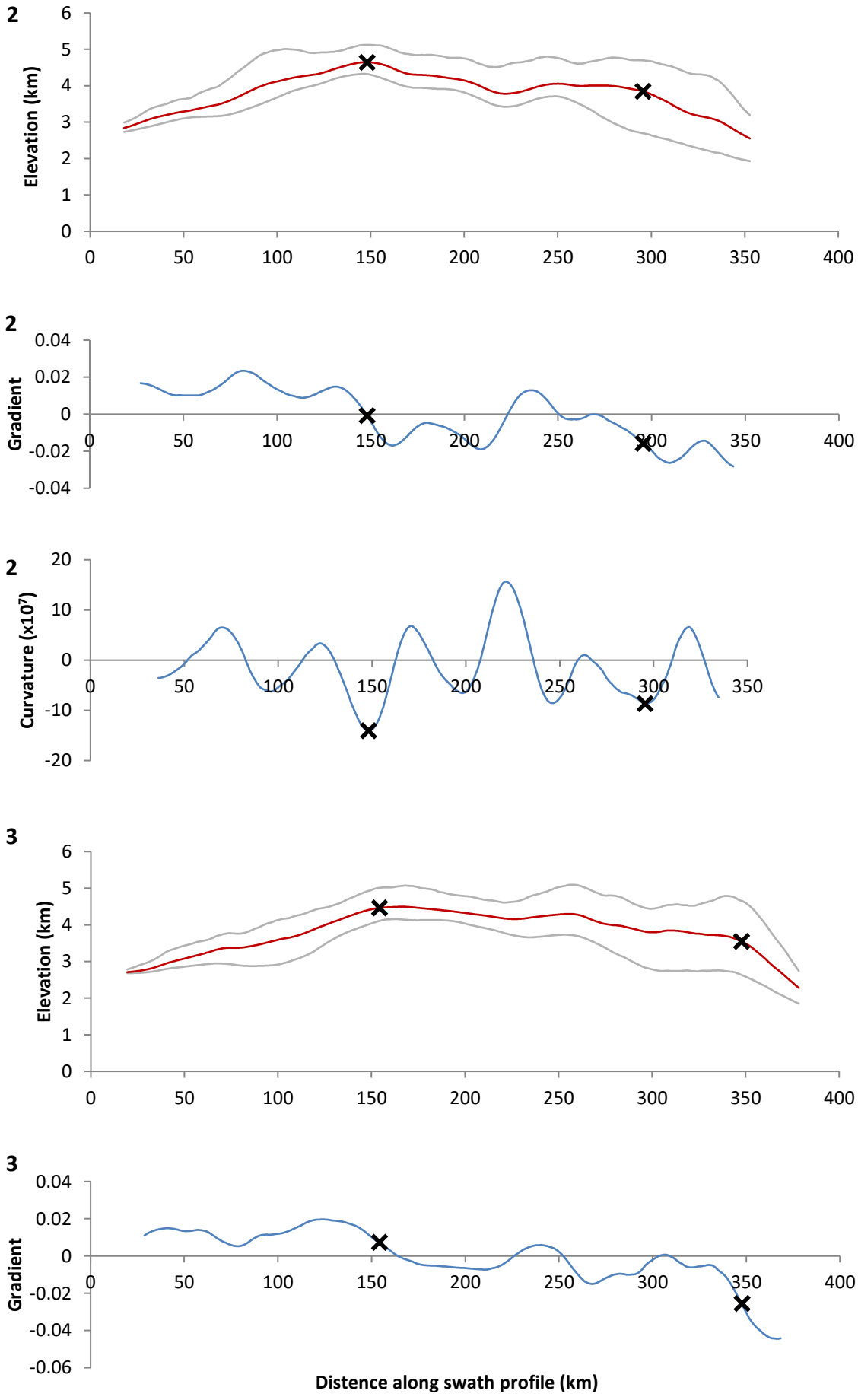
4

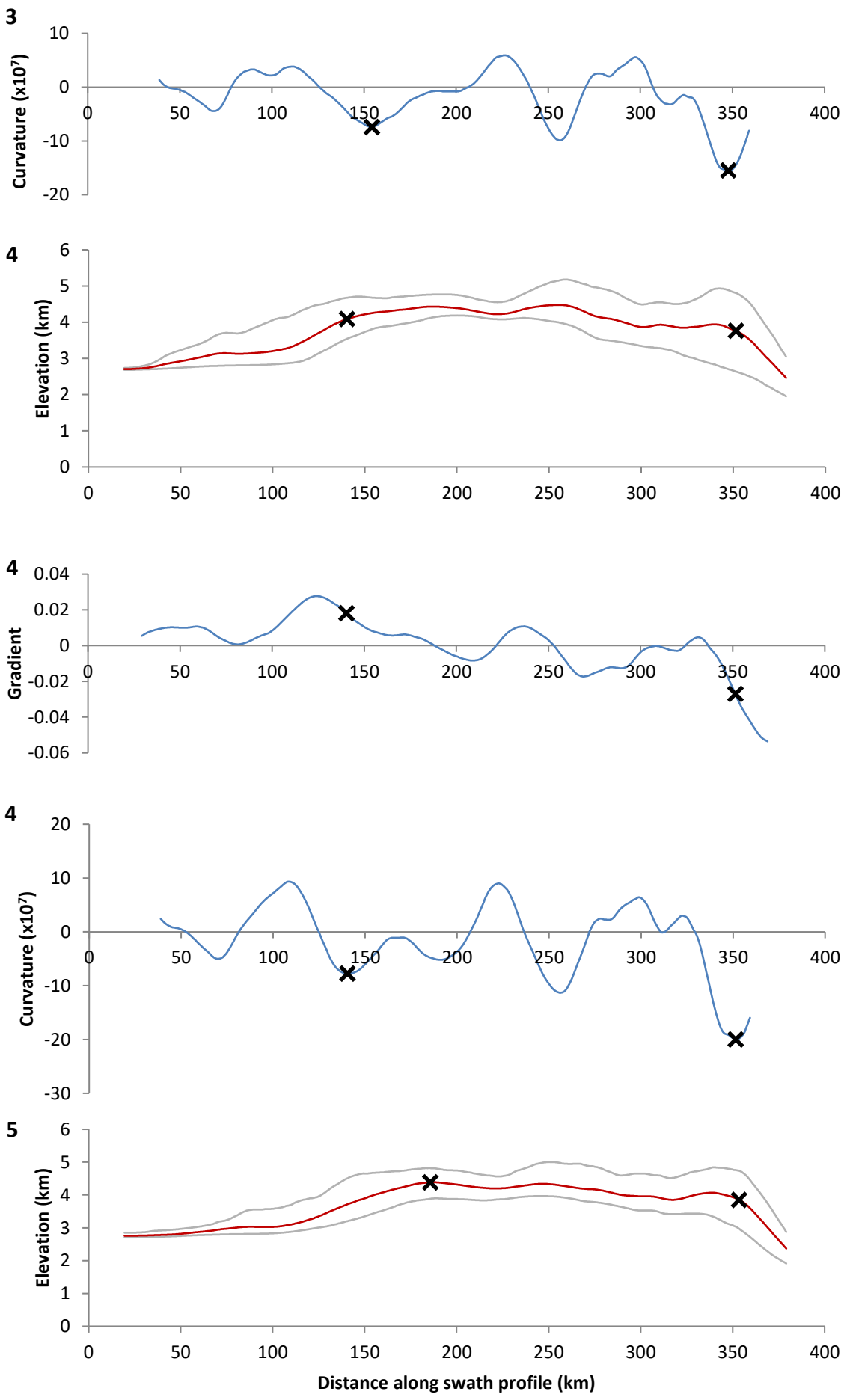

20
10
0
-10
-20
Curavture (x10⁷)
0
100
200
300
400
Distance along swath profile (km)

