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Settlement Surveys at the APS

H. Friedsam

Argonne National Laboratory

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Outline

1. **Floor Settlements**
2. **Machine Deformations**
3. **Conclusions**

1. Floor Settlements

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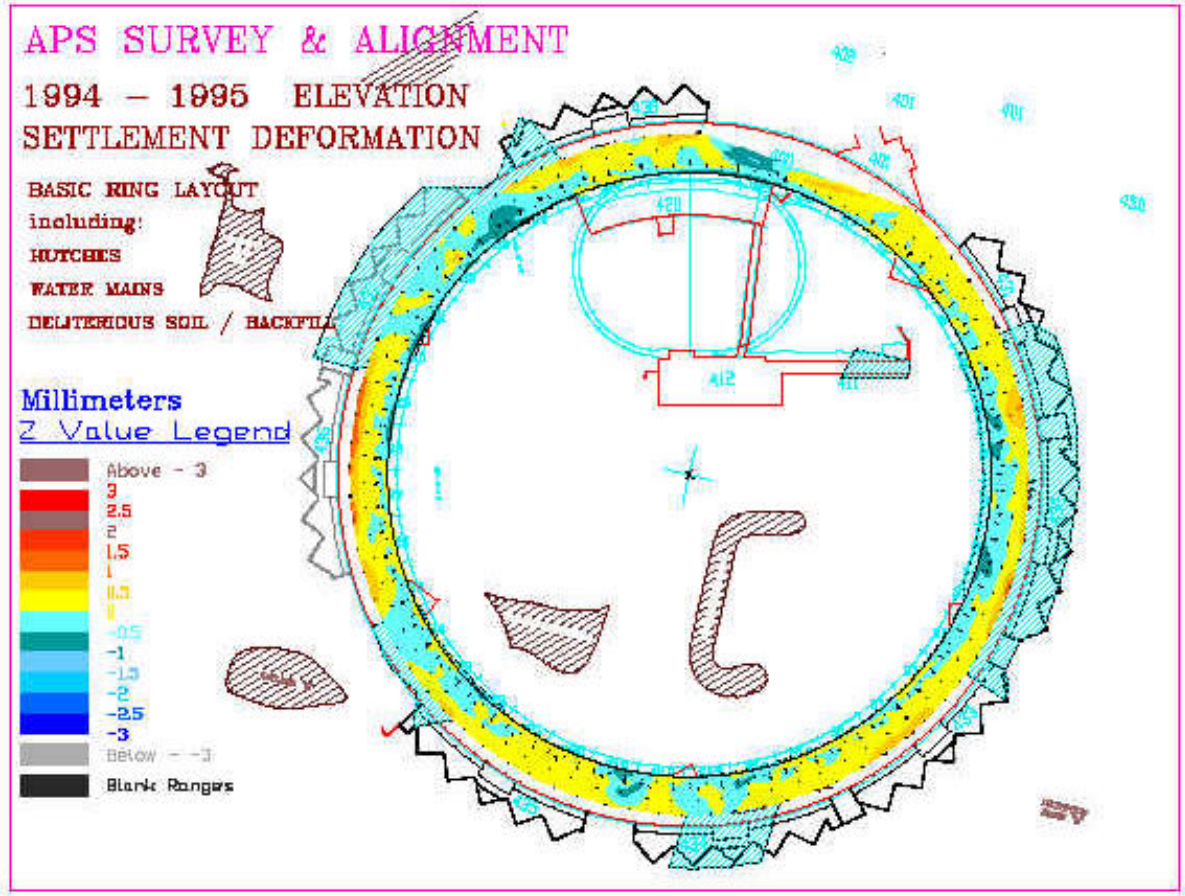
APS Settlement Results 1994 - 1995



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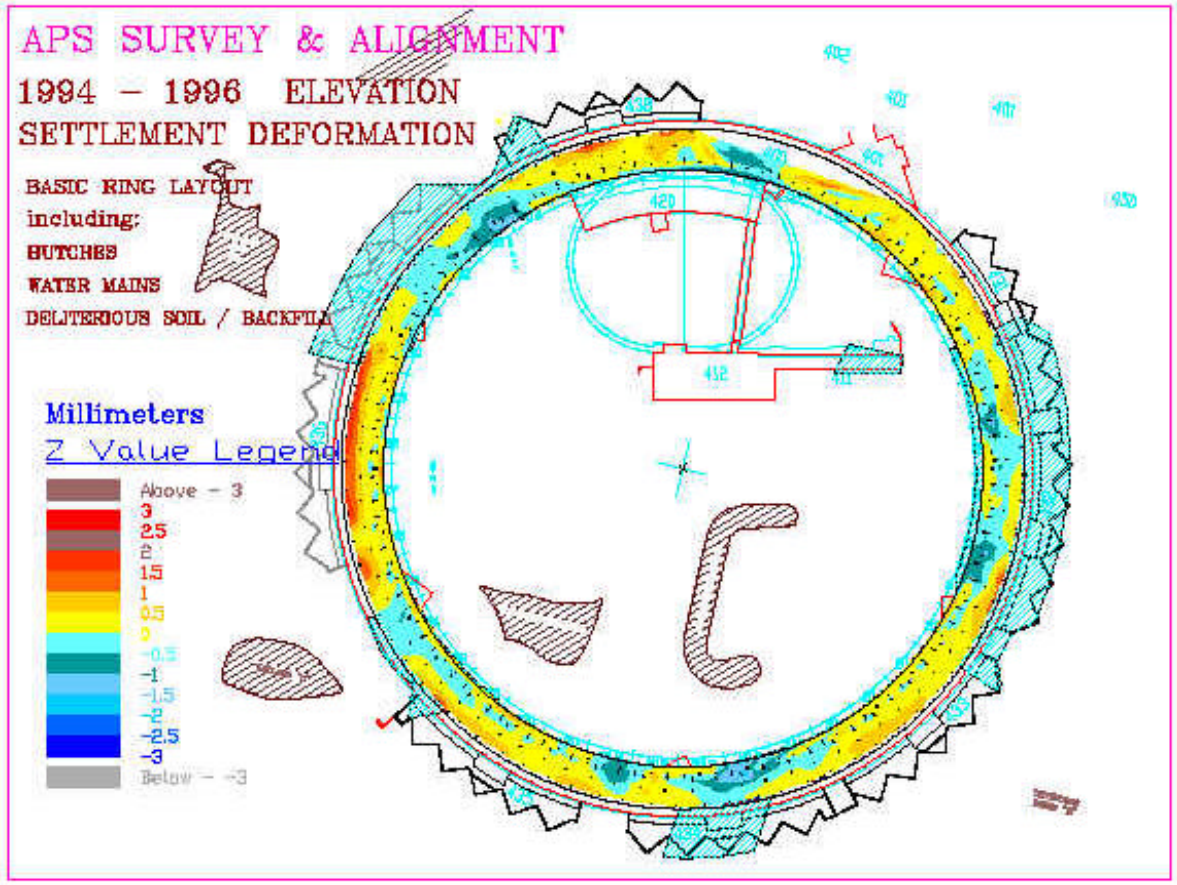
APS Settlement Results 1994 - 1996



