Bias Detection Techniques And Capabilities

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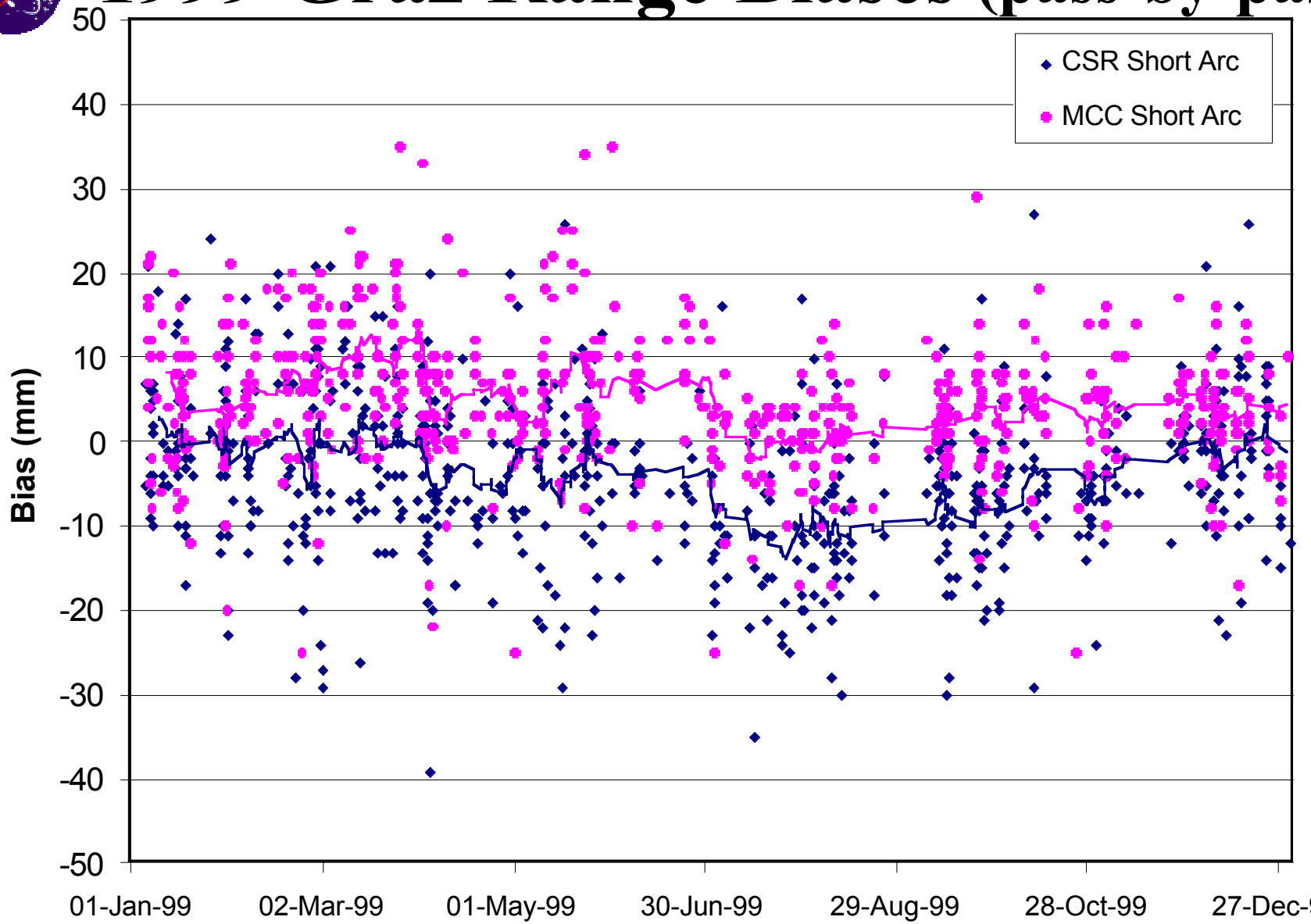
Bias Detection Techniques