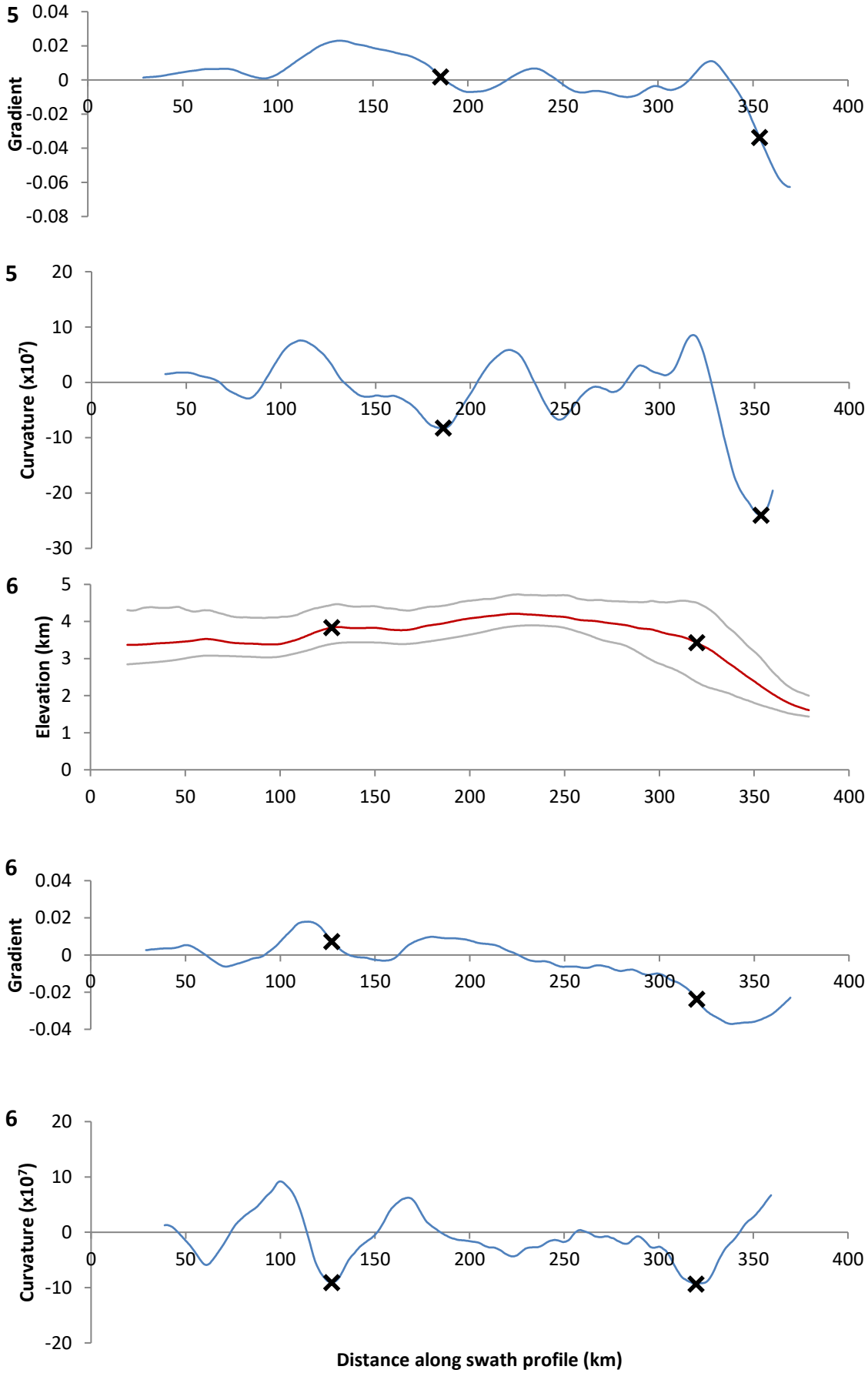
B3: The Qilian Shan

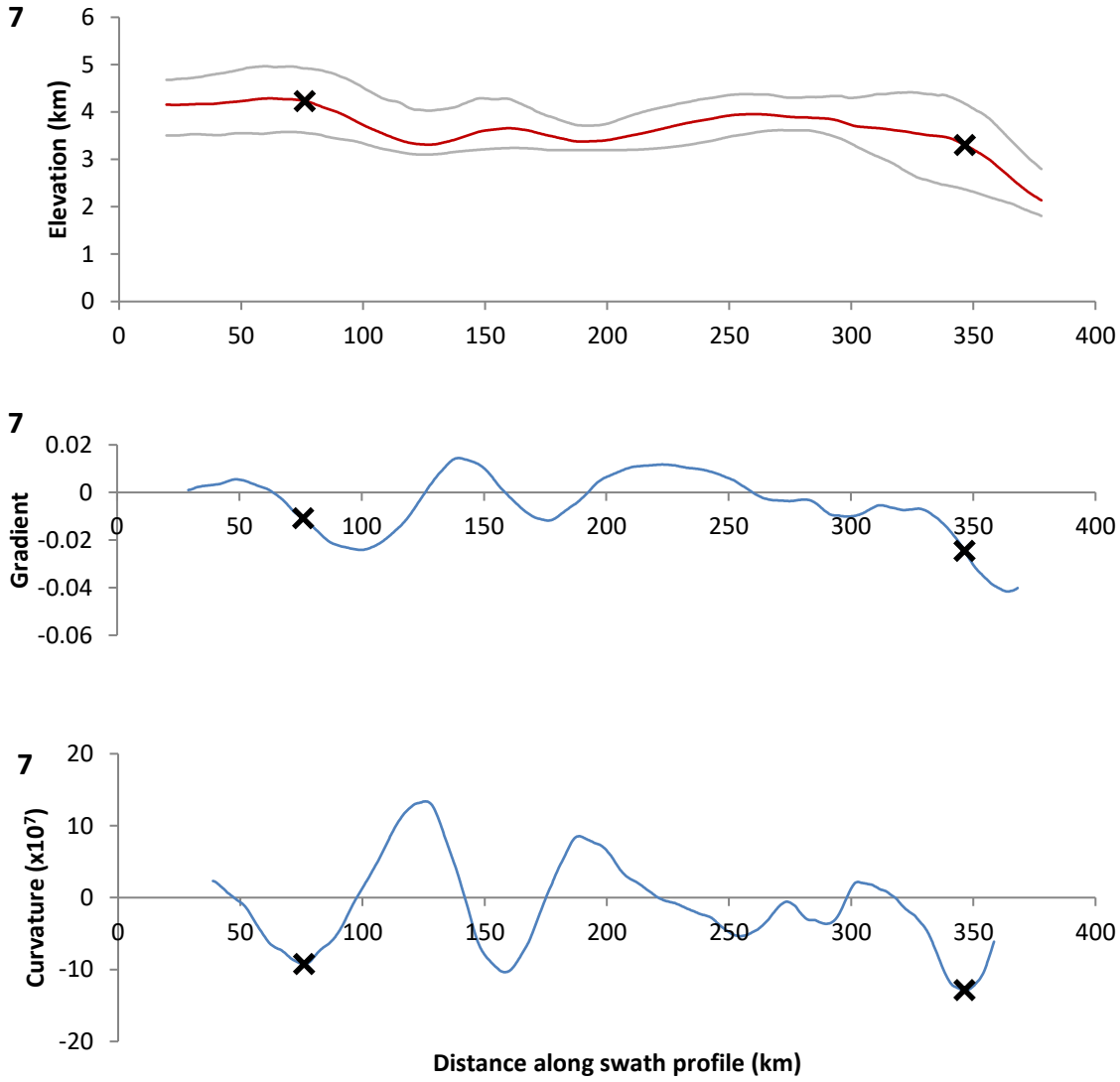
Swath profiles of 50 km width are seen below. Smoothing is undertaken by a running average of ±50. Elevation refers to elevation above mean sea level and in all cases transects were taken from SW to NE. Each graph is labelled by a number that represents the swath profile the graph is in reference to. The central red line refers to the average swath profile while the grey lines above and below refers to the maximum and minimum respectively. The black X marks the calculated plateau edge. Both the gradient and curvature graphs are taken from the average swath profile.