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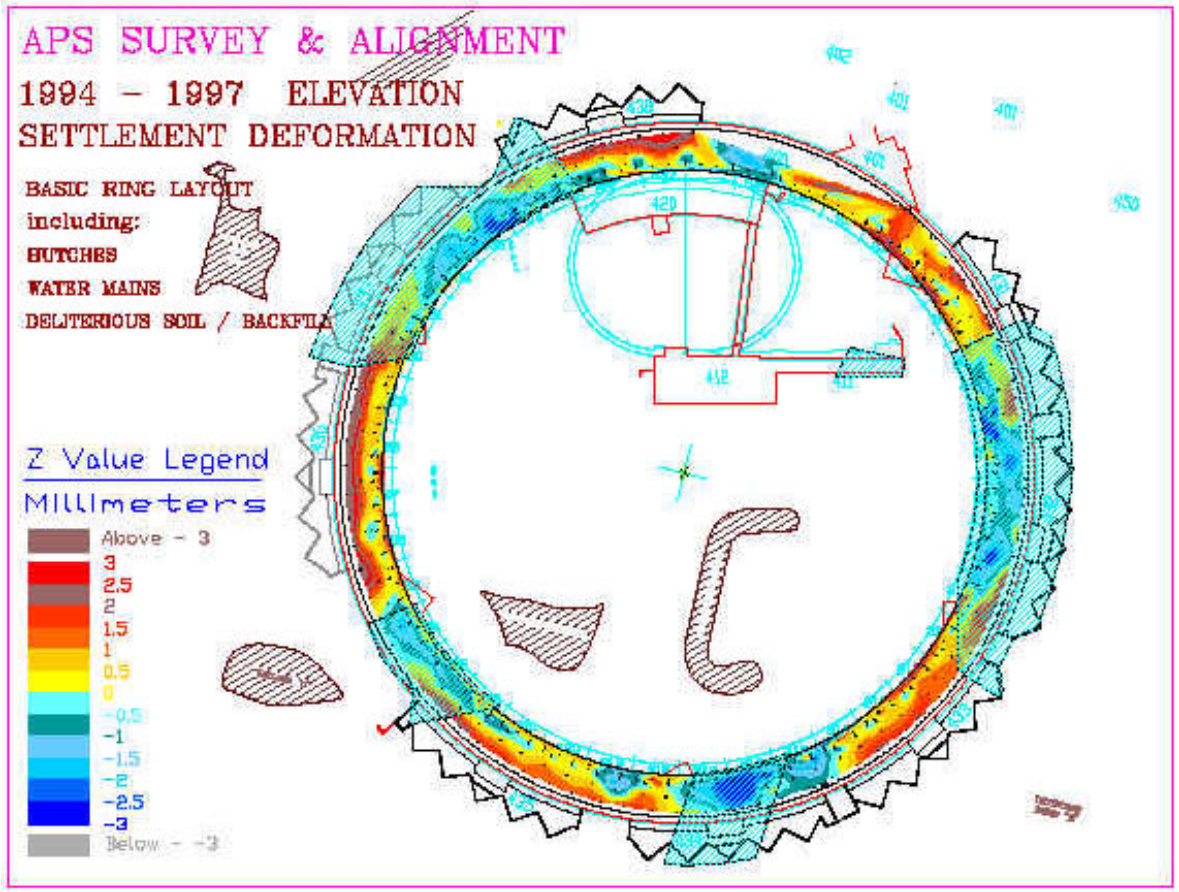
APS Settlement Results 1994 - 1997



