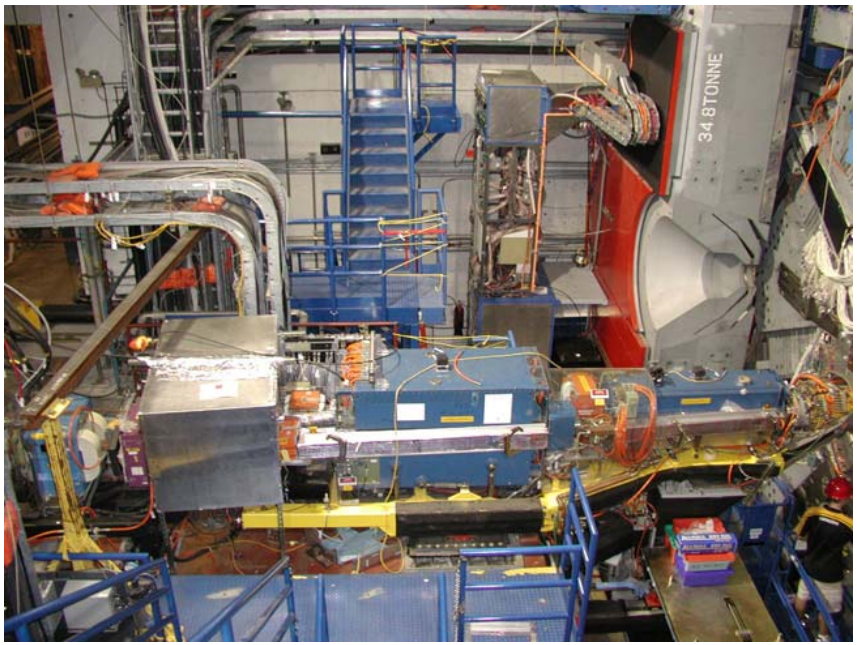
Q4 & Q5 Position History



B Side

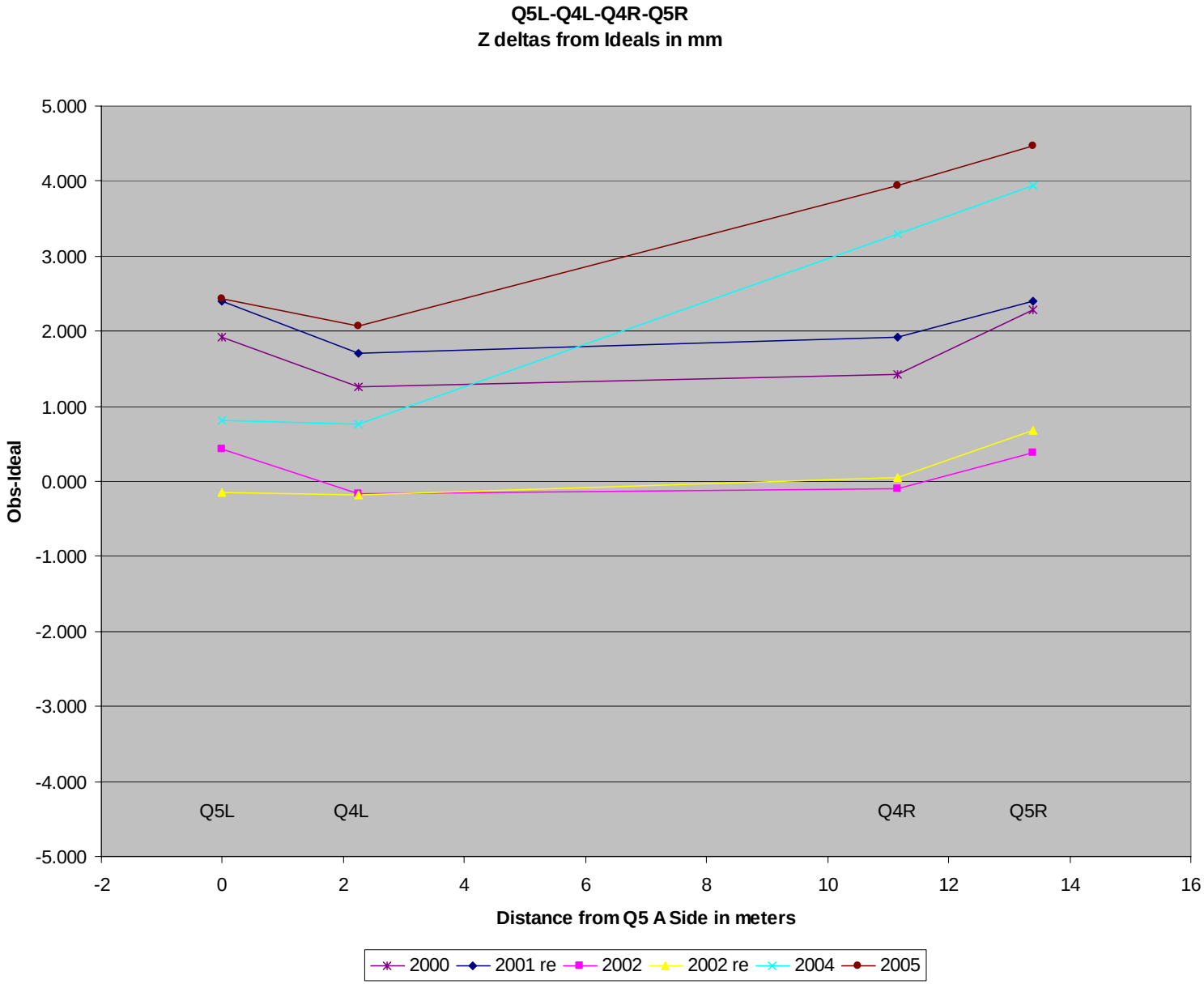
(before shielding wall)

