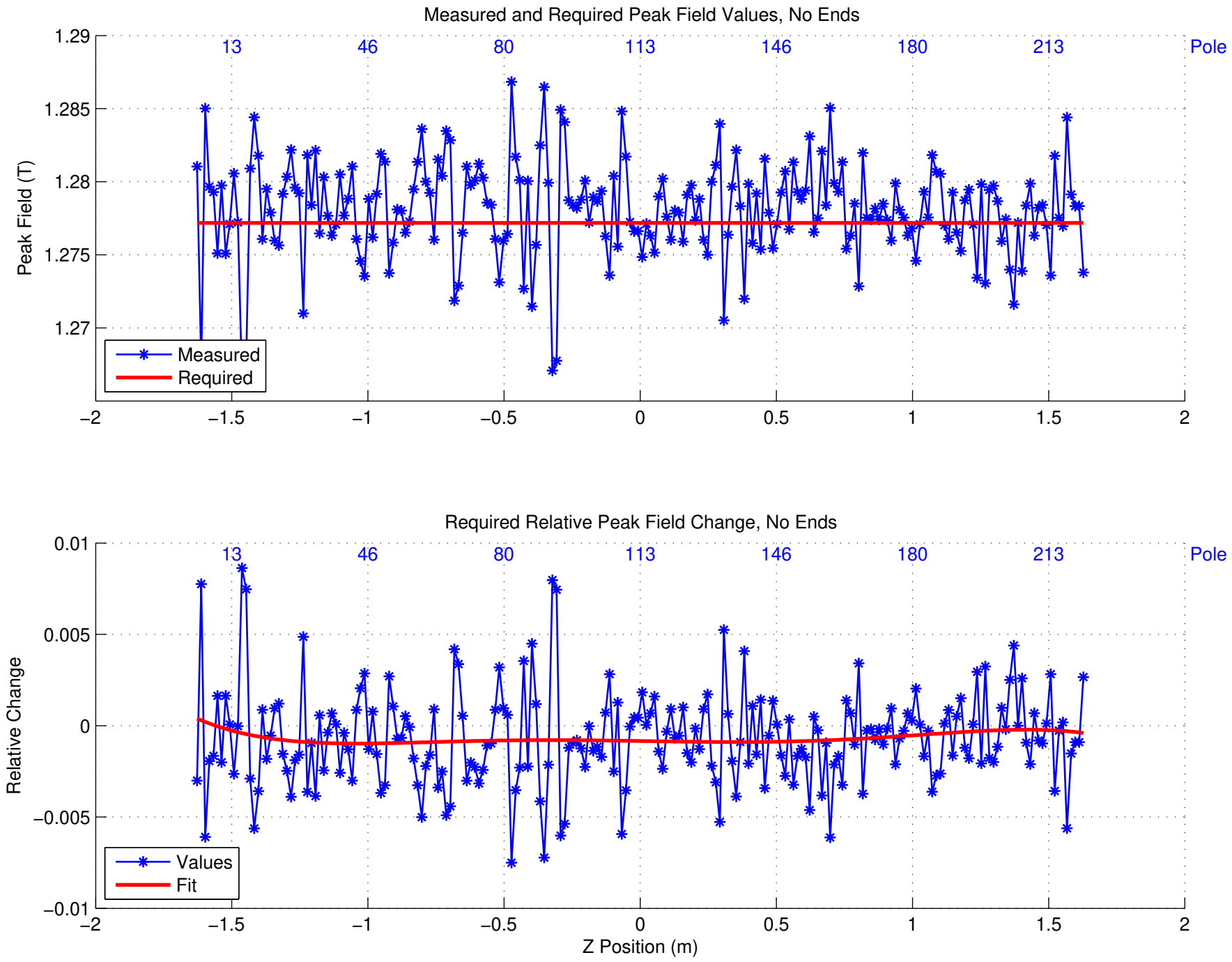
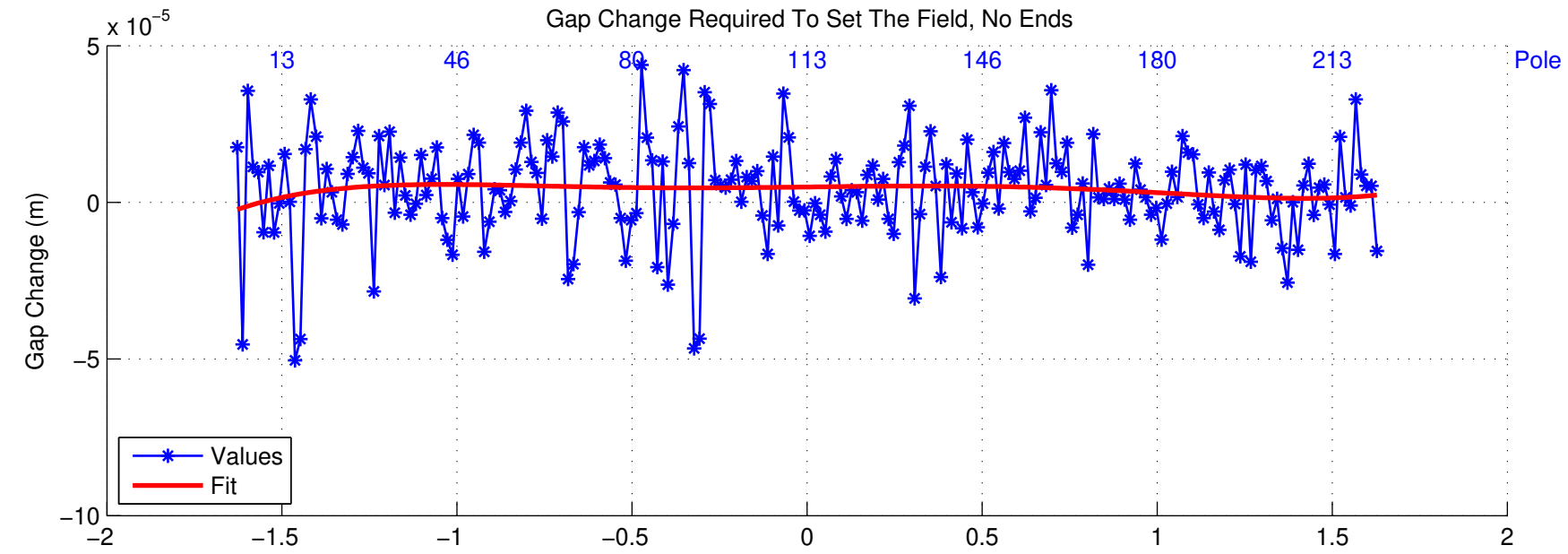
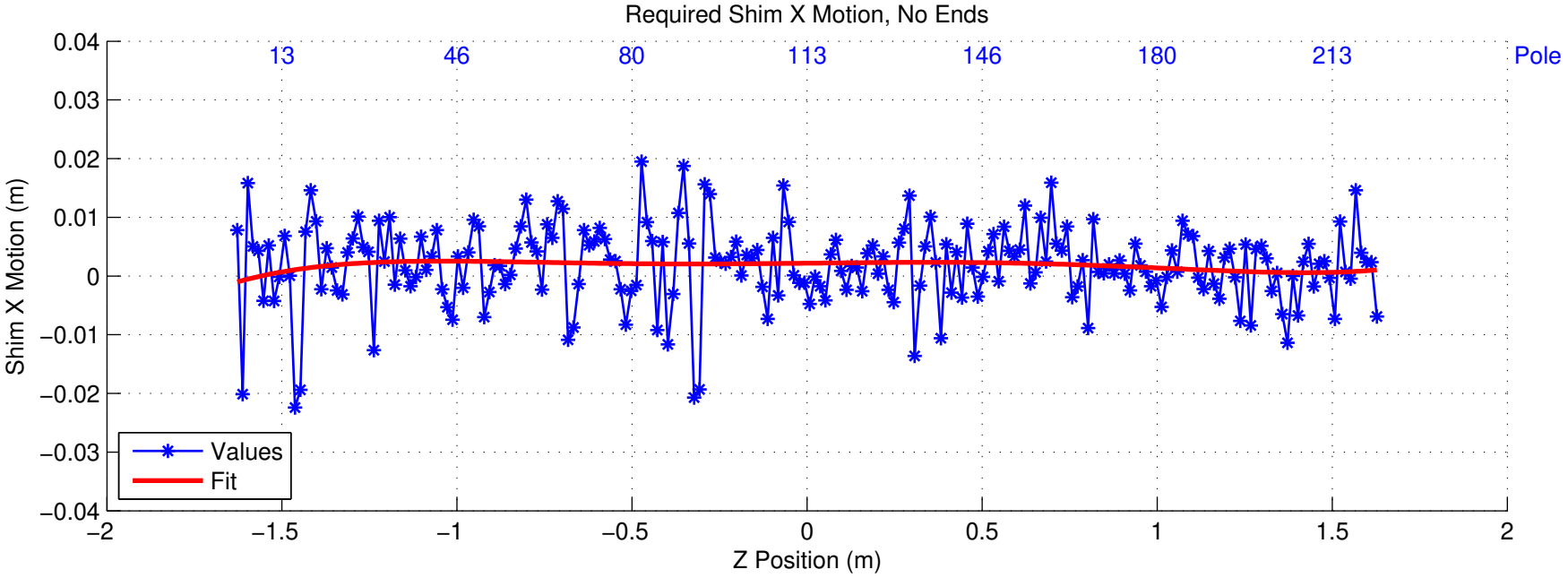
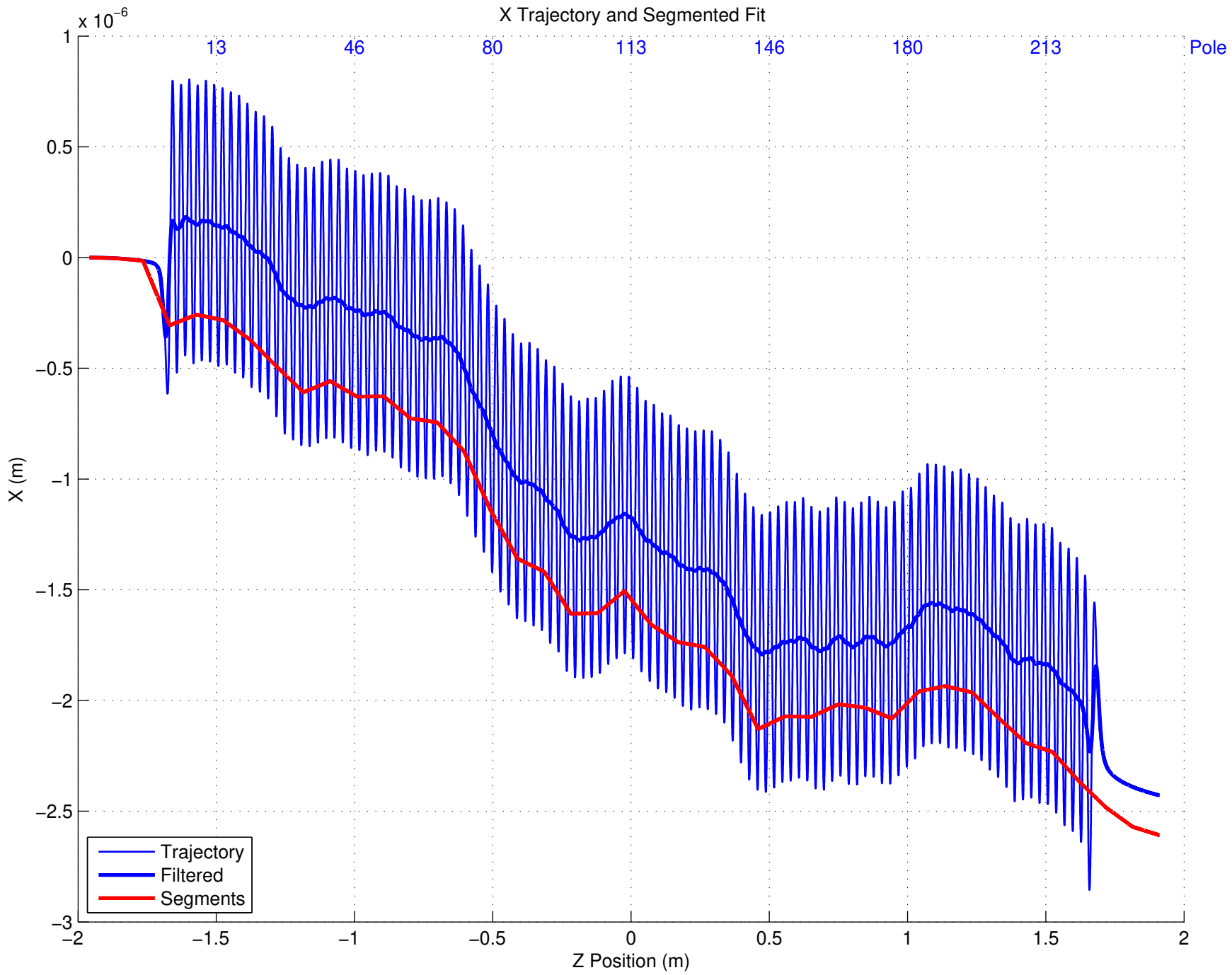
Planar Insertion Device Shim Analysis