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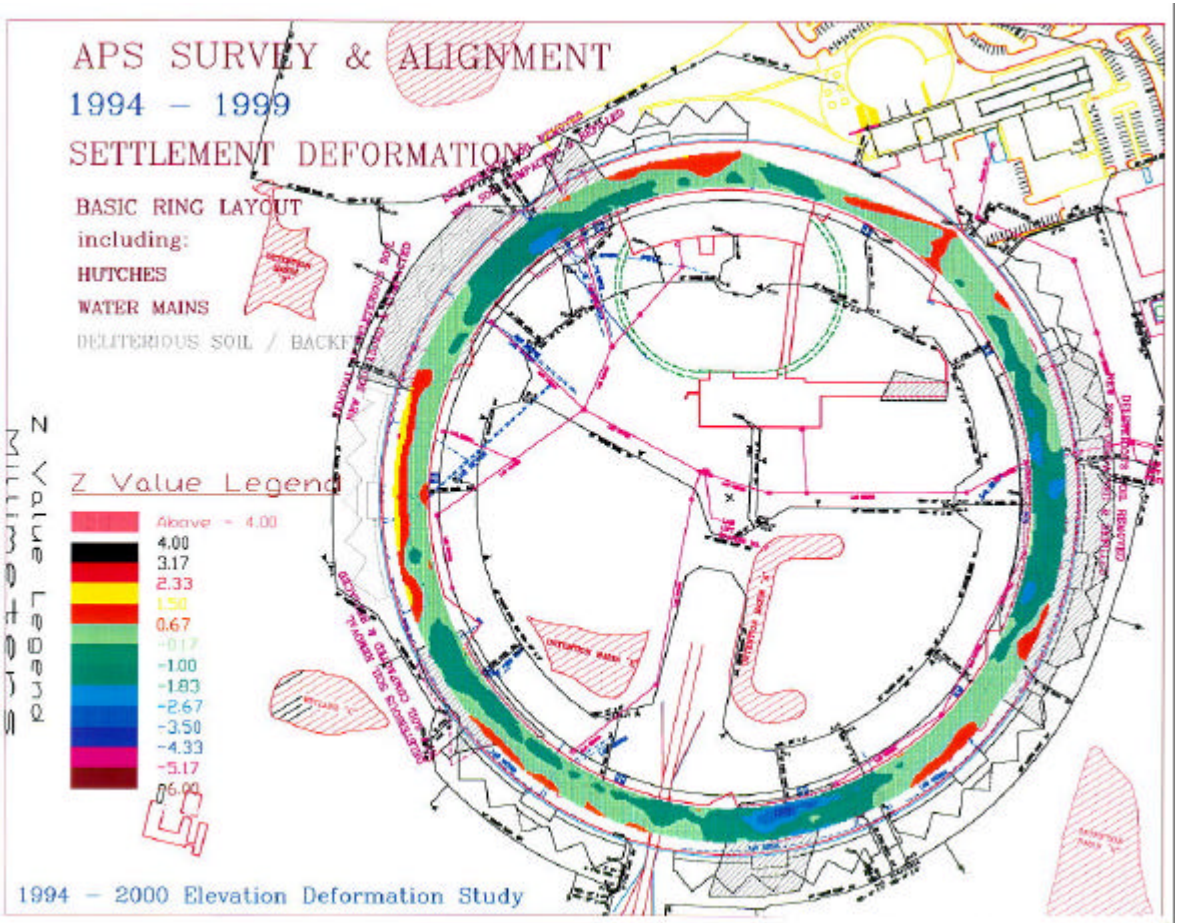
APS Settlement Results 1994 - 1999



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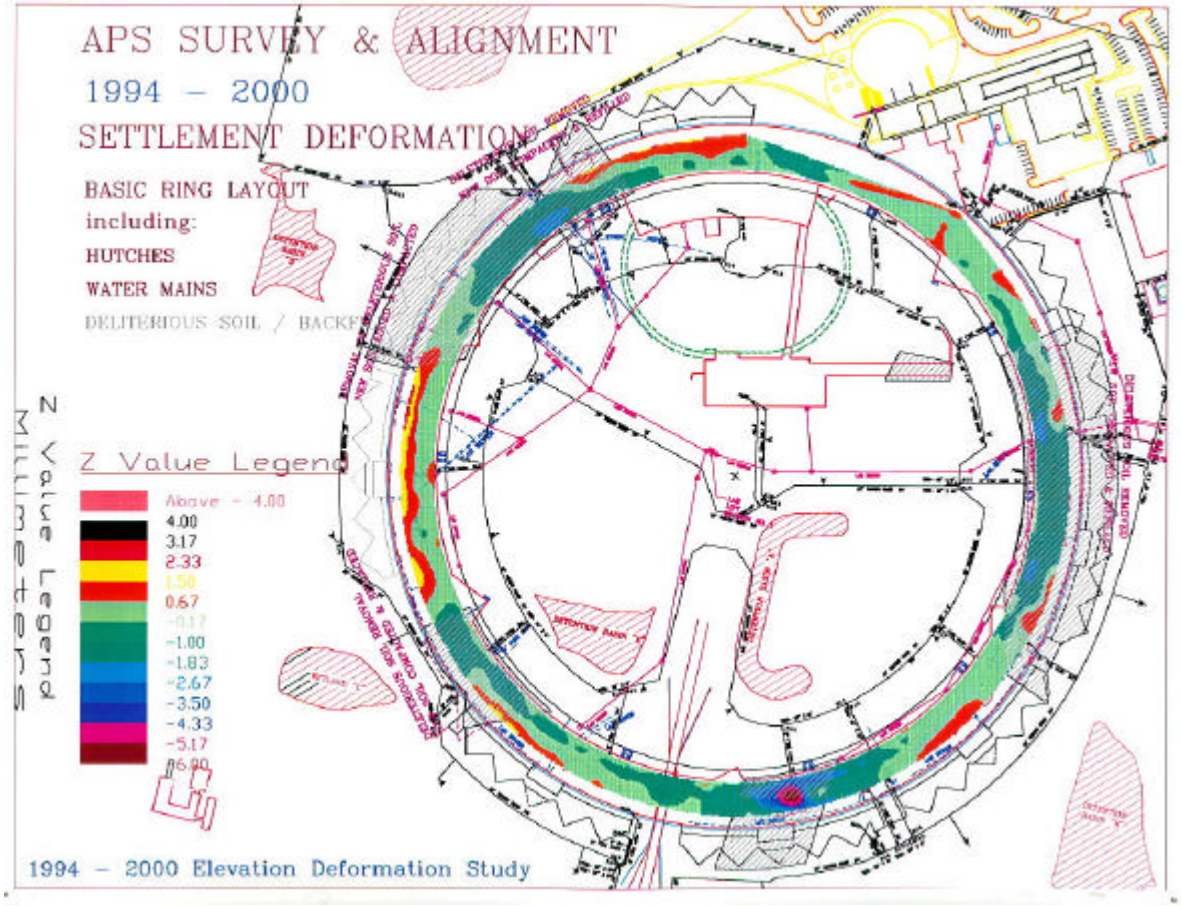
APS Settlement Results 1994 - 2000