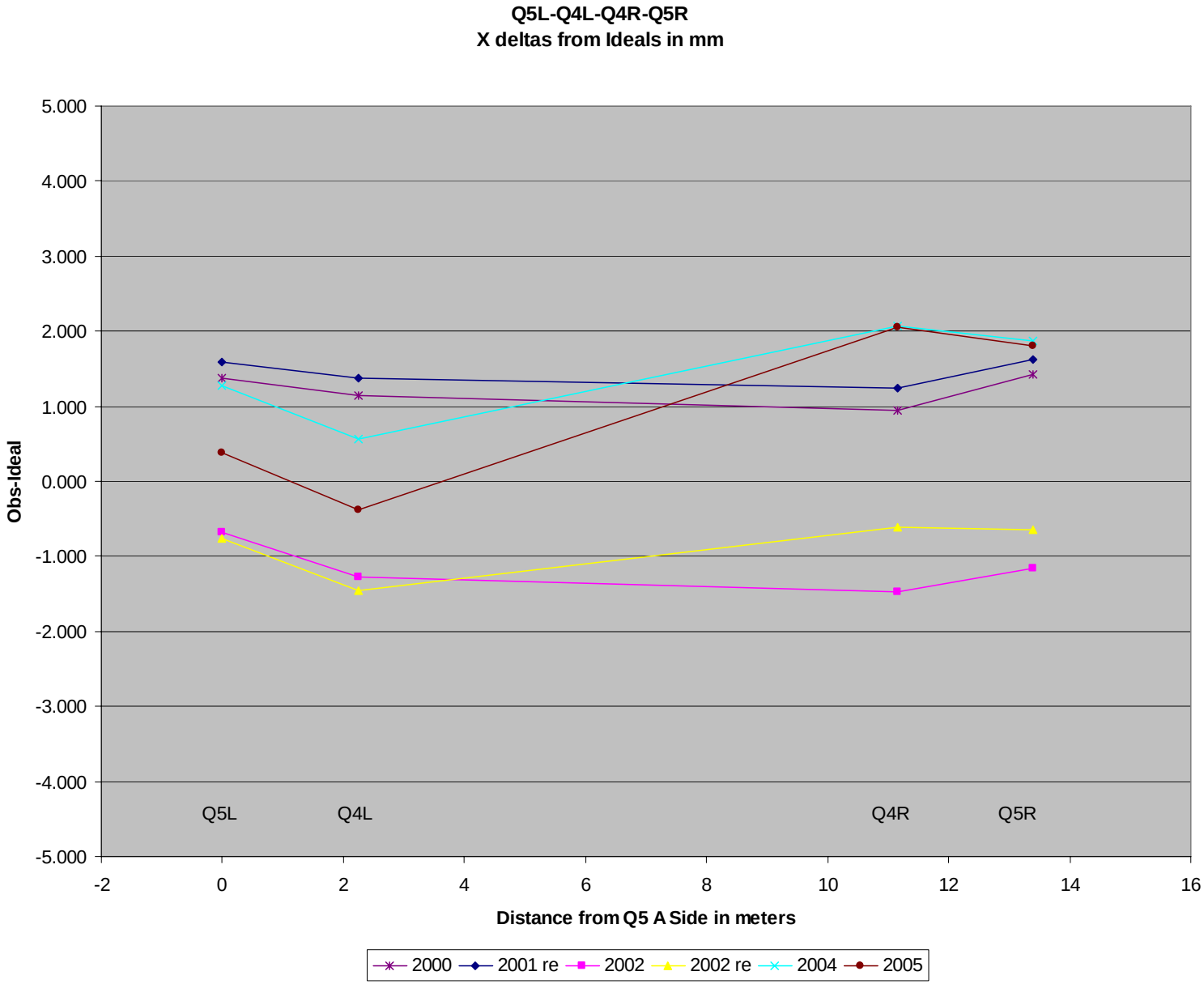
A Side

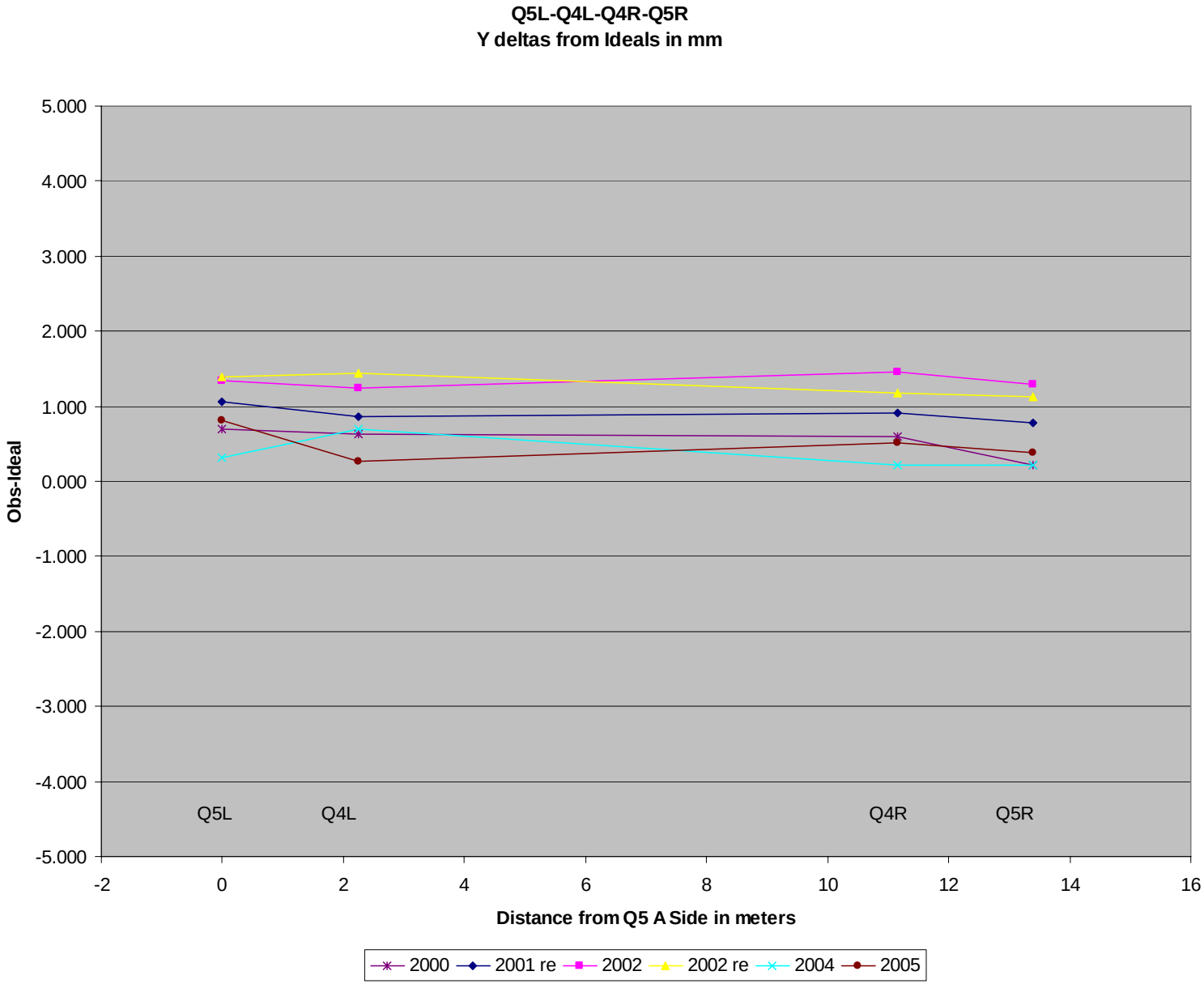
Ideal Positions
PEPII Coordinate System

	Z (m)	X (m)	Y (m)	yaw (deg)
BH2AQU5M	50290.30042	70175.34248	2065.99502	-59.885695
BH2AQU4M	50291.44175	70173.40335	2065.99702	-59.377768
BH2AIP1M	50293.63416	70169.52976	2065.99502	-59.798835
BH2BQU4M	50295.82659	70165.65618	2065.99801	-59.377768
BH2BQU5M	50296.96790	70163.71704	2065.99502	-59.885695

The 3 following graphs use the ideal yaw angle of this table to display the delta (observed minus ideal) in a beam following system.


Q5L-Q4L-Q4R-Q5R
Z deltas from Ideals in mm
Obs-Ideal
5.000
4.000
3.000
2.000
1.000
0.000
-1.000
-2.000
-3.000
-4.000
-5.000
-2
0
2
4
6
8
10
12
14
16
Q5L
Q4L
Q4R
Q5R
Distance from Q5 A Side in meters
2000
2001 re
2002
2002 re
2004
2005


Q5L-Q4L-Q4R-Q5R
X deltas from Ideals in mm
5.000
4.000
3.000
2.000
1.000
0.000
-1.000
-2.000
-3.000
-4.000
-5.000
Obs-Ideal
Q5L
Q4L
Q4R
Q5R
-2
0
2
4
6
8
10
12
14
16
Distance from Q5 A Side in meters
2000
2001 re
2002
2002 re
2004
2005


Q5L-Q4L-Q4R-Q5R
Y deltas from Ideals in mm
5.000
4.000
3.000
2.000
1.000
0.000
-1.000
-2.000
-3.000
-4.000
-5.000
Obs-Ideal
Q5L
Q4L
Q4R
Q5R
-2
0
2
4
6
8
10
12
14
16
Distance from Q5 A Side in meters
2000
2001 re
2002
2002 re
2004
2005