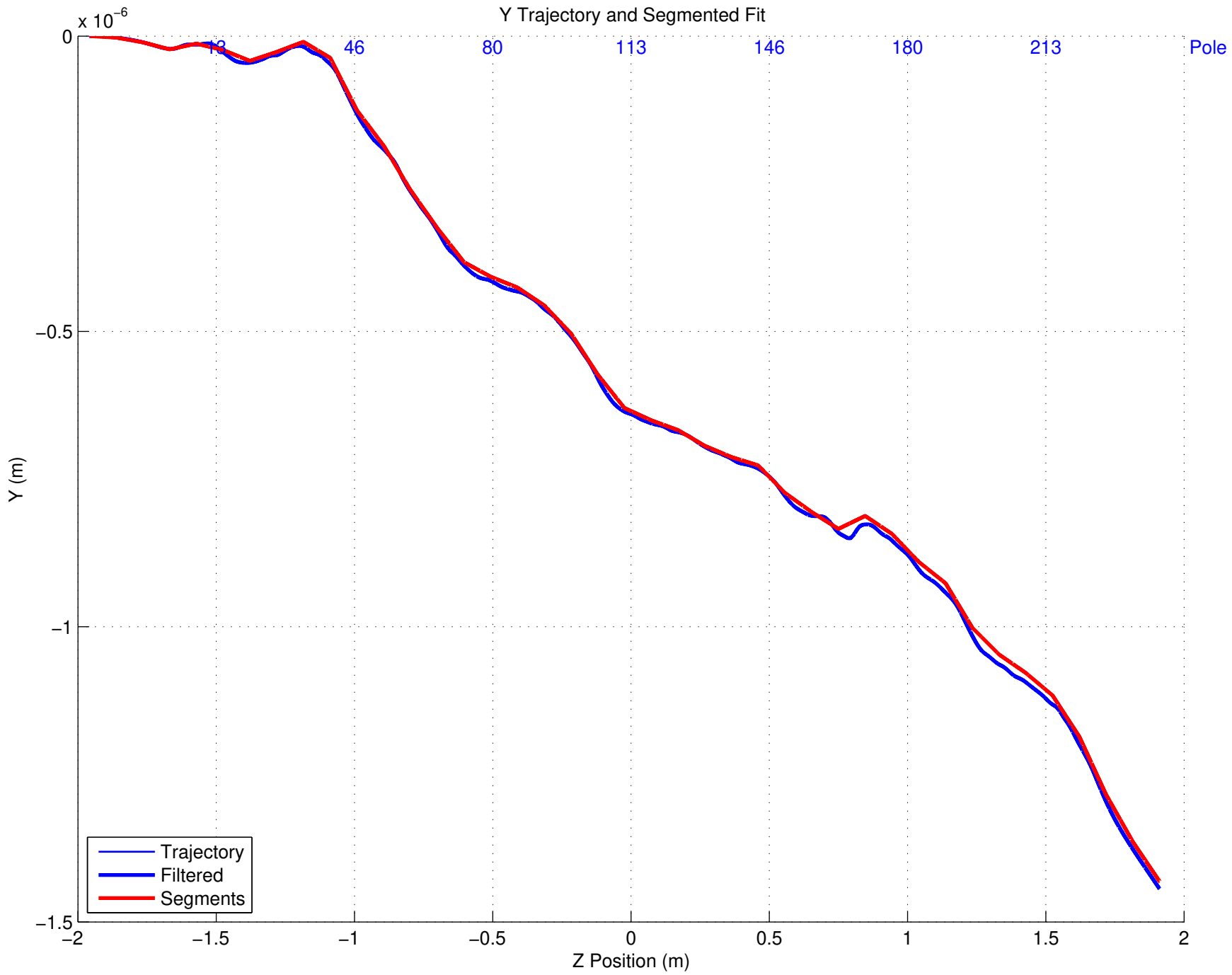
Parameters:
INPUT−FILE−DIR =C:\magdata\Lcls\Undulator\L143−112000−17\RMA0001\Rough Tuning\Z Scans\Run 044\
INPUT−FILE−NAME =bscanz−dat.001
INPUT−FILE−TYPE =SLAC−BXBYVSZ
CORR−REQUIRED =1
CORR−FILE =c:\Insertion Device Analysis\Workspace\earth−field−sign.txt
CORR−FILE−TYPE =CORR−BY
GAMMA =26690.65
NOM−LAMBDA−U =0.03
NOM−K−VALUE =3.4996
NOM−LAMBDA−R =1.5e−010
NUM−POLES =226
NUM−END−POLES =4
CELL−LENGTH =3.656

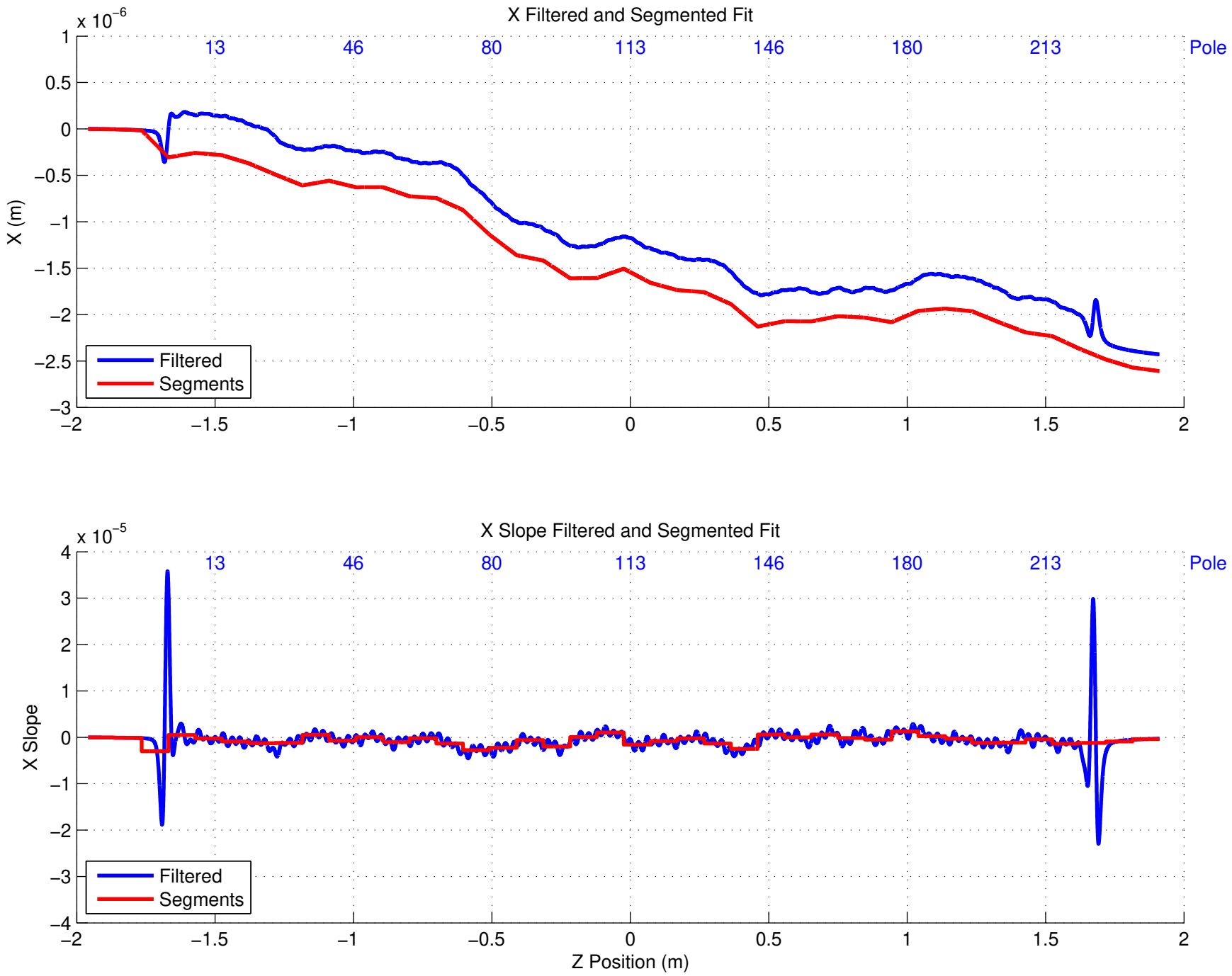

Measured and Required Peak Field Values, No Ends
13
46
80
113
146
180
213
Pole
1.29
1.285
1.28
1.275
1.27
Peak Field (T)
Measured
Required
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Required Relative Peak Field Change, No Ends
13
46
80
113
146
180
213
Pole
0.01
0.005
0
−0.005
−0.01
Relative Change
Values
Fit
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z Position (m)