2. Machine Deformations

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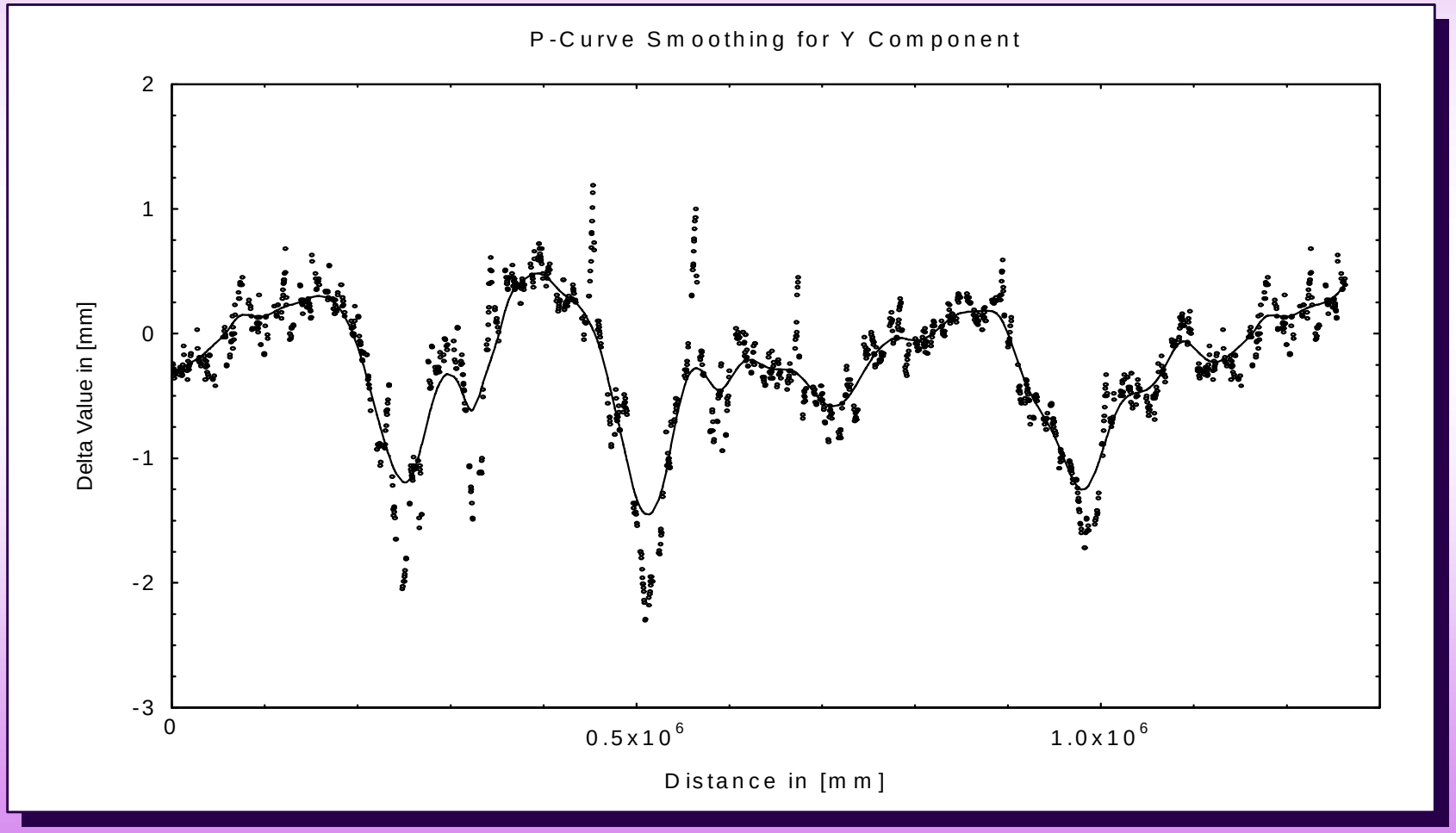

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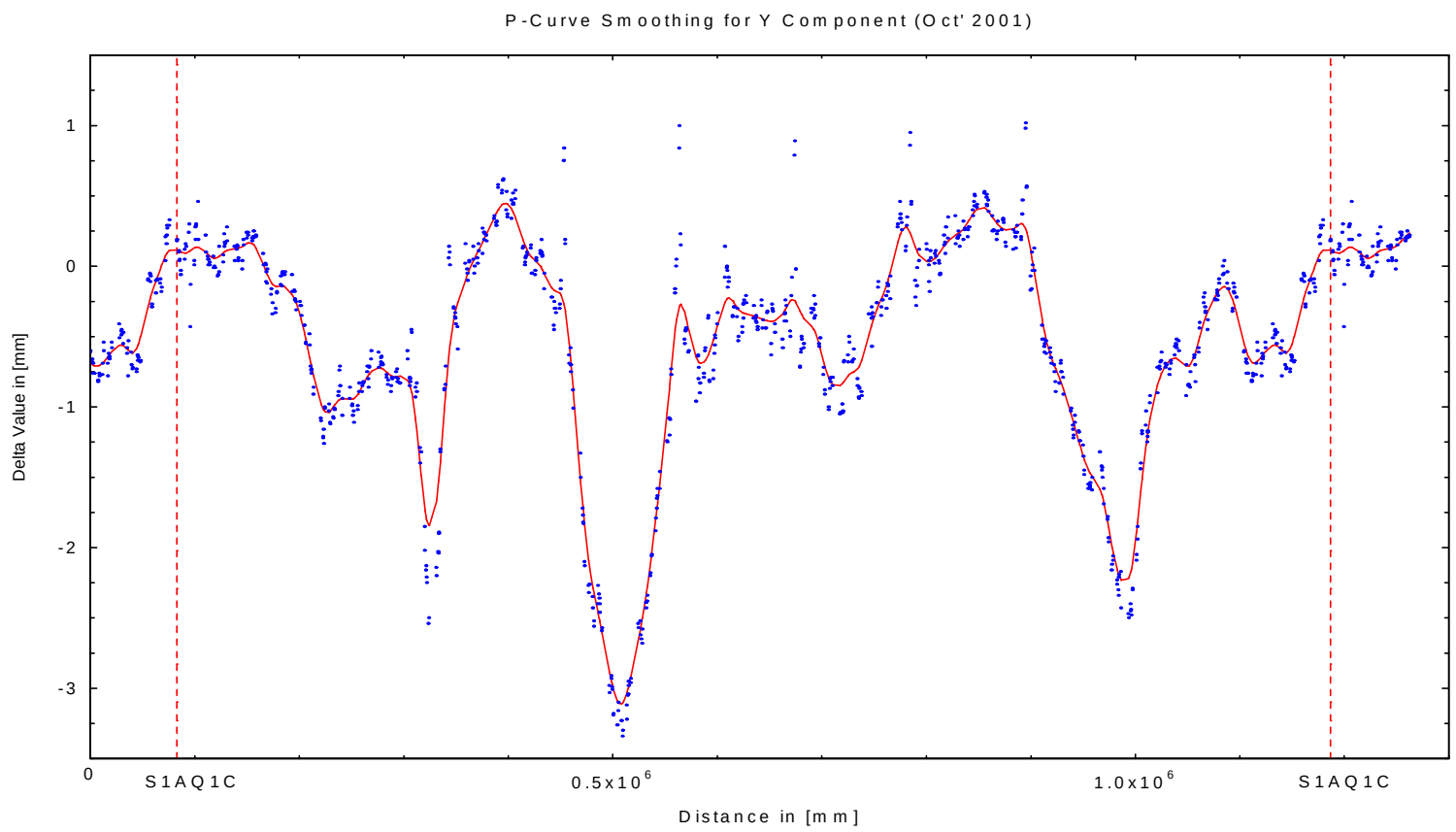