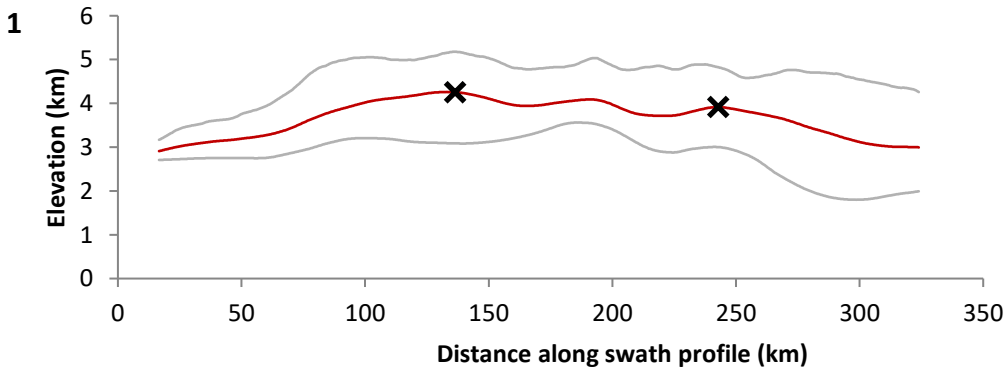

2
Elevation (km)
6
5
4
3
2
1
0
0
50
100
150
200
250
300
350
400
2
Gradient
0.04
0.02
0
-0.02
-0.04
2
Curvature (x10⁷)
20
10
0
-10
-20
3
Elevation (km)
3
Gradient
0.04
0.02
0
-0.02
-0.04
-0.06
Distence along swath profile (km)

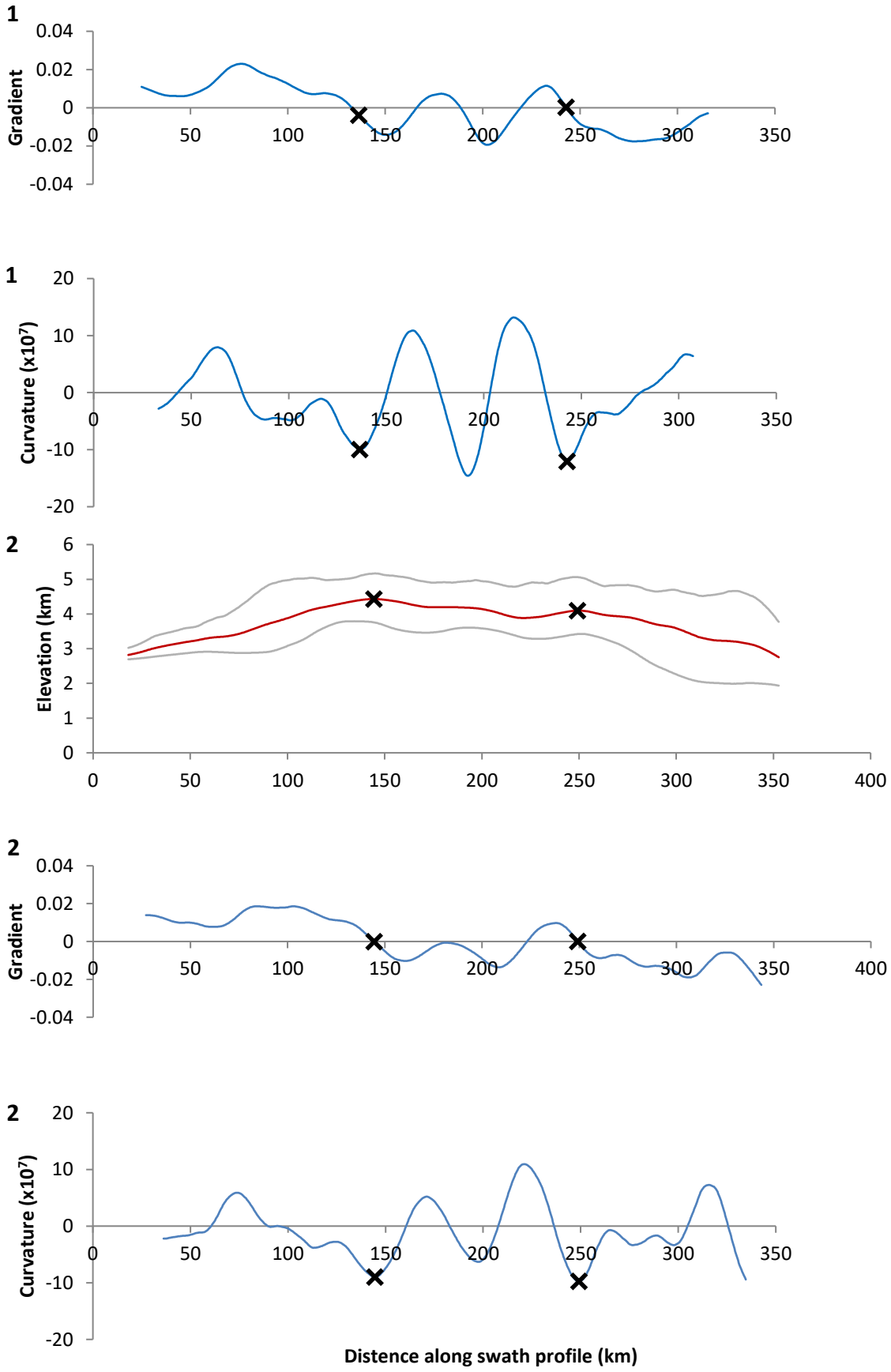

3
Curvature (x10⁷)
10
0
-10
-20
0
50
100
150
200
250
300
350
400
4
Elevation (km)
6
5
4
3
2
1
0
4
Gradient
0.04
0.02
0
-0.02
-0.04
-0.06
4
Curvature (x10⁷)
20
10
0
-10
-20
-30
5
Elevation (km)
Distance along swath profile (km)

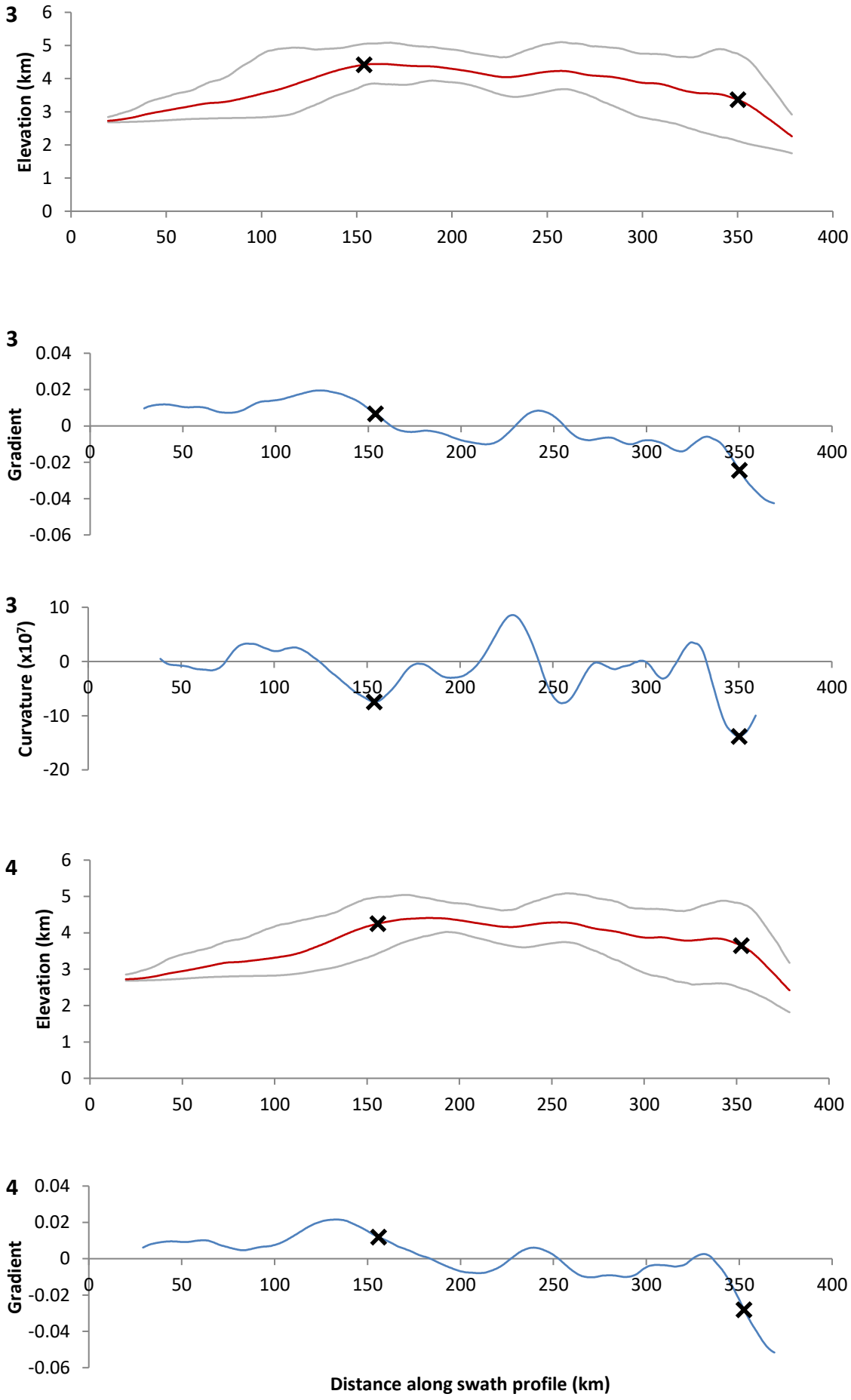

5
Gradient
0.04
0.02
0
-0.02
-0.04
-0.06
-0.08
0
50
100
150
200
250
300
350
400
5
Curvature (x10⁷)
20
10
0
-10
-20
-30
6
Elevation (km)
5
4
3
2
1
0
6
Gradient
0.04
0.02
0
-0.02
-0.04
6
Curvature (x10⁷)
20
10
0
-10
-20
Distance along swath profile (km)