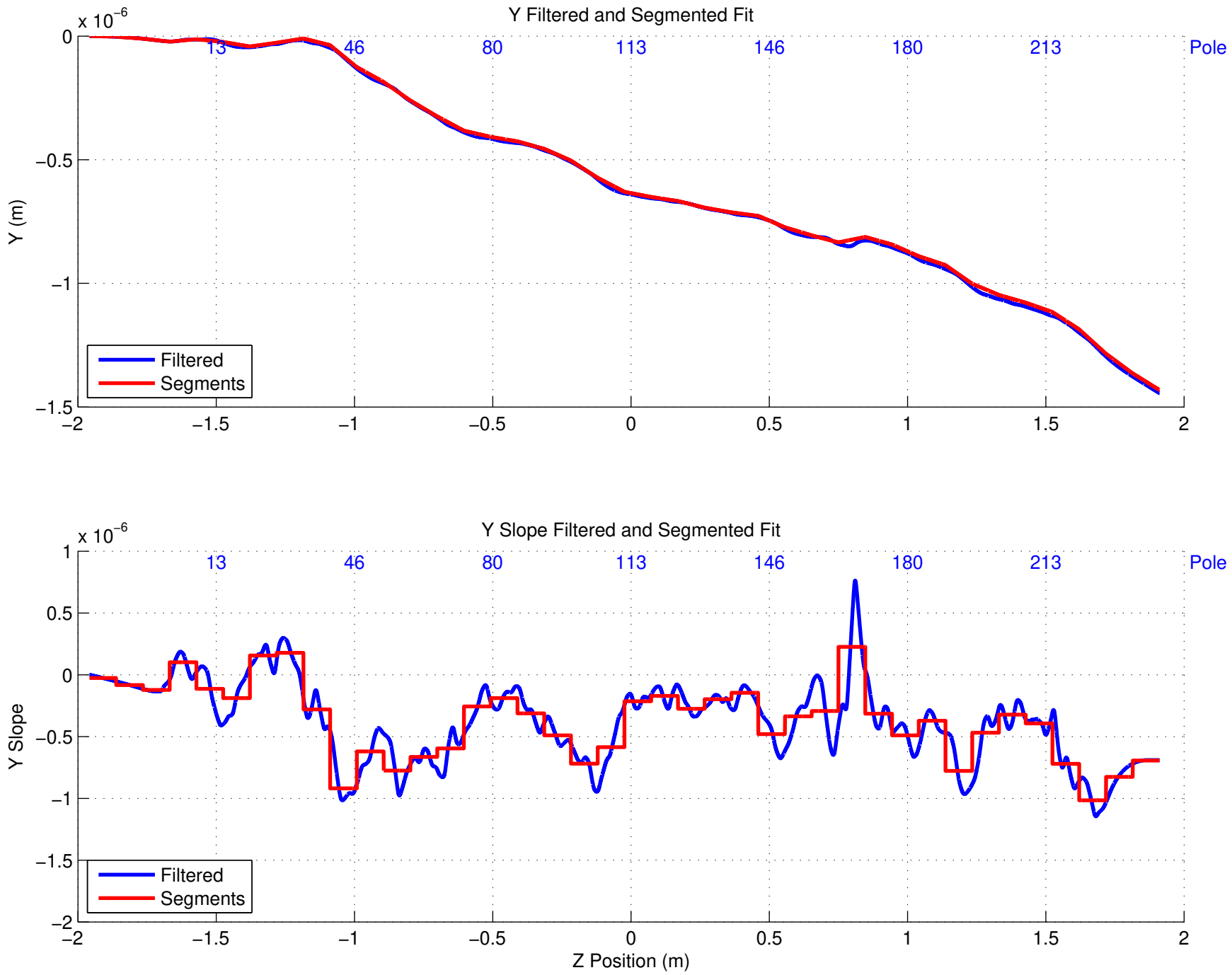

Gap Change Required To Set The Field, No Ends
x 10^-5
5
0
−5
−10
13
46
80
113
146
180
213
Pole
Gap Change (m)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Values
Fit

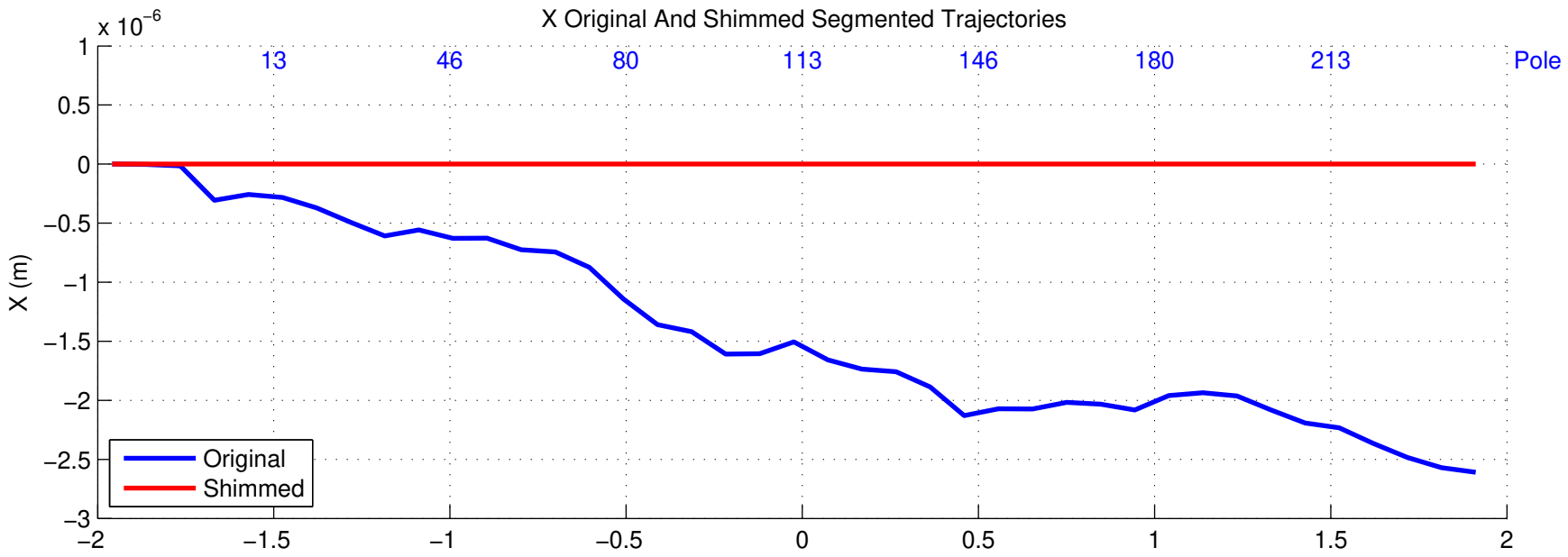

Required Shim X Motion, No Ends
0.04
0.03
0.02
0.01
0
−0.01
−0.02
−0.03
−0.04
13
46
80
113
146
180
213
Pole
Shim X Motion (m)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z Position (m)
Values
Fit

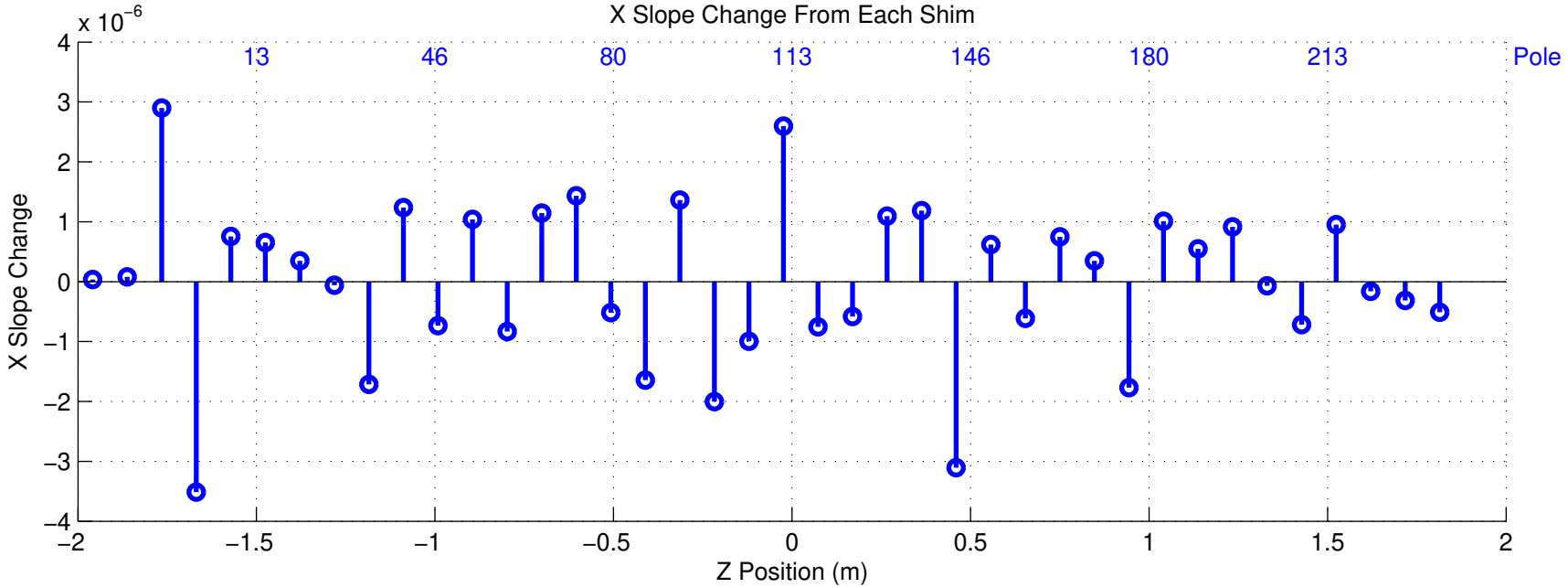

X Trajectory and Segmented Fit
x 10^-6
13
46
80
113
146
180
213
Pole
1
0.5
0
−0.5
−1
−1.5
−2
−2.5
−3
X (m)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z Position (m)
Trajectory
Filtered
Segments