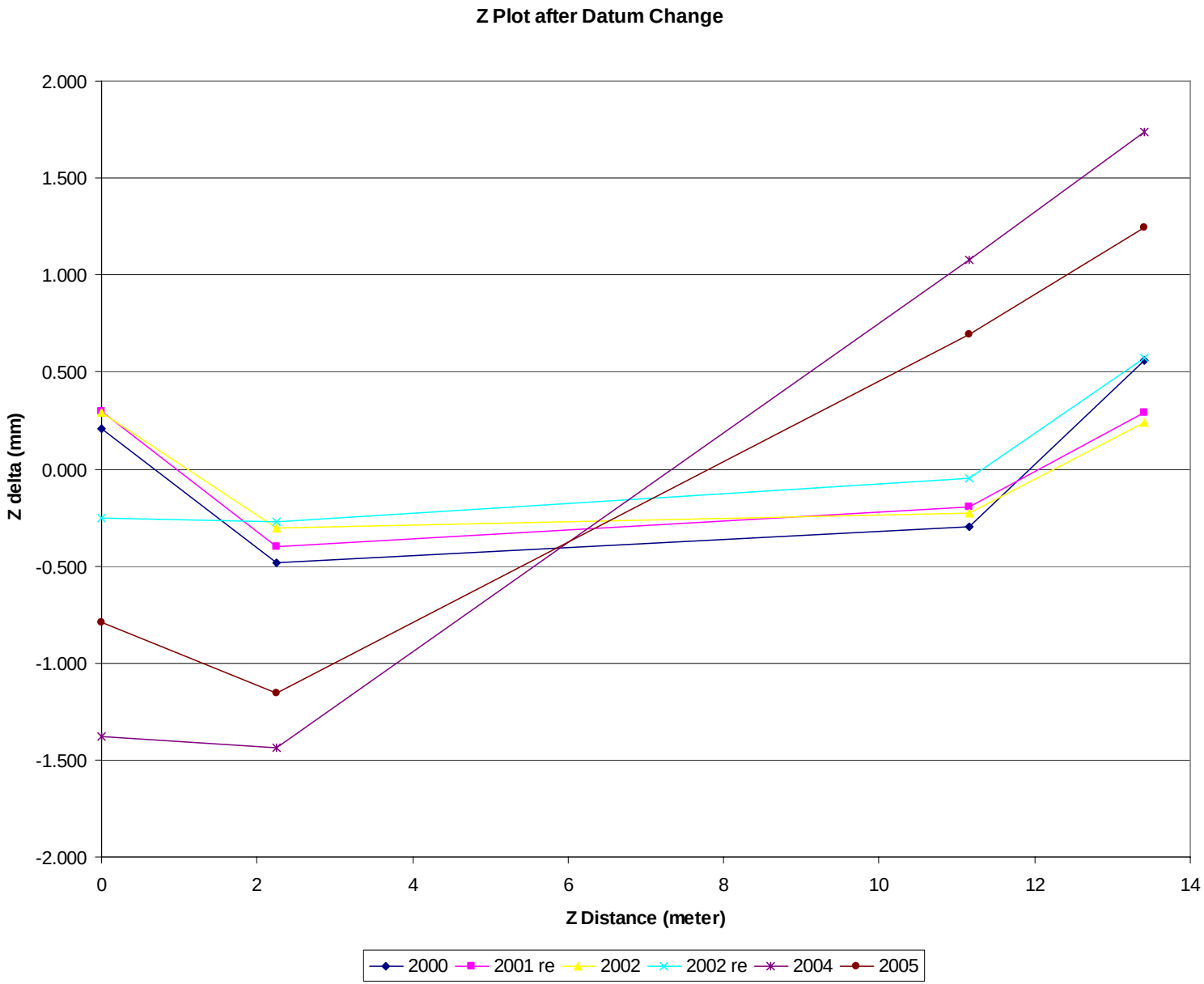
Survey Characteristics

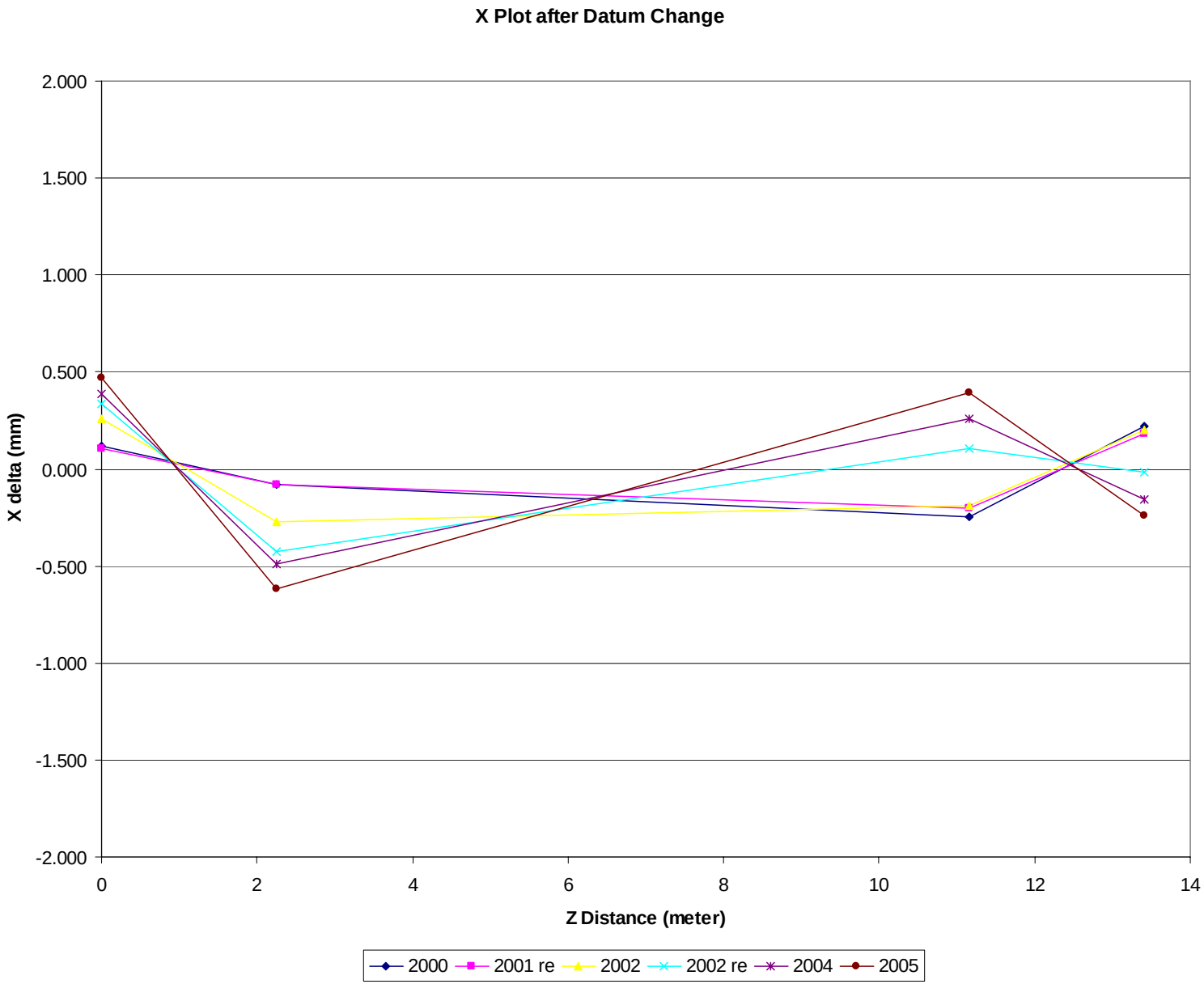
Date	Description	Quality
2000	Entire PEPII ring survey using laser tracker and leveling. Current source for all PEPII monument coordinates.	Base
2001 re	Laser tracker/leveling survey of BaBar and IR2 area at the end of the 2000 Downtime.	IR2 local
2002	Laser tracker/leveling survey of BaBar and IR2 area before pulling out the 2 BV1 rafts for the Q2 retrofit.	IR2 local
2002 re	Laser tracker/leveling survey of BaBar and IR2 area at the end of the 2002 Summer Downtime (after rafts back).	One side only
2004	Laser tracker/leveling survey of BaBar and IR2 area at the beginning of the 2004 Summer/Fall Downtime.	IR2 local
2005	Local resections only for the purpose of flange determination.	Individual set-ups