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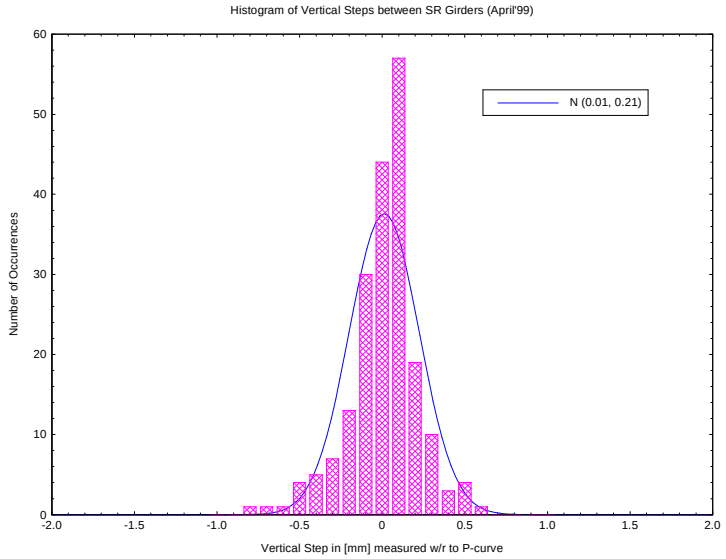
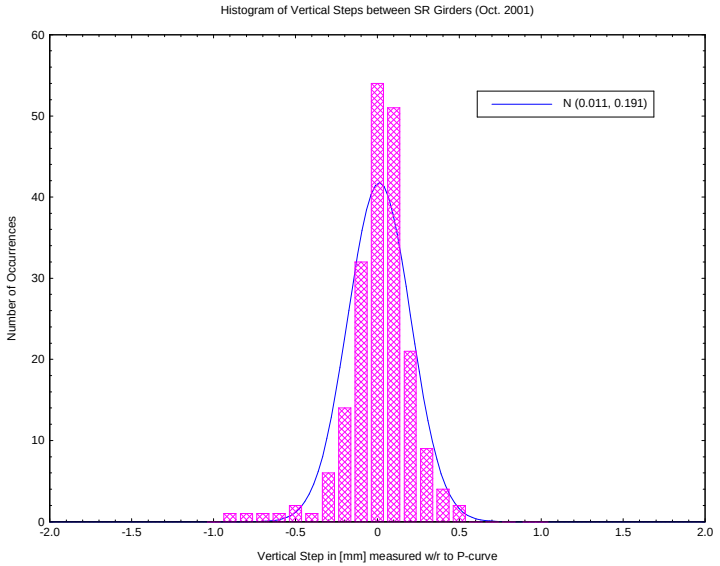
Vertical Intra Girder Steps 98/01