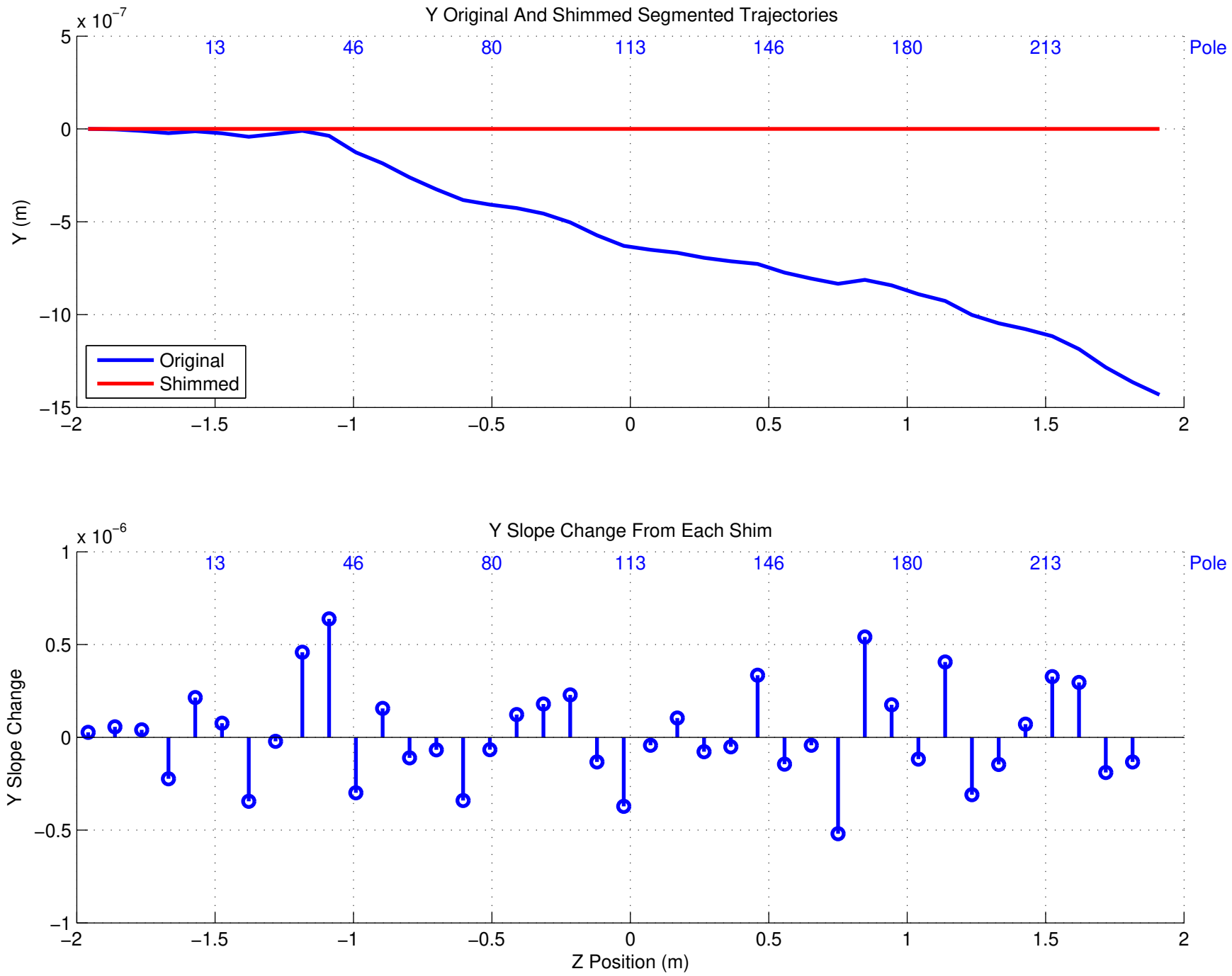

Y Trajectory and Segmented Fit
x 10^-6
0
−0.5
−1
−1.5
Y (m)
13
46
80
113
146
180
213
Pole
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z Position (m)
Trajectory
Filtered
Segments

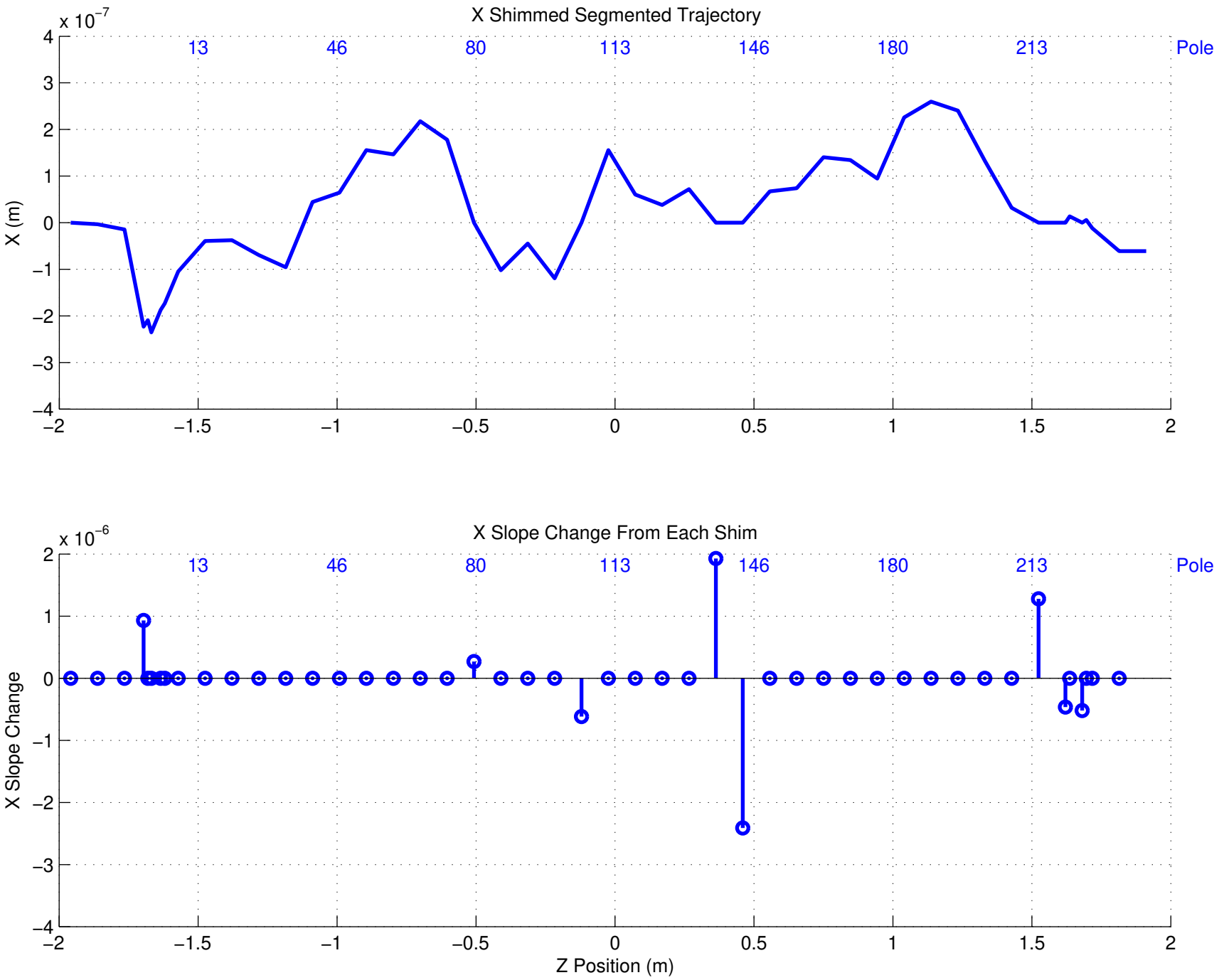

X Filtered and Segmented Fit
x 10^-6
X (m)
13
46
80
113
146
180
213
Pole
Filtered
Segments
X Slope Filtered and Segmented Fit
x 10^-5
X Slope
Z Position (m)

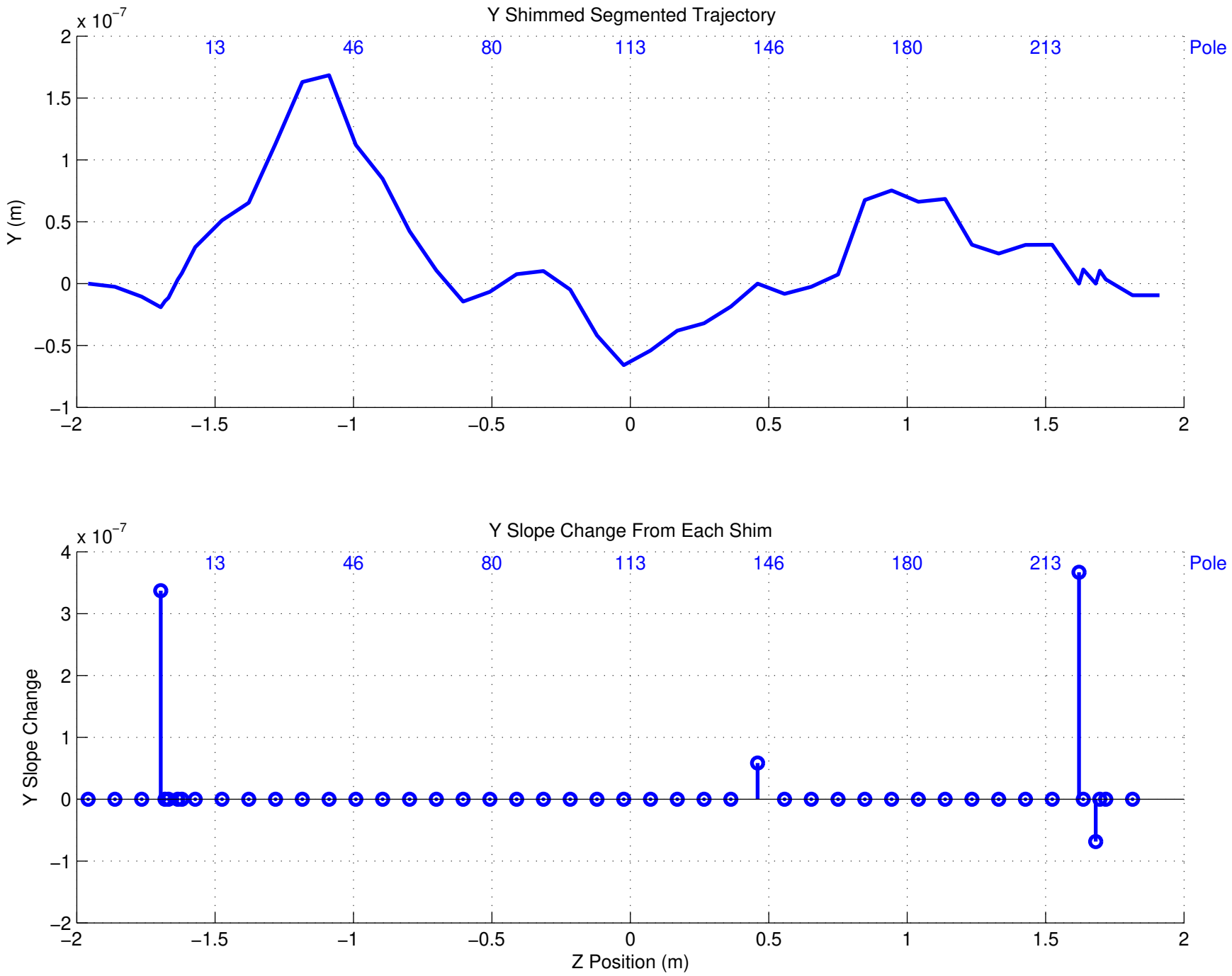

Y Filtered and Segmented Fit
x 10^-6
0
−0.5
−1
−1.5
Y (m)
13
46
80
113
146
180
213
Pole
Filtered
Segments
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Y Slope Filtered and Segmented Fit
x 10^-6
1
0.5
0
−0.5
−1
−1.5
−2
Y Slope
13
46
80
113
146
180
213
Pole
Filtered
Segments
Z Position (m)