Technique	Bias Detection Capability	Detection Level	Orbit Determination Required?	Simultaneous Data Required?	Station Coordinates?
System Characterization	Absolute	<=1mm	NO	NO	N/A
Portable calibration standard	Absolute	<=1mm	NO	NO	N/A
Collocation	Relative	1-2mm	NO	YES	Local Tie
Simultaneous Arc	Relative	5-10mm	YES	YES	Fixed
Short Arc (few days)	Absolute	10-20mm	YES	NO	Fixed
Long Arc (several days)	Absolute	6-14mm	YES	NO	Fixed
Long Arc (28 days)	Absolute	5-10mm	YES	NO	estimated

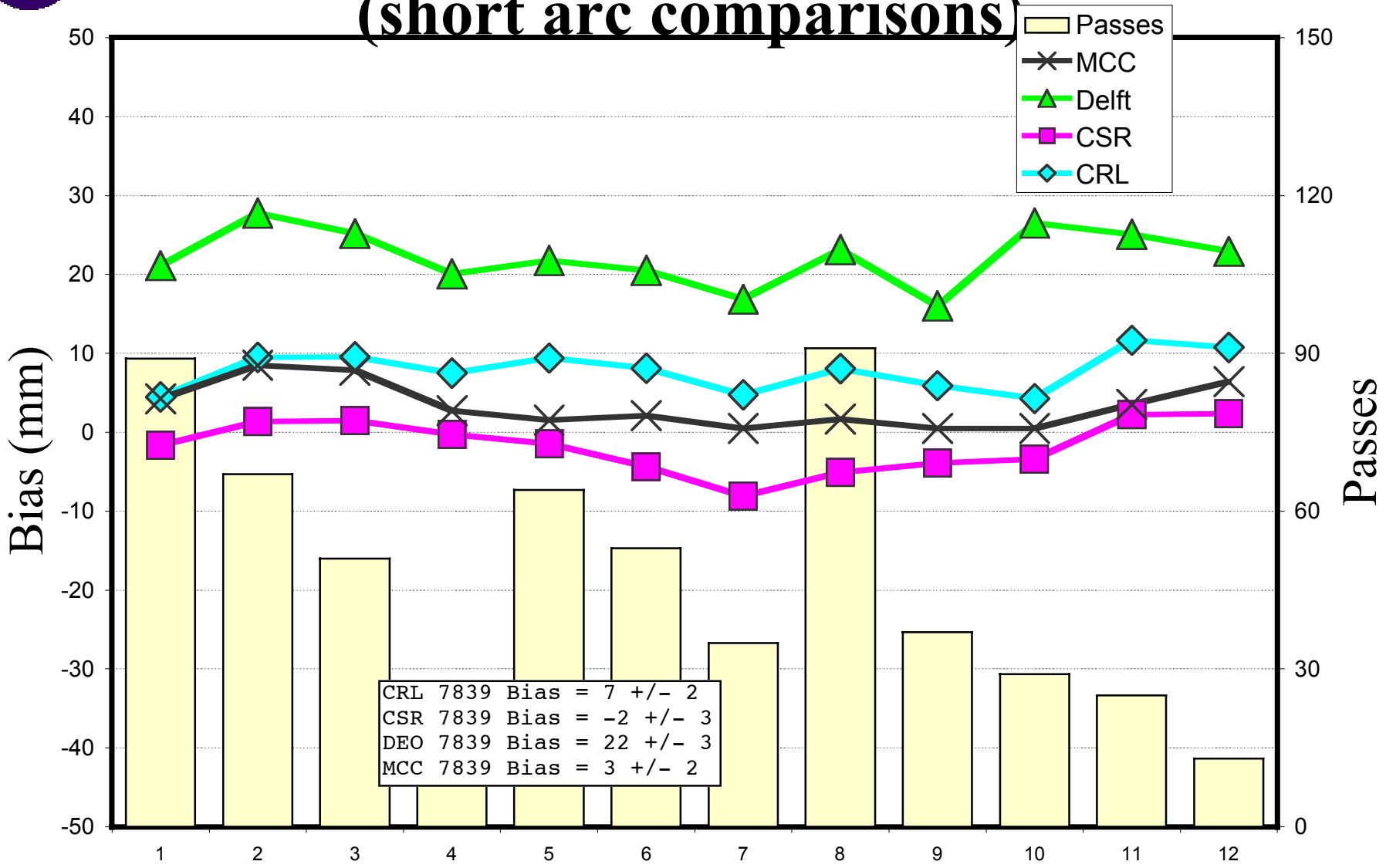
Limiting Factors in Absolute Bias Detection using an Orbit