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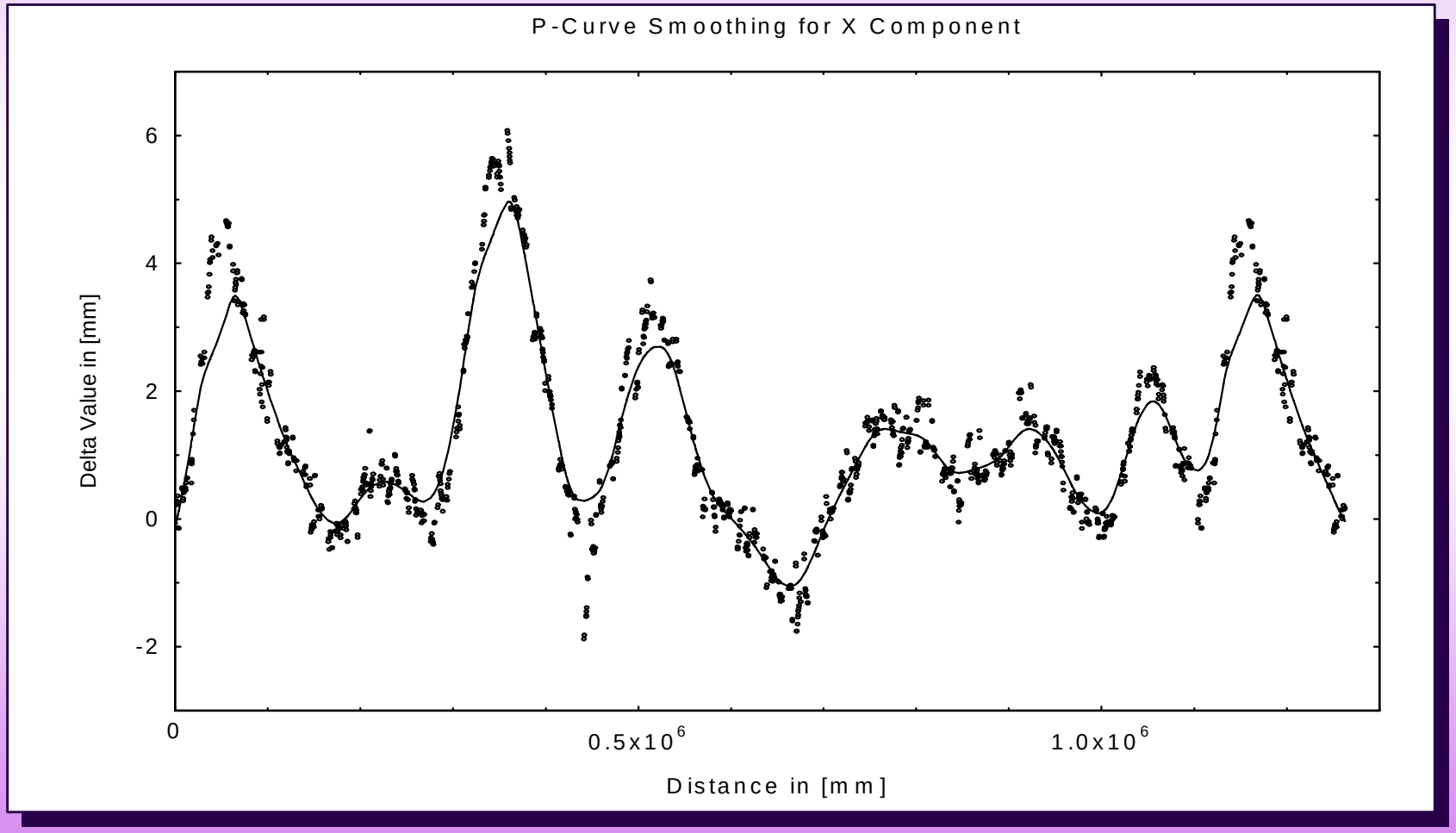

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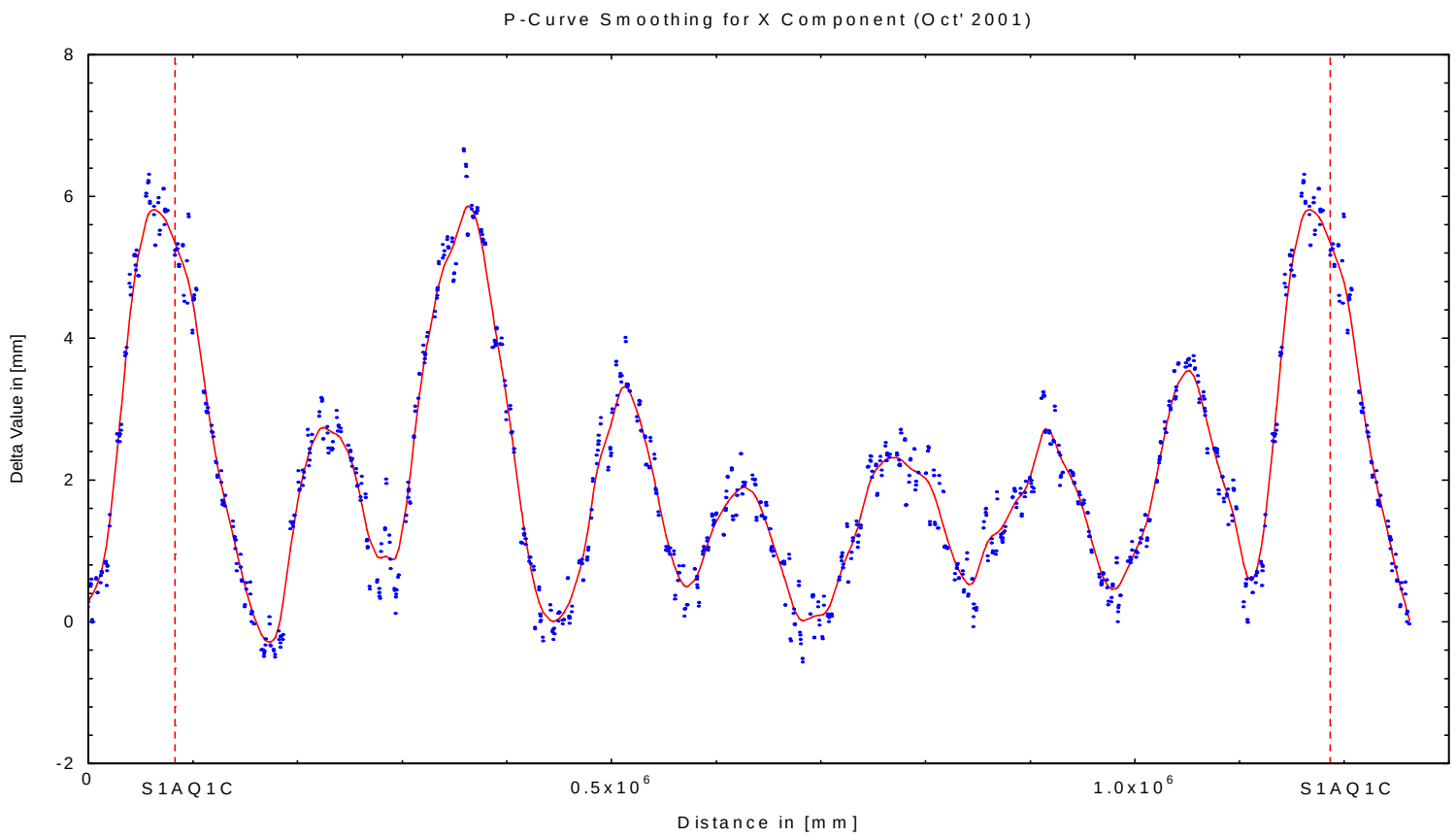