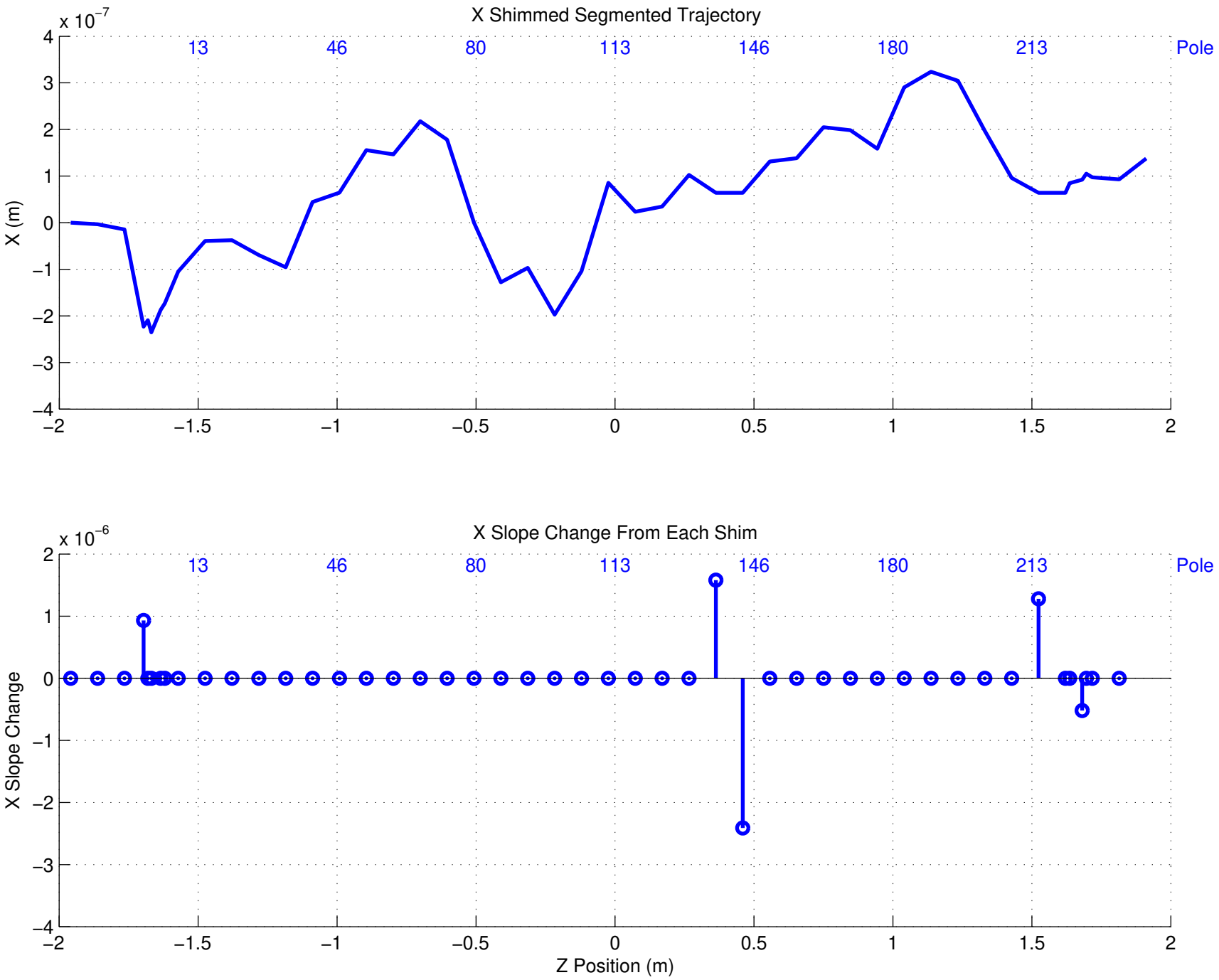

X Original And Shimmed Segmented Trajectories
x 10^-6
13
46
80
113
146
180
213
Pole
X (m)
Original
Shimmed

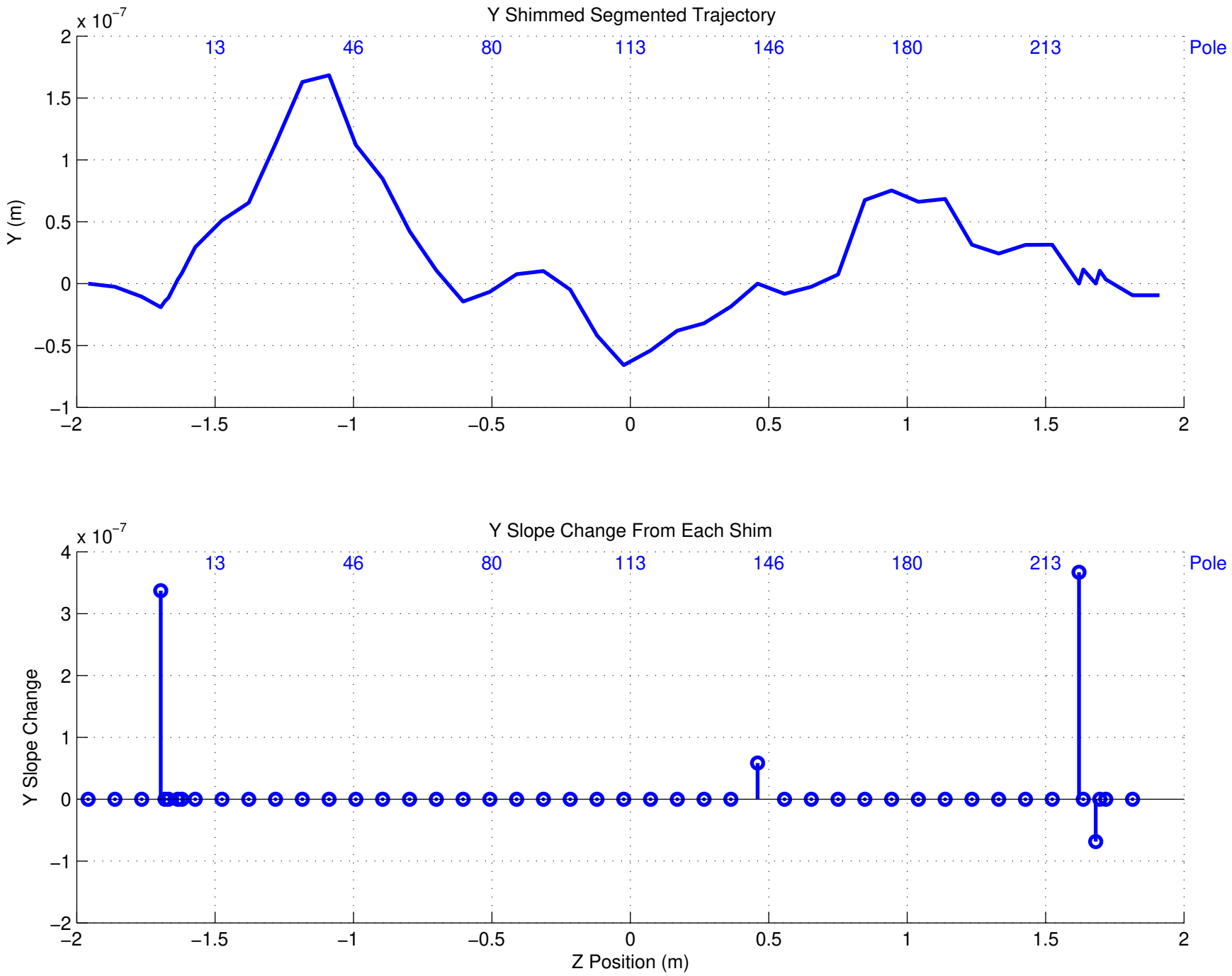

X Slope Change From Each Shim
x 10^-6
13
46
80
113
146
180
213
Pole
X Slope Change
Z Position (m)