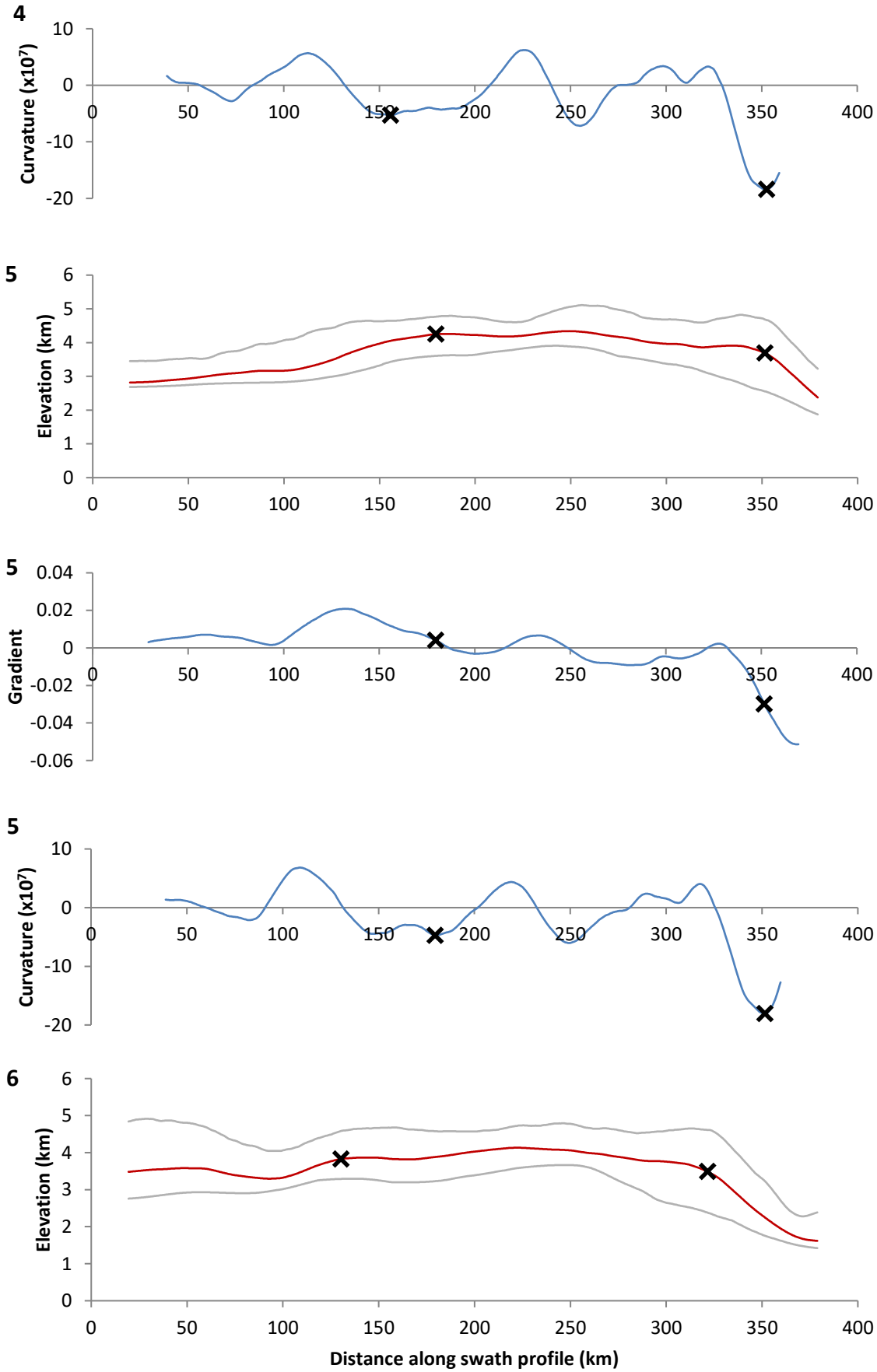


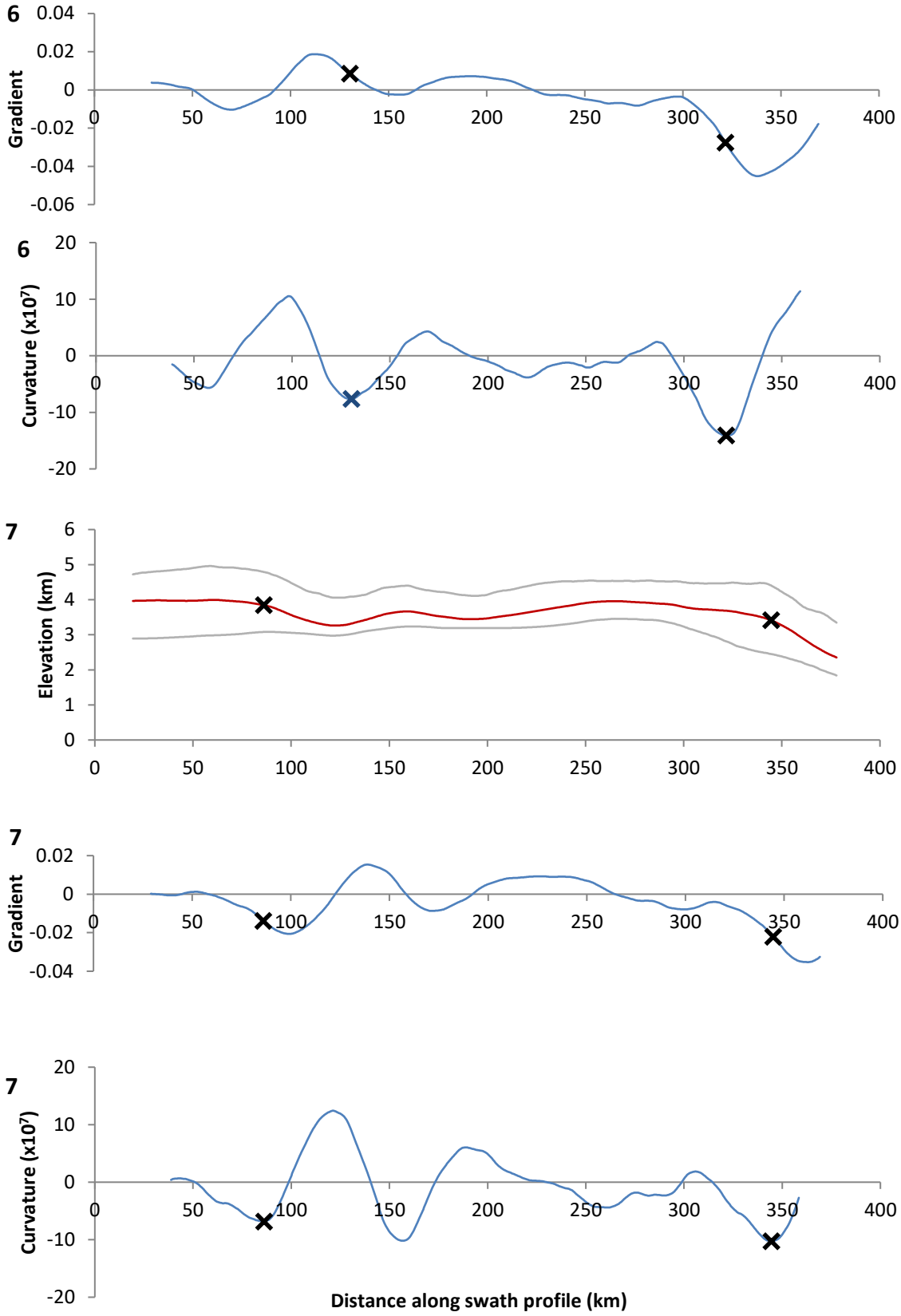
Swath profiles with a 100 km width are seen below. The conditions are the same as those for the 50 km swath widths.