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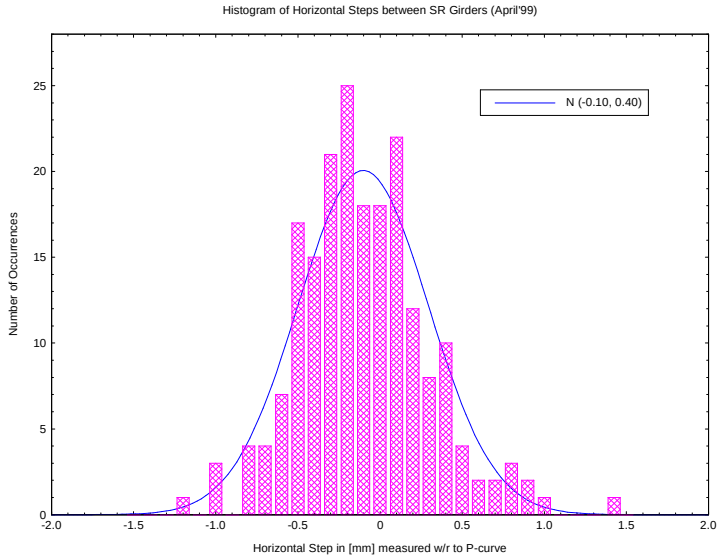
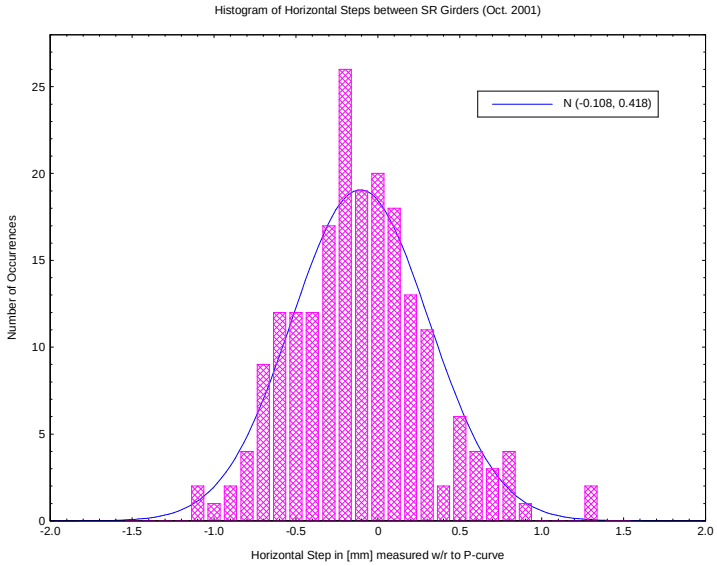
Transverse Intra Girder Steps 98/01





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Relative alignment changes over time

	1995	*1998*	*2001*
X (0.15)	0.09	0.43	
Y (0.15)	0.07	0.24	
X-inter	0.07	0.10	
Y-inter	0.09	0.10	
X-intra	0.14	0.40	
Y-intra	0.11	0.21	
X	0.14		0.41
Y	0.11		0.21
X		0.40	0.41
Y		0.21	0.20

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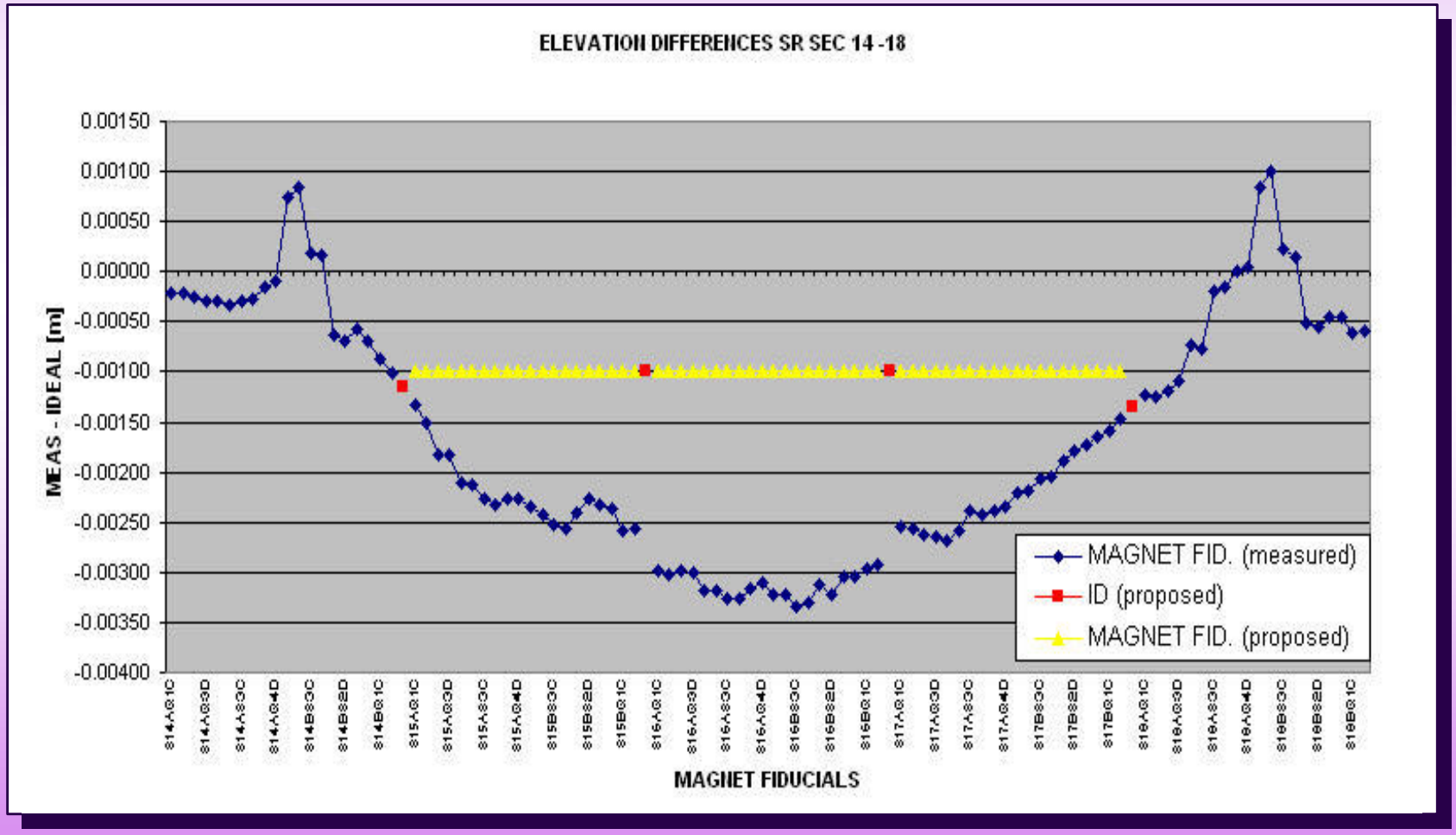