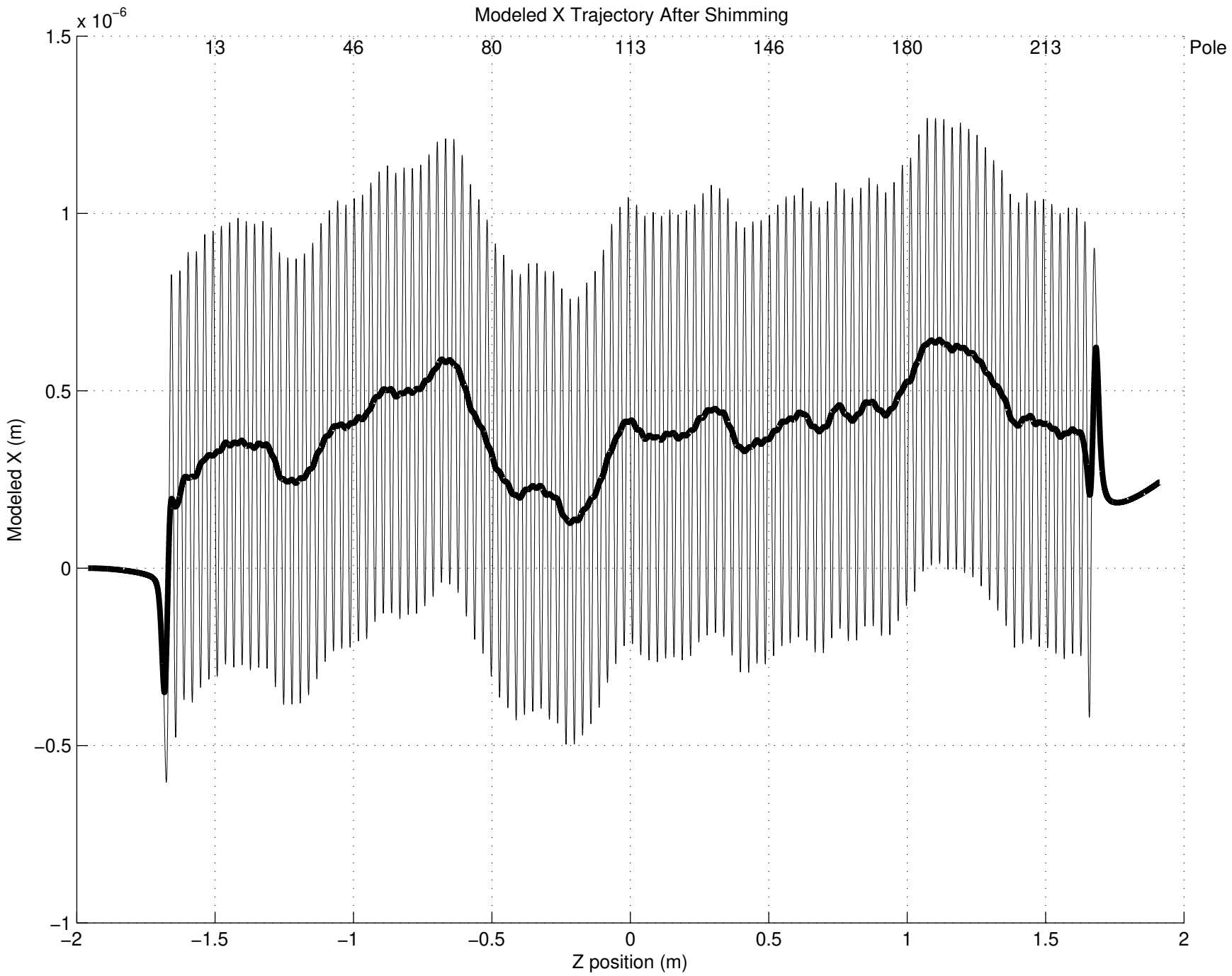

Y Original And Shimmed Segmented Trajectories
x 10^-7
5
0
−5
−10
−15
13
46
80
113
146
180
213
Pole
Y (m)
Original
Shimmed
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Y Slope Change From Each Shim
x 10^-6
1
0.5
0
−0.5
−1
Y Slope Change
Z Position (m)

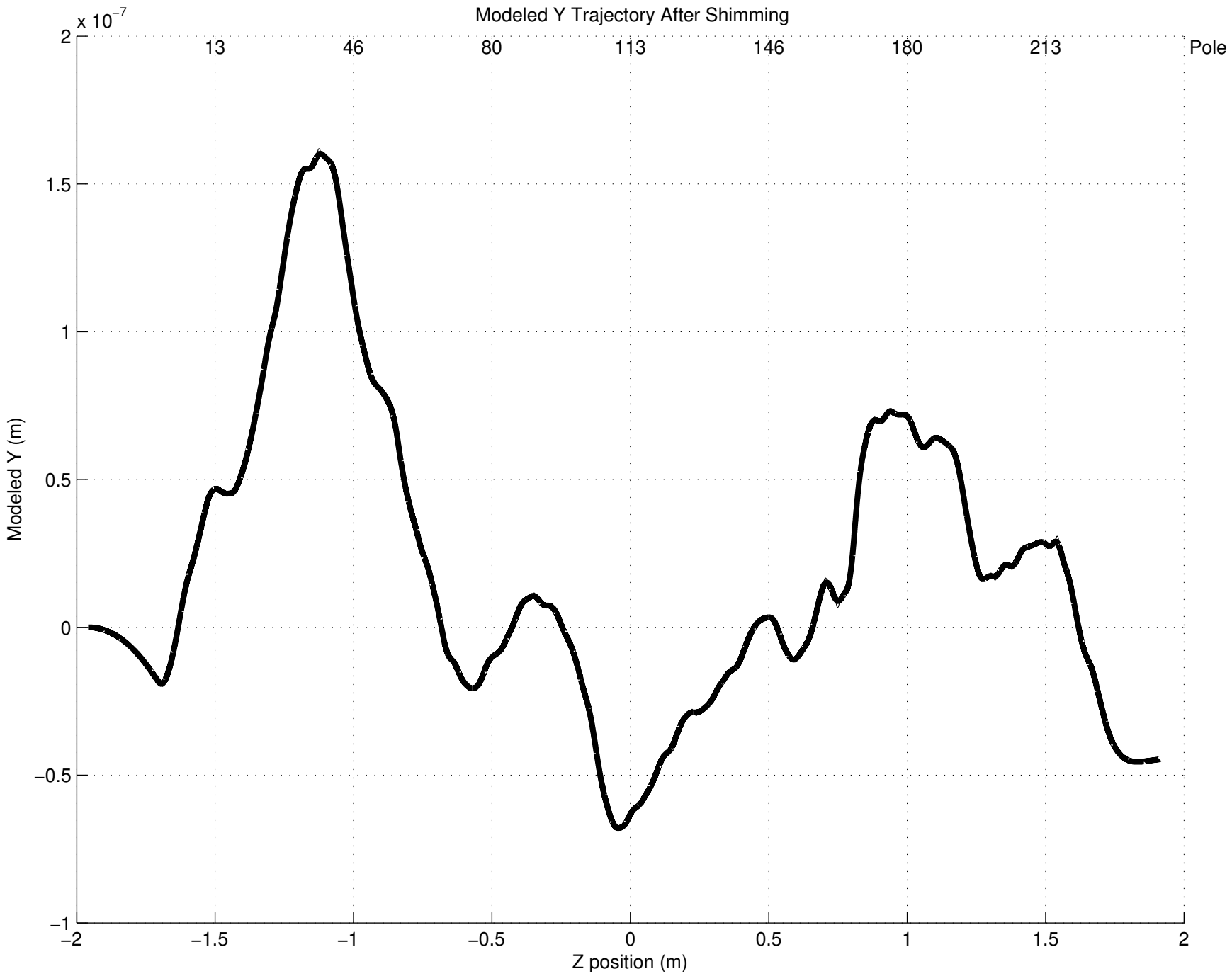

X Shimmed Segmented Trajectory
x 10^-7
X (m)
13
46
80
113
146
180
213
Pole
4
3
2
1
0
−1
−2
−3
−4
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
X Slope Change From Each Shim
x 10^-6
X Slope Change
Z Position (m)

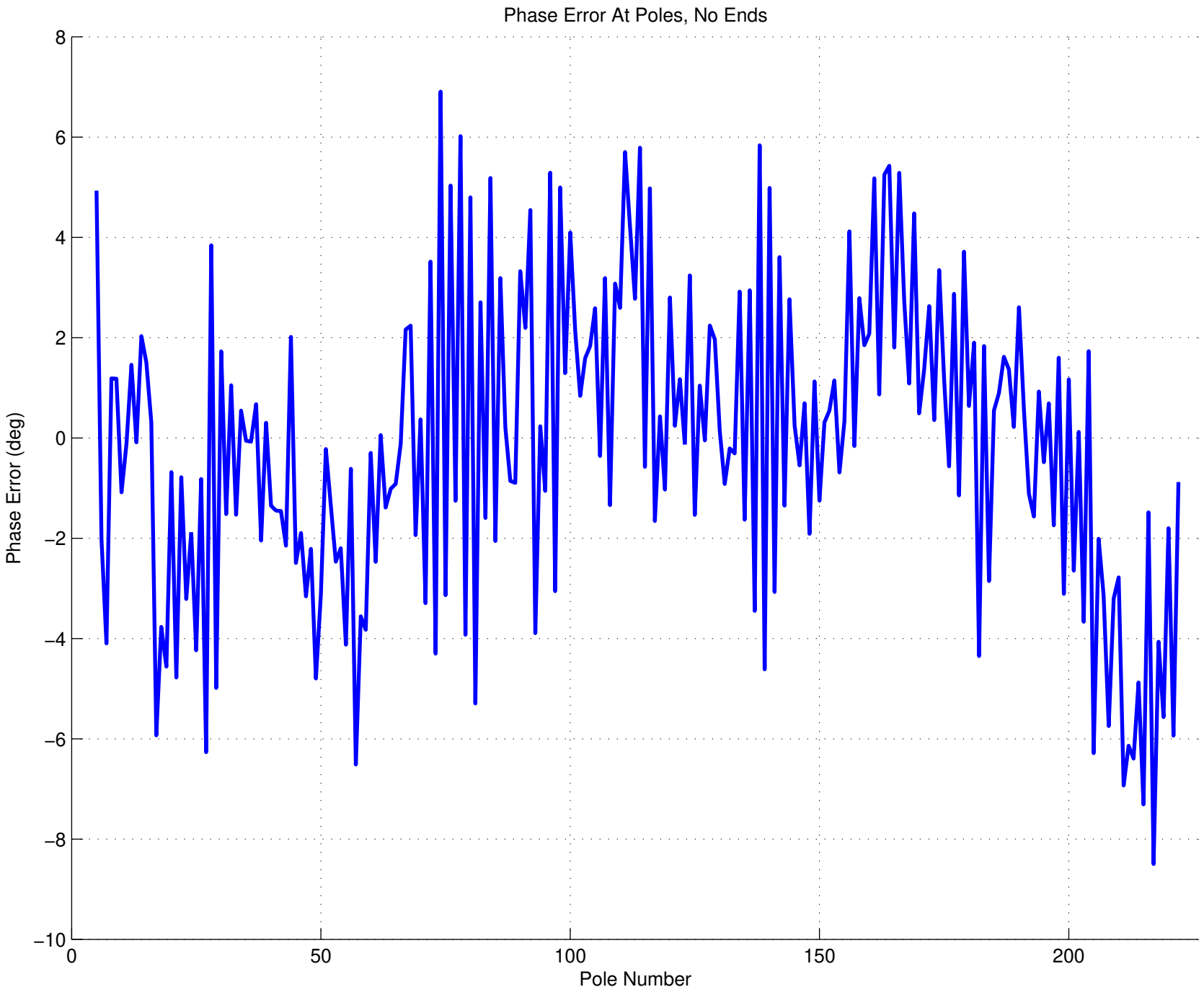

Y Shimmed Segmented Trajectory
x 10^-7
13
46
80
113
146
180
213
Pole
Y (m)
2
1.5
1
0.5
0
−0.5
−1
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Y Slope Change From Each Shim
x 10^-7
Y Slope Change
4
3
2
1
0
−1
−2
Z Position (m)