1
Gradient
0.04
0.02
0
-0.02
-0.04
0
50
100
150
200
250
300
350
1
Curvature (x10⁷)
20
10
0
-10
-20
2
Elevation (km)
6
5
4
3
2
1
0
400
2
Gradient
2
Curvature (x10⁷)
Distence along swath profile (km)

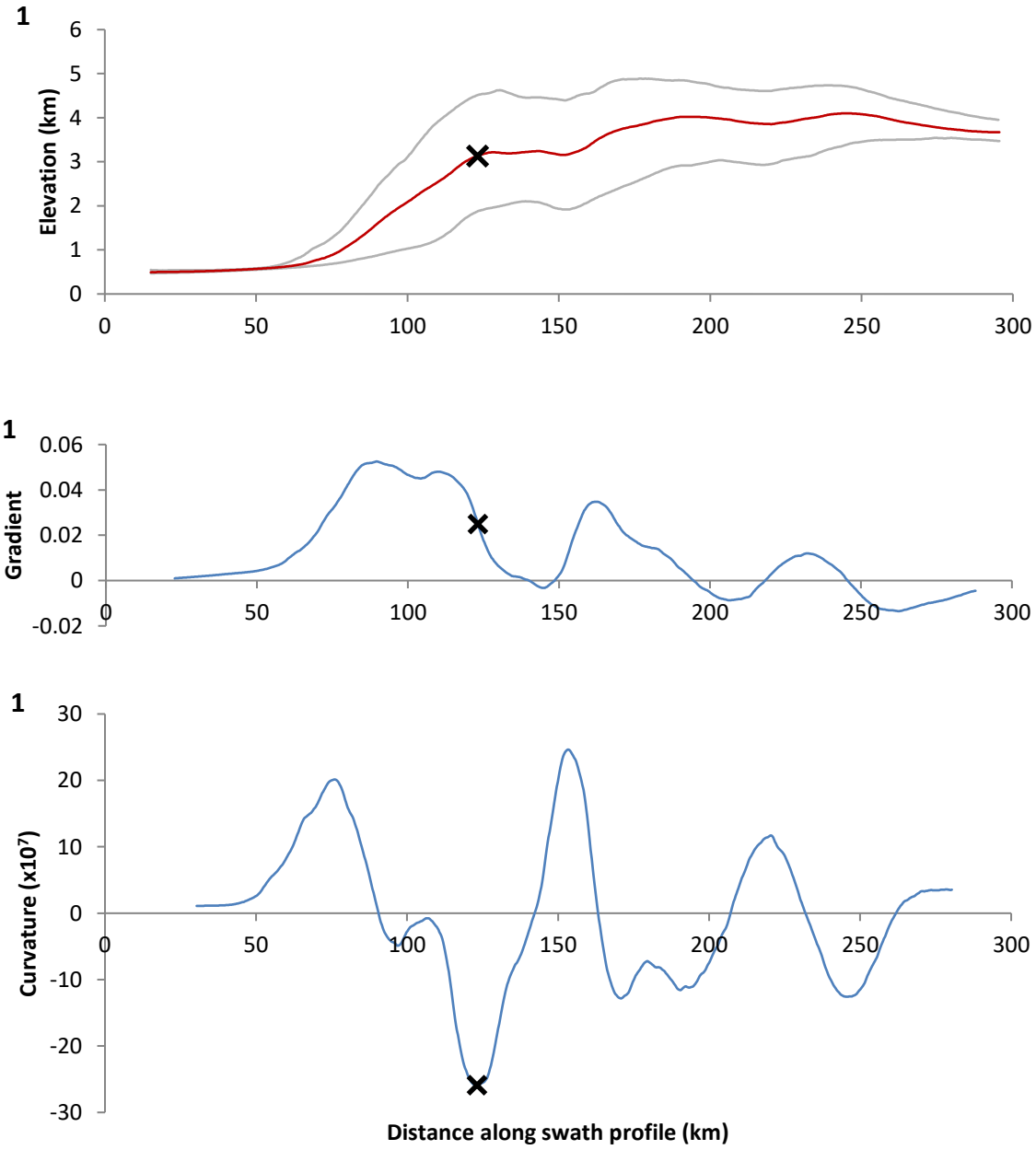

3
Elevation (km)
0
1
2
3
4
5
6
0
50
100
150
200
250
300
350
400
3
Gradient
0.04
0.02
0
-0.02
-0.04
-0.06
3
Curvature (x10⁷)
10
0
-10
-20
4
Elevation (km)
4
Gradient
Distance along swath profile (km)

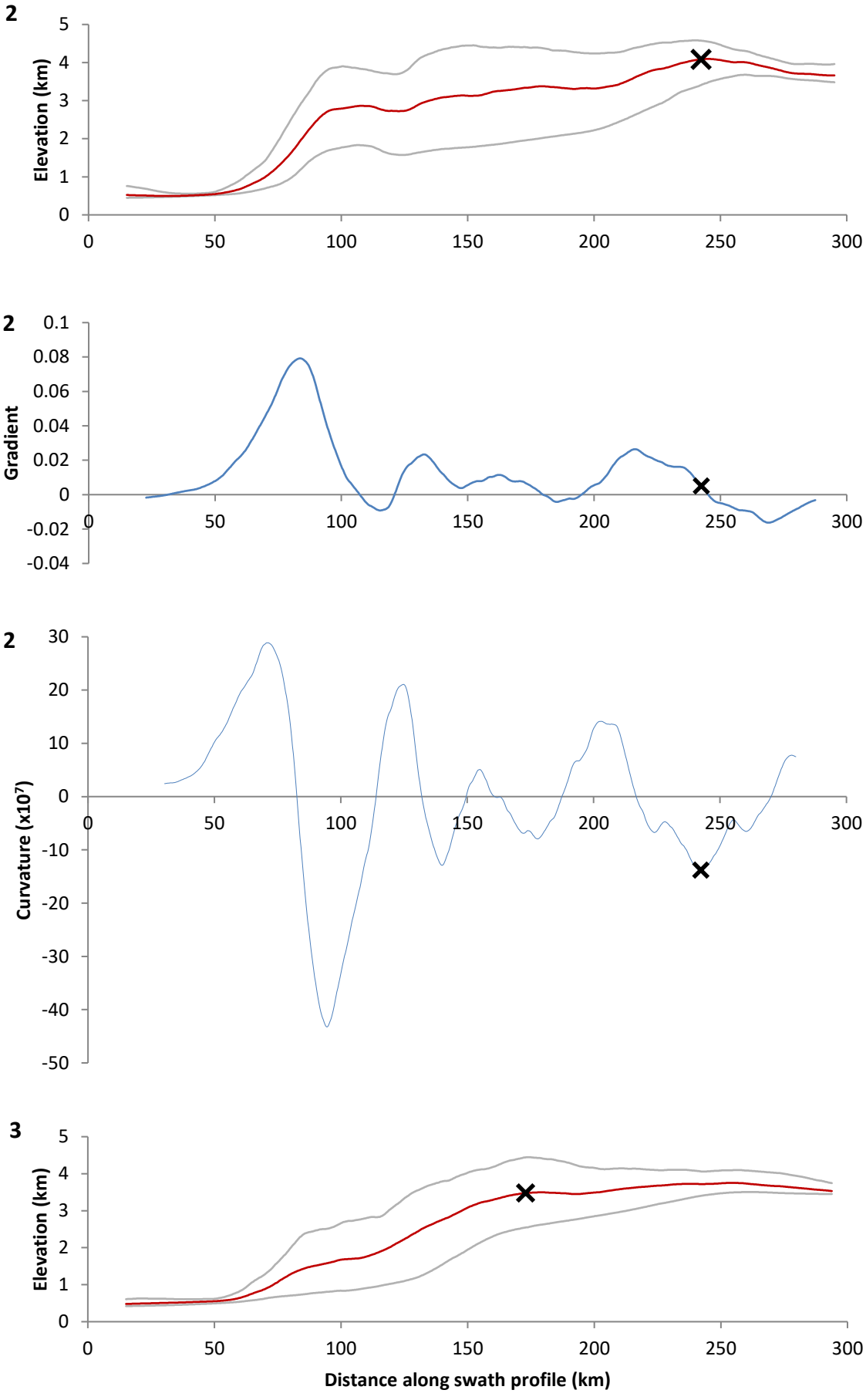

4
Curvature (x10⁷)
10
0
-10
-20
0
50
100
150
200
250
300
350
400
5
Elevation (km)
6
5
4
3
2
1
0
5
Gradient
0.04
0.02
0
-0.02
-0.04
-0.06
5
Curvature (x10⁷)
10
0
-10
-20
6
Elevation (km)
Distance along swath profile (km)