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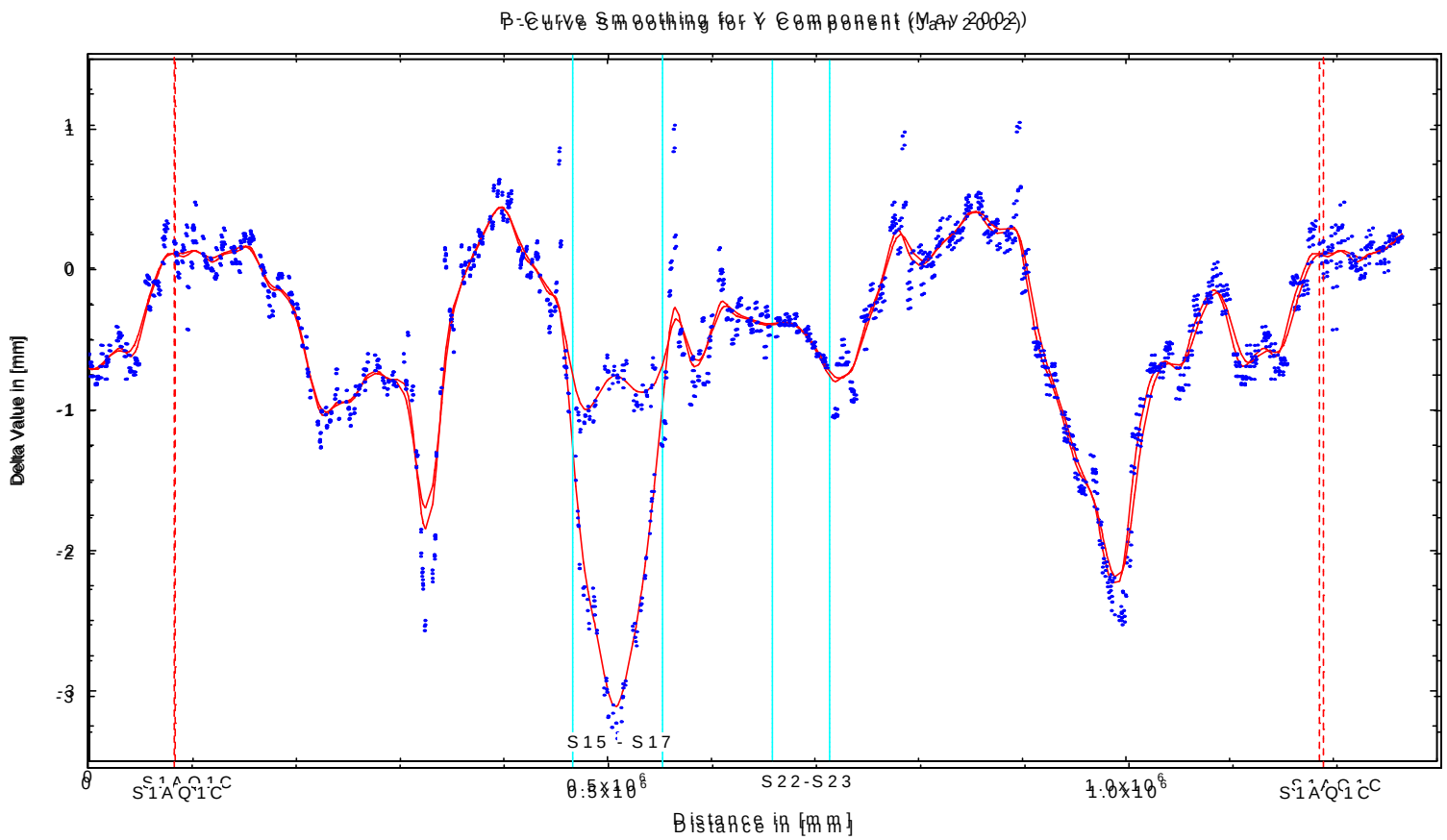

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Conclusions

- **The APS Storage Ring alignment is deteriorating over time.**
- **Surprisingly the horizontal deterioration is worse than the vertical.**
- **Most of the deterioration can be attributed to girder motion.**

Conclusions

- We are continuing with the implementation of the Decker distortions. As this effort progresses we take care of the steps between the girders and settlements. We also need to implement an elevation measurement to the ratchet wall collimators. In the future all wall collimators will be set to source height.

Conclusions

- Should we continue to take the large floor settlements out of the system? These changes will be undone by changes in the lattice to satisfy the x-ray beamlines and are therefore counter productive as the e-beam will not be centered in the IDVC.
- We need a discussion on how to deal with SR and beamline settlements. Both of these components are inter-related and can not be viewed as separate parts. (Re-alignment of the SR affecting all CATs versus one CAT at a time).

Detector development

- In the future it would be helpful if each beamline had a target detector installed with a known outside reference for alignment purposes. With that the x-ray beam could be used directly for the alignment of intermediary components and the repeatability of the x-ray beam location could be evaluated. Tests with burn paper were performed on the diagnostics beamline. However, with the implementation of the x-ray BPMs this may no longer be necessary.

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