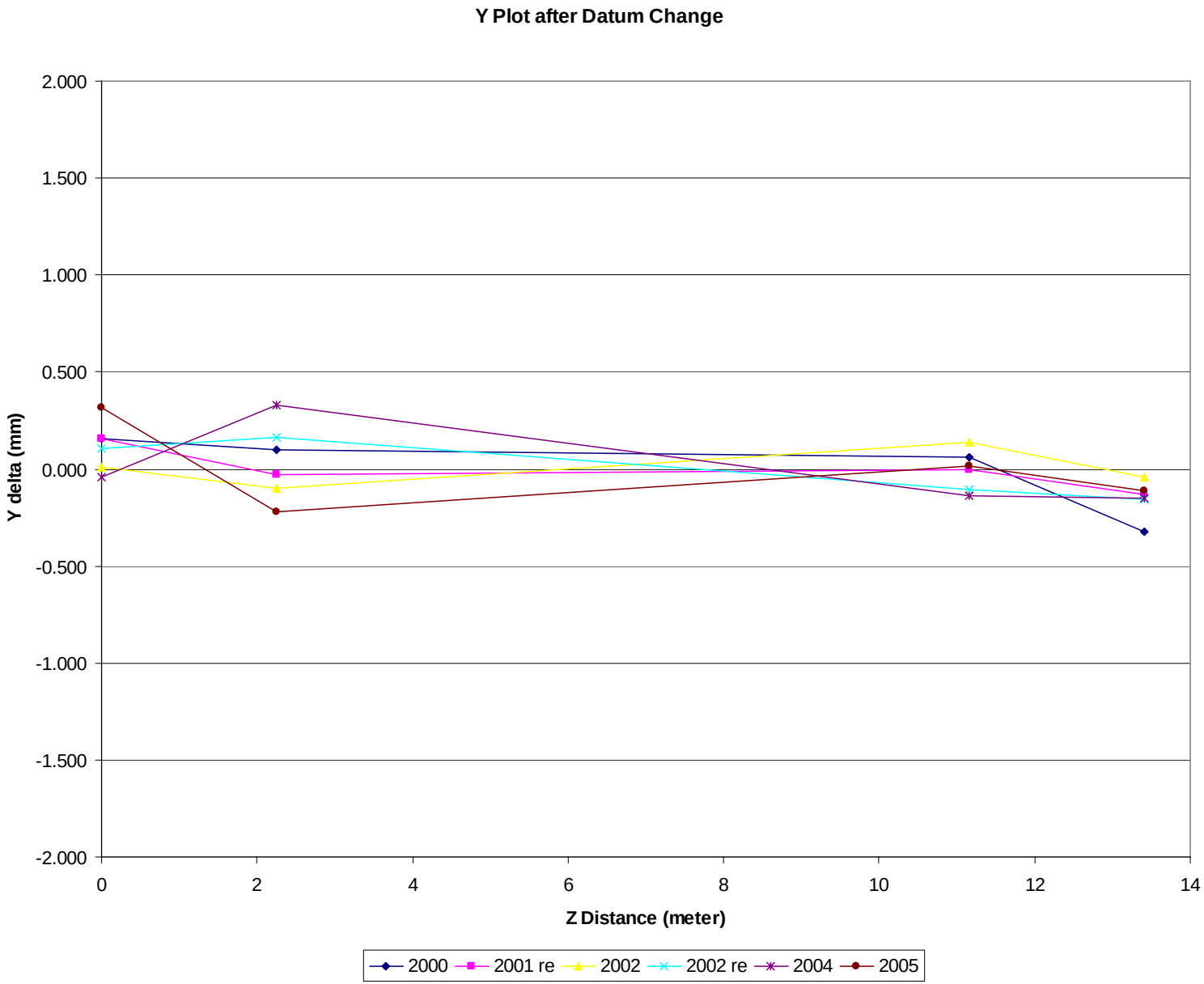
Conclusion

- Direct comparison between surveys is very difficult as they are processed using the free datum approach. This means that nothing is held fixed: the coordinates of the monuments determined in 2000 are used only as approximate values and play the same role as the ideal location of the magnets. See page 10 of:
  http://www-group.slac.stanford.edu/met/Align/TechAnalysis/2002/Babar_Position.pdf
- Each 2 successive BaBar/IR2 surveys should be close together:
  - 2000 and 2001 re
  - 2002 and 2002 re
- The last 2 surveys cannot be comparable as the measurement in 2005 were only local. See:
  http://www-group.slac.stanford.edu/met/Align/PEPII/IR2_A-Side_Flanges_Jan05.pdf
  http://www-group.slac.stanford.edu/met/Align/PEPII/IR2_B-Side_Flanges_Jan05.pdf

- A possible approach to solve for this datum inconsistency is to best-fit each set of results to the ideal and solve for a 3D translation as well as 1 rotation around the Y axis.
- The next 3 graphs are the results of this process and as expected show lesser changes.
- The last 2 surveys in the Z plot can be explained by the fact that after the 2002 downtime the raft on the B side has been moved due to a problem with the earthquake pin and the closing of the detector doors. No record of the exact move has been found in the AEG archive. It appears to have been around 2 mm.


Z Plot after Datum Change
2.000
1.500
1.000
0.500
0.000
-0.500
-1.000
-1.500
-2.000
Z delta (mm)
0
2
4
6
8
10
12
14
Z Distance (meter)
2000
2001 re
2002
2002 re
2004
2005


X Plot after Datum Change
2.000
1.500
1.000
0.500
0.000
-0.500
-1.000
-1.500
-2.000
X delta (mm)
0
2
4
6
8
10
12
14
Z Distance (meter)
2000
2001 re
2002
2002 re
2004
2005


Y Plot after Datum Change
2.000
1.500
1.000
0.500
0.000
-0.500
-1.000
-1.500
-2.000
Y delta (mm)
0
2
4
6
8
10
12
14
Z Distance (meter)
2000
2001 re
2002
2002 re
2004
2005