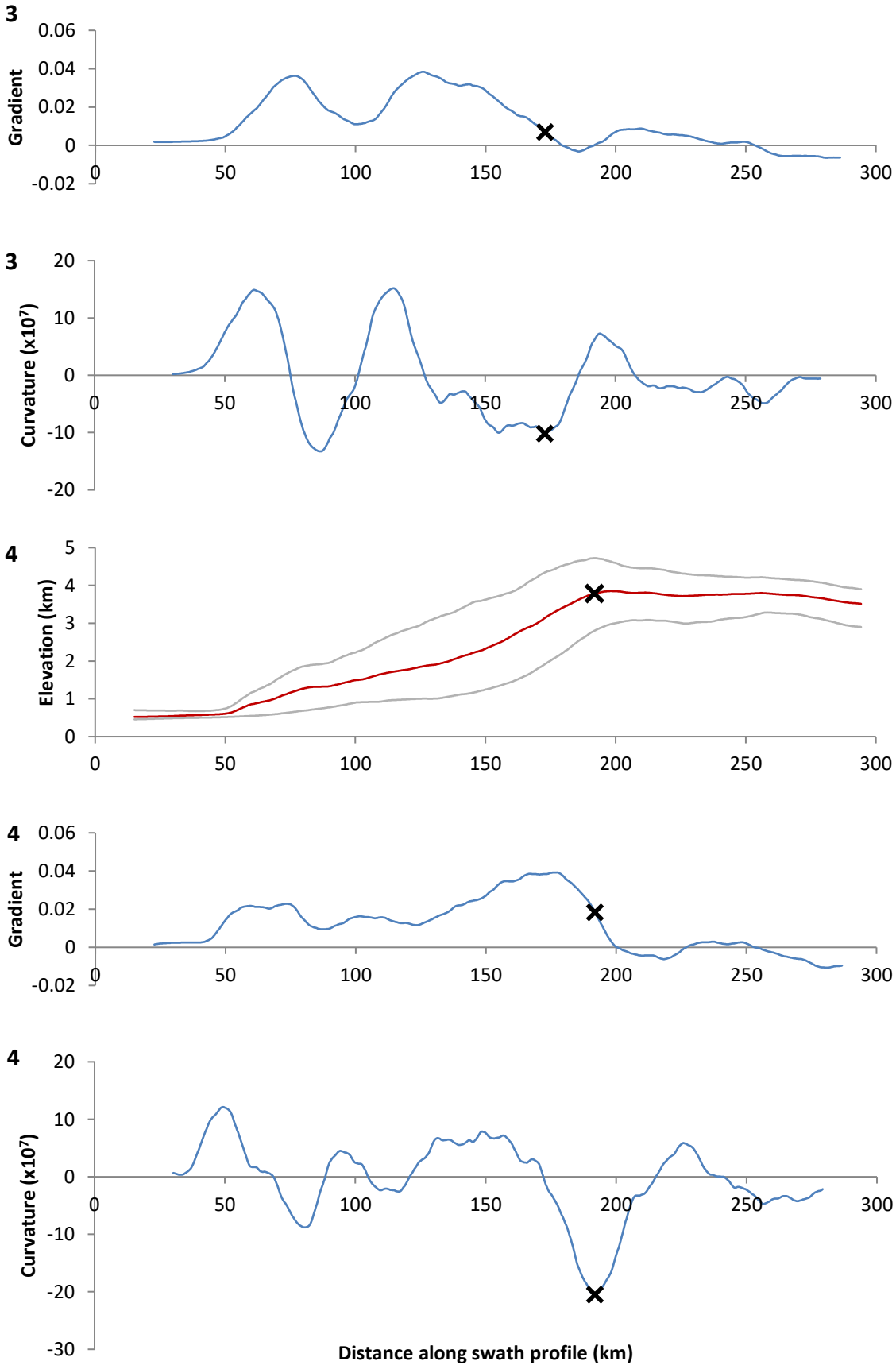

6
Gradient
0.04
0.02
0
-0.02
-0.04
-0.06
0
50
100
150
200
250
300
350
400
6
Curvature (x10⁷)
20
10
0
-10
-20
7
Elevation (km)
6
5
4
3
2
1
0
7
Gradient
0.02
0
-0.02
-0.04
7
Curvature (x10⁷)
20
10
0
-10
-20
Distance along swath profile (km)

B4: The Longmen Shan

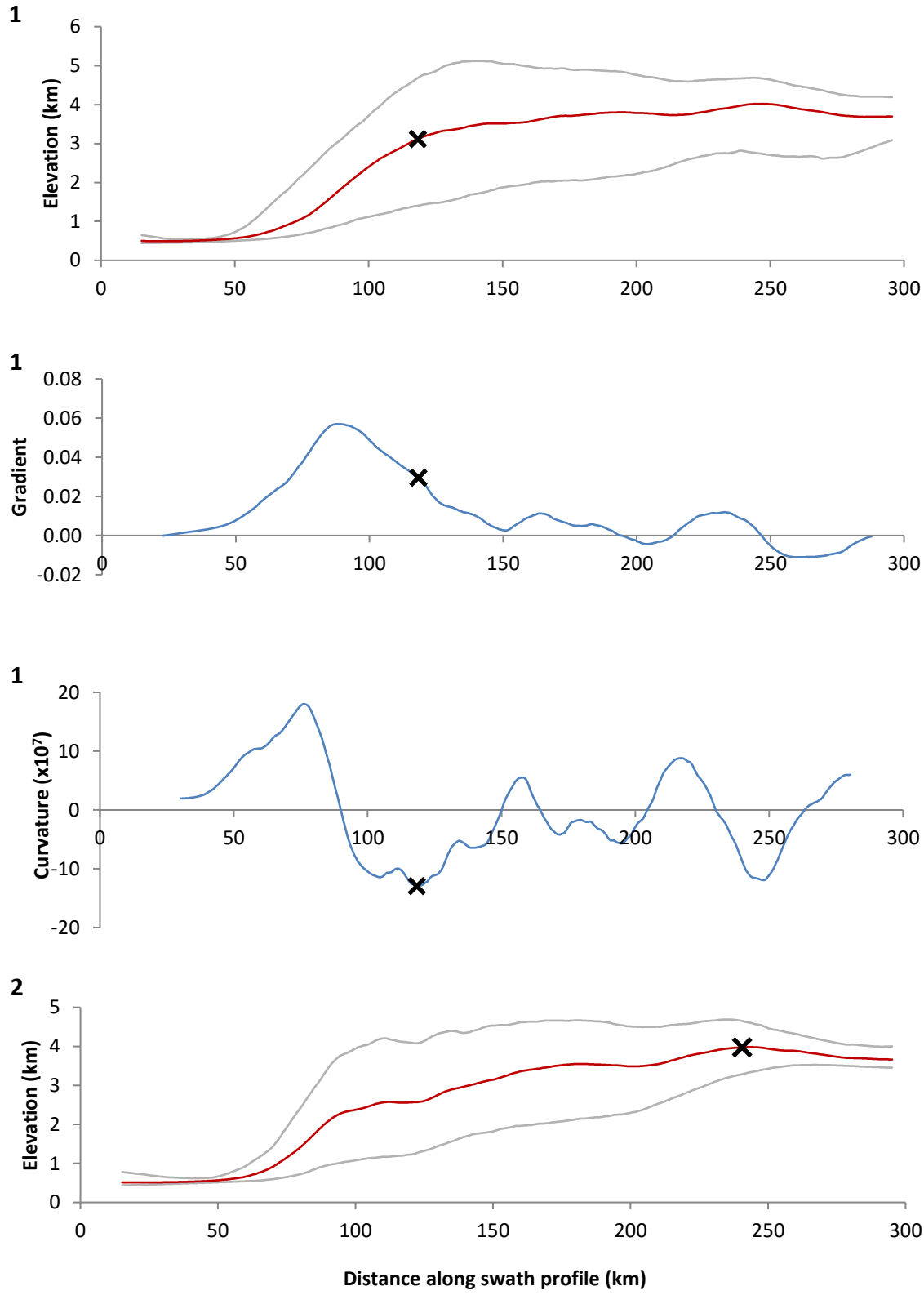
Swath profiles of 20 km width are seen below. Smoothing is undertaken by a running average of ±50. Elevation refers to elevation above mean sea level and in all cases transects were taken from SE to NW. Each graph is labelled by a number that represents the swath profile the graph is in reference to. The central red line refers to the average swath profile while the grey lines above and below refers to the maximum and minimum respectively. The black X marks the calculated plateau edge. Both the gradient and curvature graphs are taken from the average swath profile.