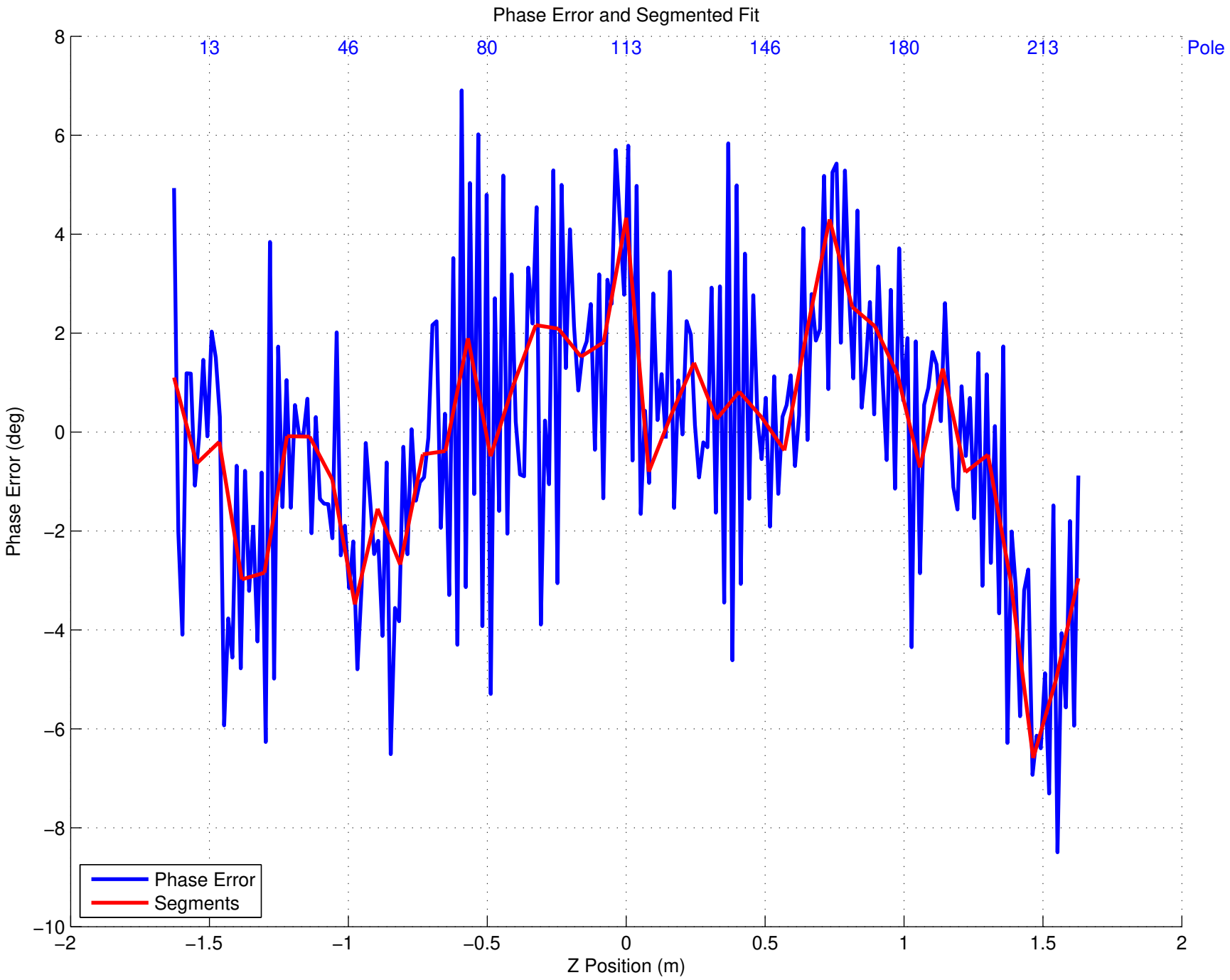

X Shimmed Segmented Trajectory
x 10^-7
X (m)
13
46
80
113
146
180
213
Pole
X Slope Change From Each Shim
x 10^-6
X Slope Change
Z Position (m)

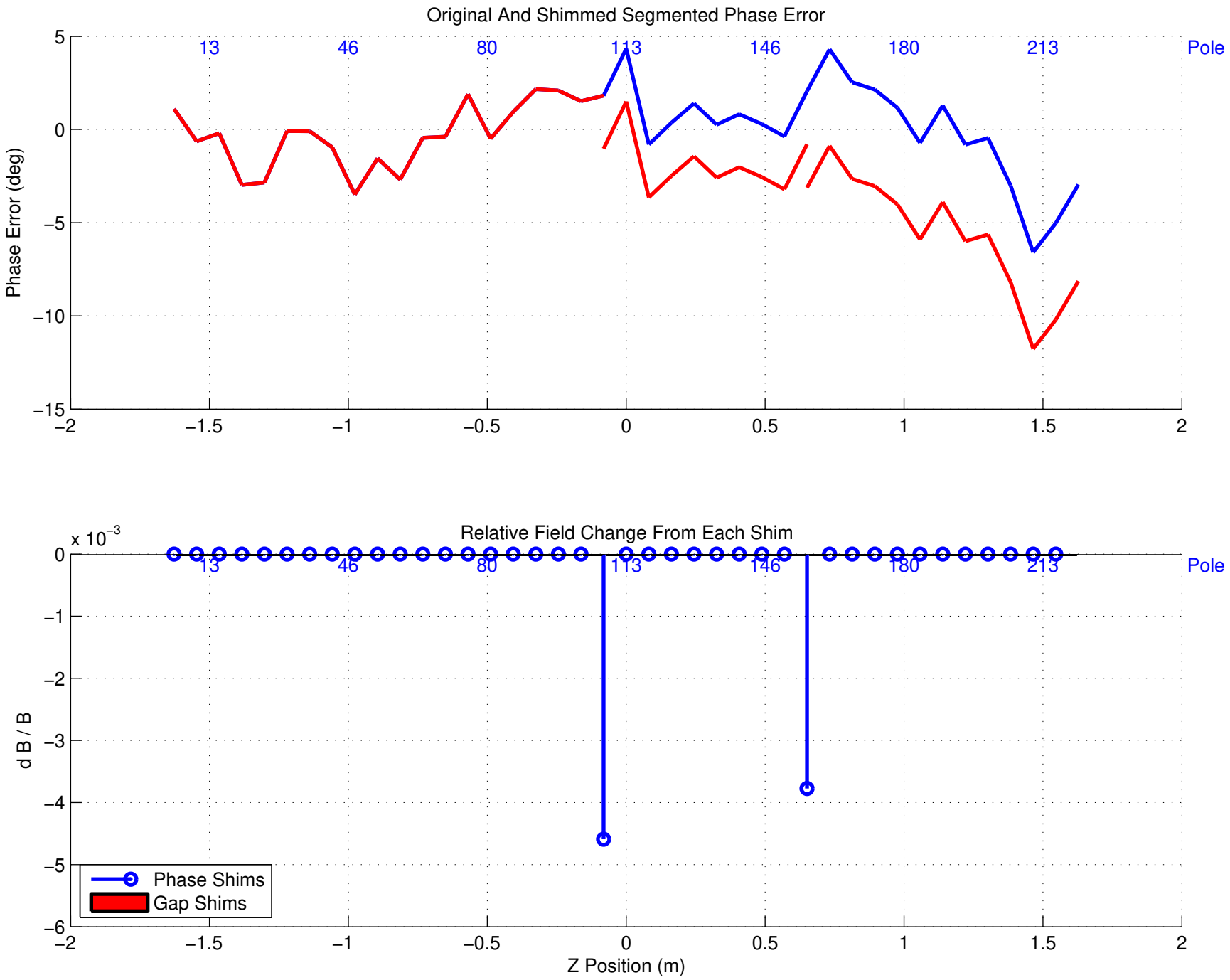

Y Shimmed Segmented Trajectory
x 10^-7
13
46
80
113
146
180
213
Pole
Y (m)
2
1.5
1
0.5
0
−0.5
−1
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Y Slope Change From Each Shim
x 10^-7
Y Slope Change
4
3
2
1
0
−1
−2
Z Position (m)