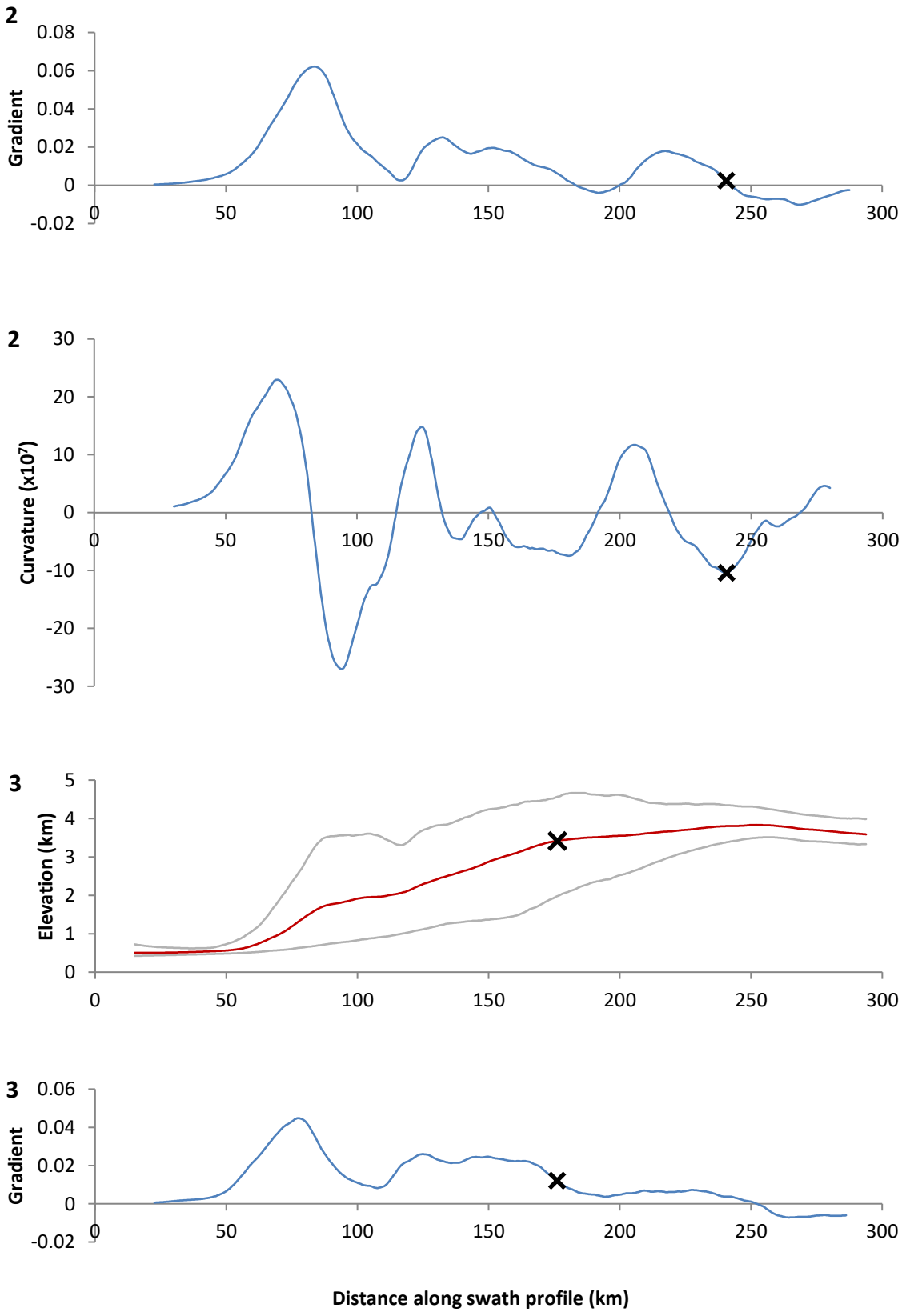


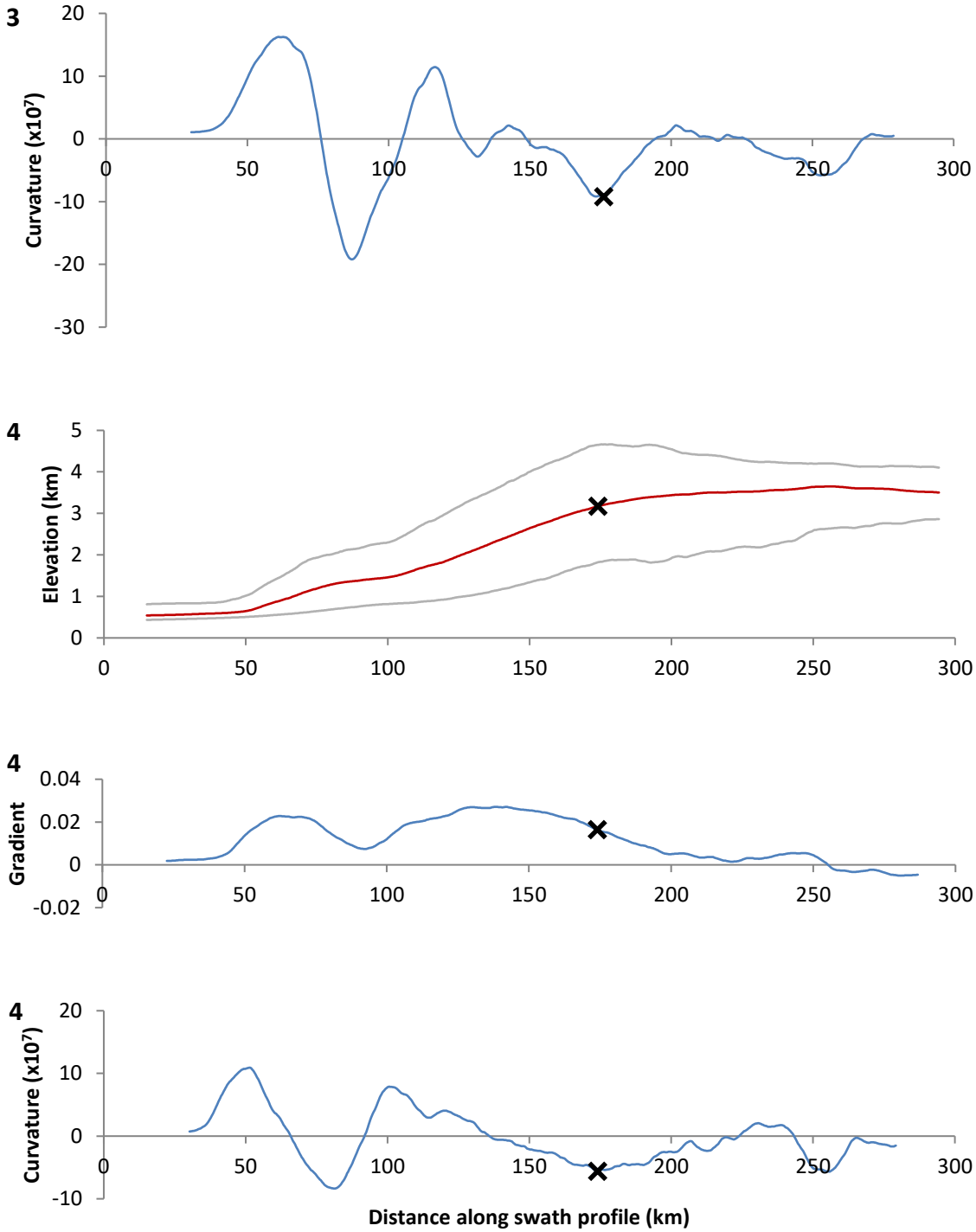

2
Elevation (km)
0
1
2
3
4
5
0
50
100
150
200
250
300
2
Gradient
0.1
0.08
0.06
0.04
0.02
0
-0.02
-0.04
0
50
100
150
200
250
300
2
Curvature (x10⁷)
30
20
10
0
-10
-20
-30
-40
-50
0
50
100
150
200
250
300
3
Elevation (km)
0
1
2
3
4
5
0
50
100
150
200
250
300
Distance along swath profile (km)


3
Gradient
0.06
0.04
0.02
0
-0.02
0
50
100
150
200
250
300
3
Curvature (x10⁷)
20
10
0
-10
-20
4
Elevation (km)
5
4
3
2
1
0
4
Gradient
4
Curvature (x10⁷)
-30
Distance along swath profile (km)

Swath profiles with a 50 km width are seen below. The conditions are the same as those for the 20 km swath widths.

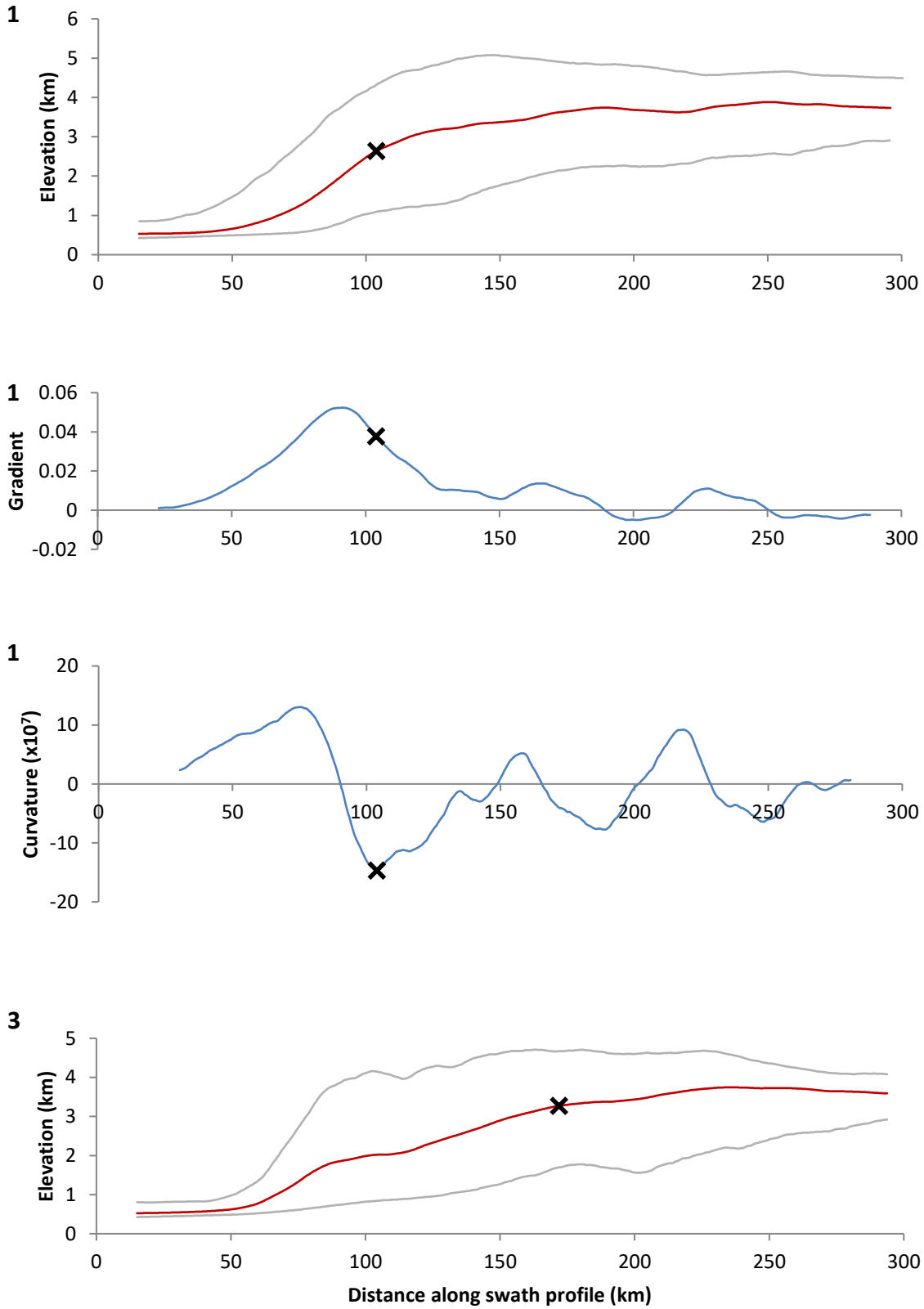


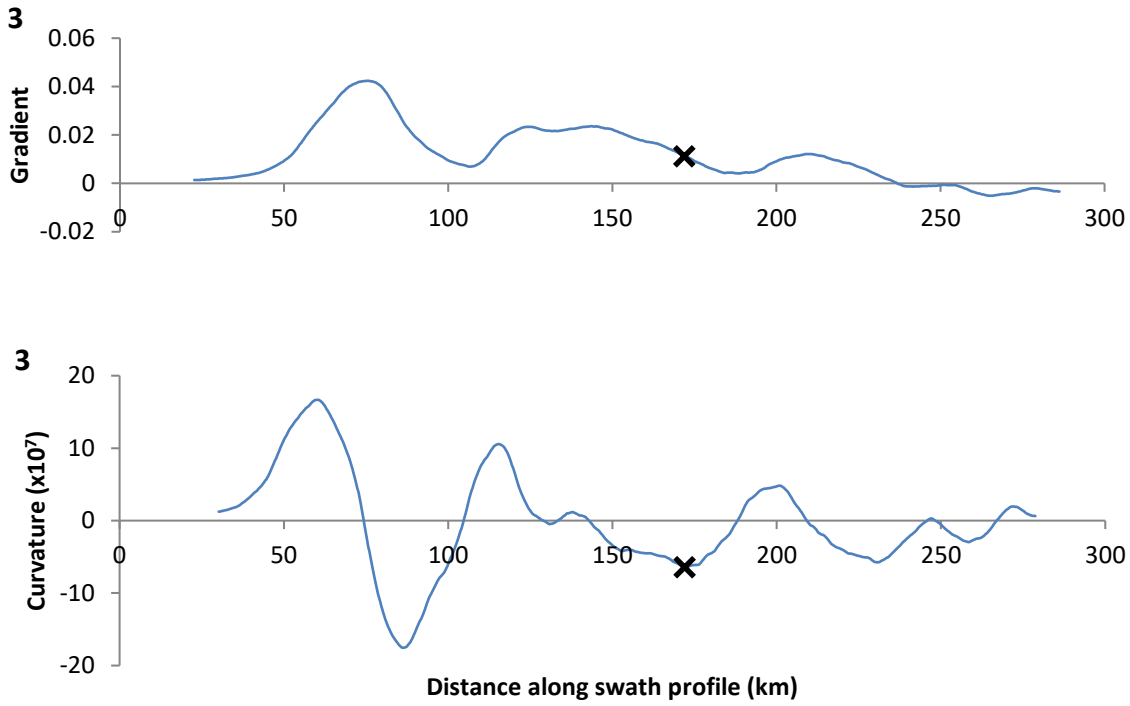

2
Gradient
0.08
0.06
0.04
0.02
0
-0.02
0
50
100
150
200
250
300
2
Curvature (x10⁷)
30
20
10
0
-10
-20
-30
3
Elevation (km)
5
4
3
2
1
0
3
Gradient
0.06
0.04
0.02
0
-0.02
Distance along swath profile (km)


3
Curvature (x10⁷)
20
10
0
-10
-20
-30
0
50
100
150
200
250
300
4
Elevation (km)
5
4
3
2
1
0
0
50
100
150
200
250
300
4
Gradient
0.04
0.02
0
-0.02
0
50
100
150
200
250
300
4
Curvature (x10⁷)
20
10
0
-10
0
50
100
150
200
250
300
Distance along swath profile (km)

#

Swath profiles with a 100 km width are seen below. The conditions are the same as those for the 20 km swath widths. Due to the small distance between each Transacts 100 km swath profiles were only taken for Transects 1 and 3.




3
Gradient
0.06
0.04
0.02
0
-0.02
0
50
100
150
200
250
300
3
Curvature (x10⁷)
20
10
0
-10
-20
0
50
100
150
200
250
300
Distance along swath profile (km)