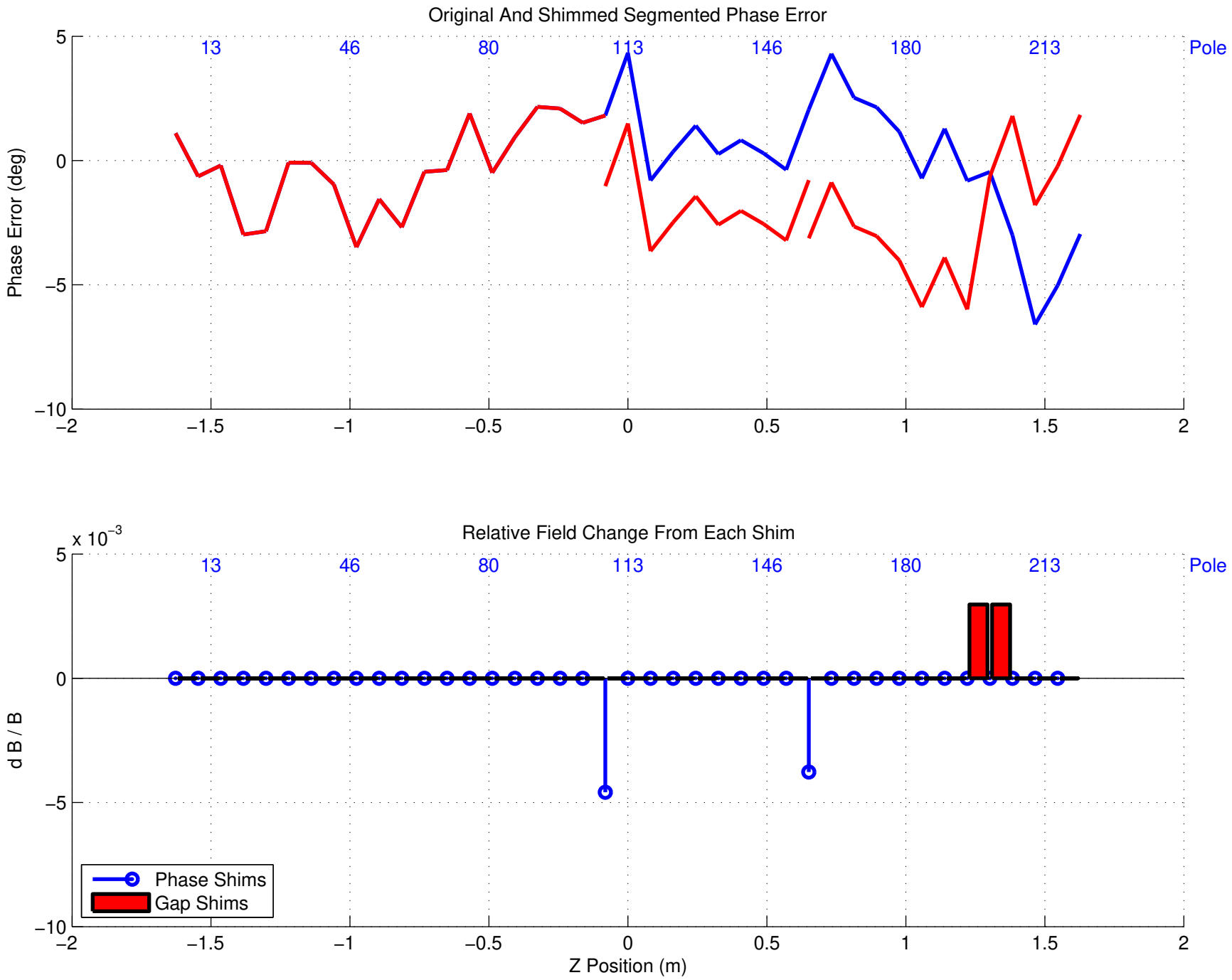

Modeled X Trajectory After Shimming
x 10^-6
1.5
1
0.5
0
−0.5
−1
13
46
80
113
146
180
213
Pole
Modeled X (m)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z position (m)

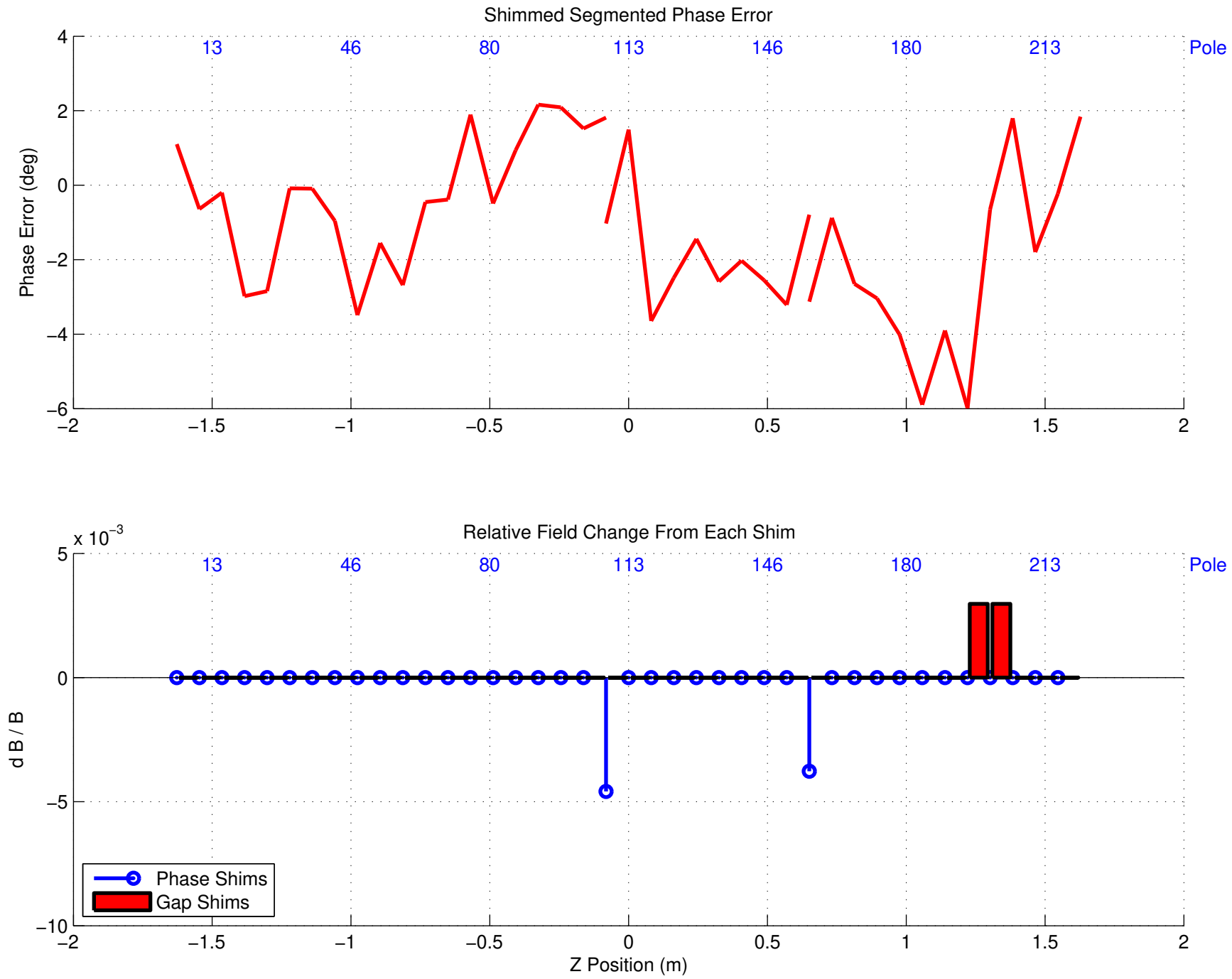

Modeled Y Trajectory After Shimming
x 10^-7
2
1.5
1
0.5
0
−0.5
−1
13
46
80
113
146
180
213
Pole
Modeled Y (m)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z position (m)

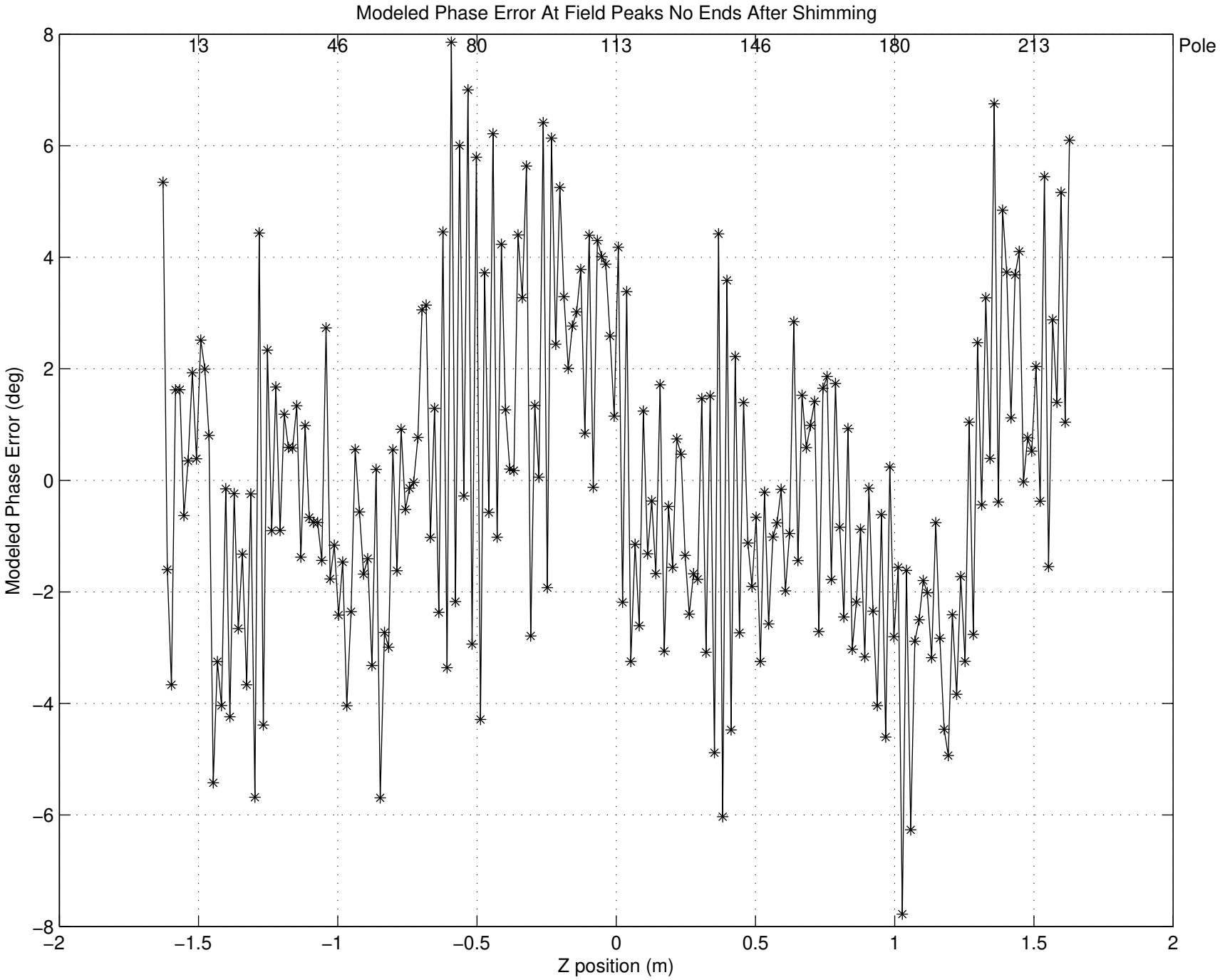

Phase Error At Poles, No Ends
Phase Error (deg)
Pole Number
8
6
4
2
0
−2
−4
−6
−8
−10
0
50
100
150
200


Phase Error and Segmented Fit
13
46
80
113
146
180
213
Pole
8
6
4
2
0
−2
−4
−6
−8
−10
Phase Error (deg)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z Position (m)
Phase Error
Segments


Original And Shimmed Segmented Phase Error
Phase Error (deg)
5
0
−5
−10
−15
13
46
80
113
146
180
213
Pole
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Relative Field Change From Each Shim
x 10^−3
d B / B
0
−1
−2
−3
−4
−5
−6
Phase Shims
Gap Shims
Z Position (m)


Original And Shimmed Segmented Phase Error
Phase Error (deg)
5
0
−5
−10
13
46
80
113
146
180
213
Pole
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Relative Field Change From Each Shim
x 10^−3
d B / B
Phase Shims
Gap Shims
Z Position (m)


Shimmed Segmented Phase Error
13
46
80
113
146
180
213
Pole
Phase Error (deg)
4
2
0
−2
−4
−6
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Relative Field Change From Each Shim
x 10^−3
5
0
−5
−10
d B / B
Phase Shims
Gap Shims
Z Position (m)



Phase Error: Ave = −0.000000 deg, RMS = 2.938711 deg