1. Station Position,
2. # of Passes,
3. Satellite Signature,
4. Tropospheric model,
5. GM,
6. And others models

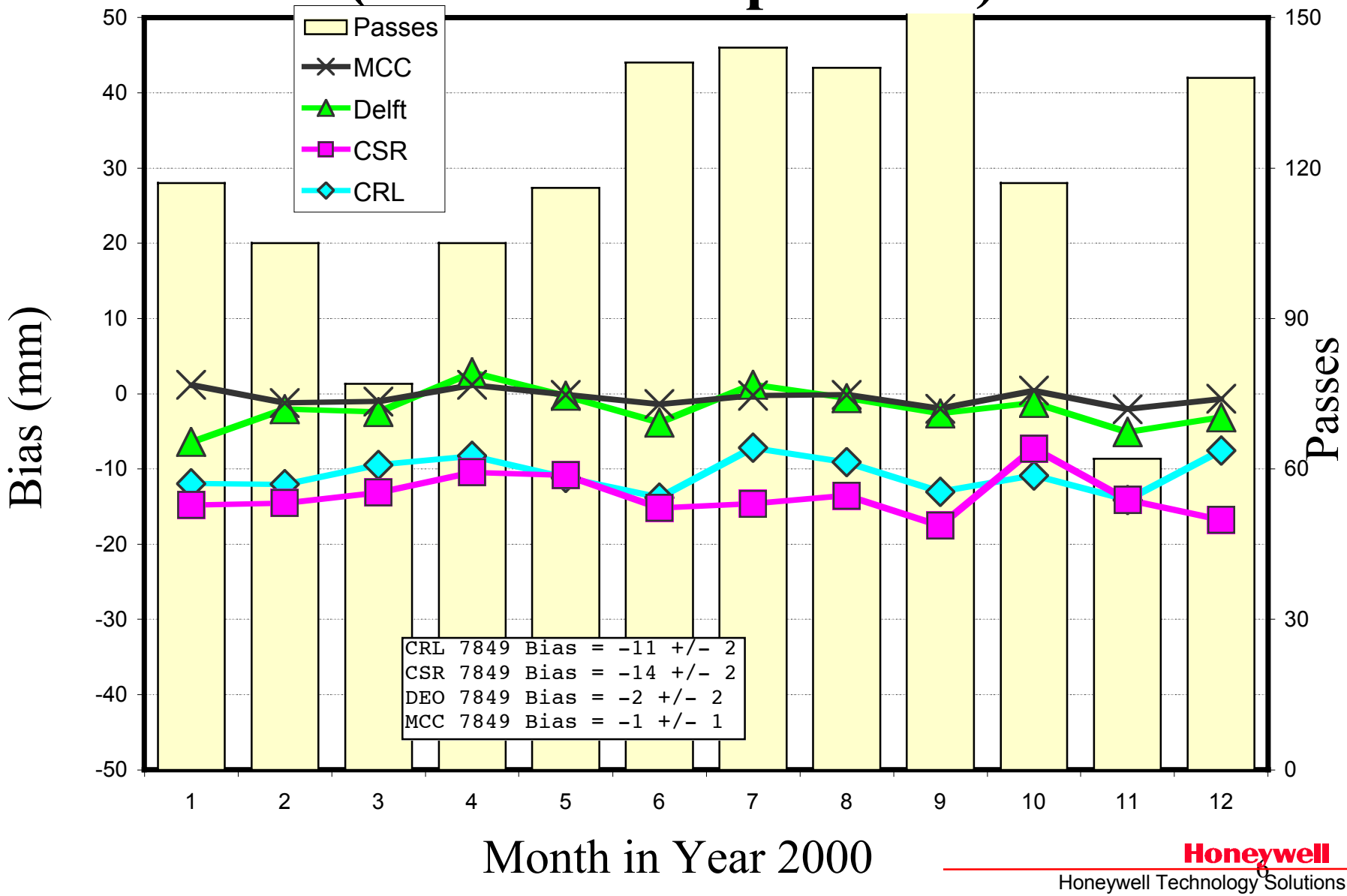
1999 Graz Range Biases (pass-by-pass)



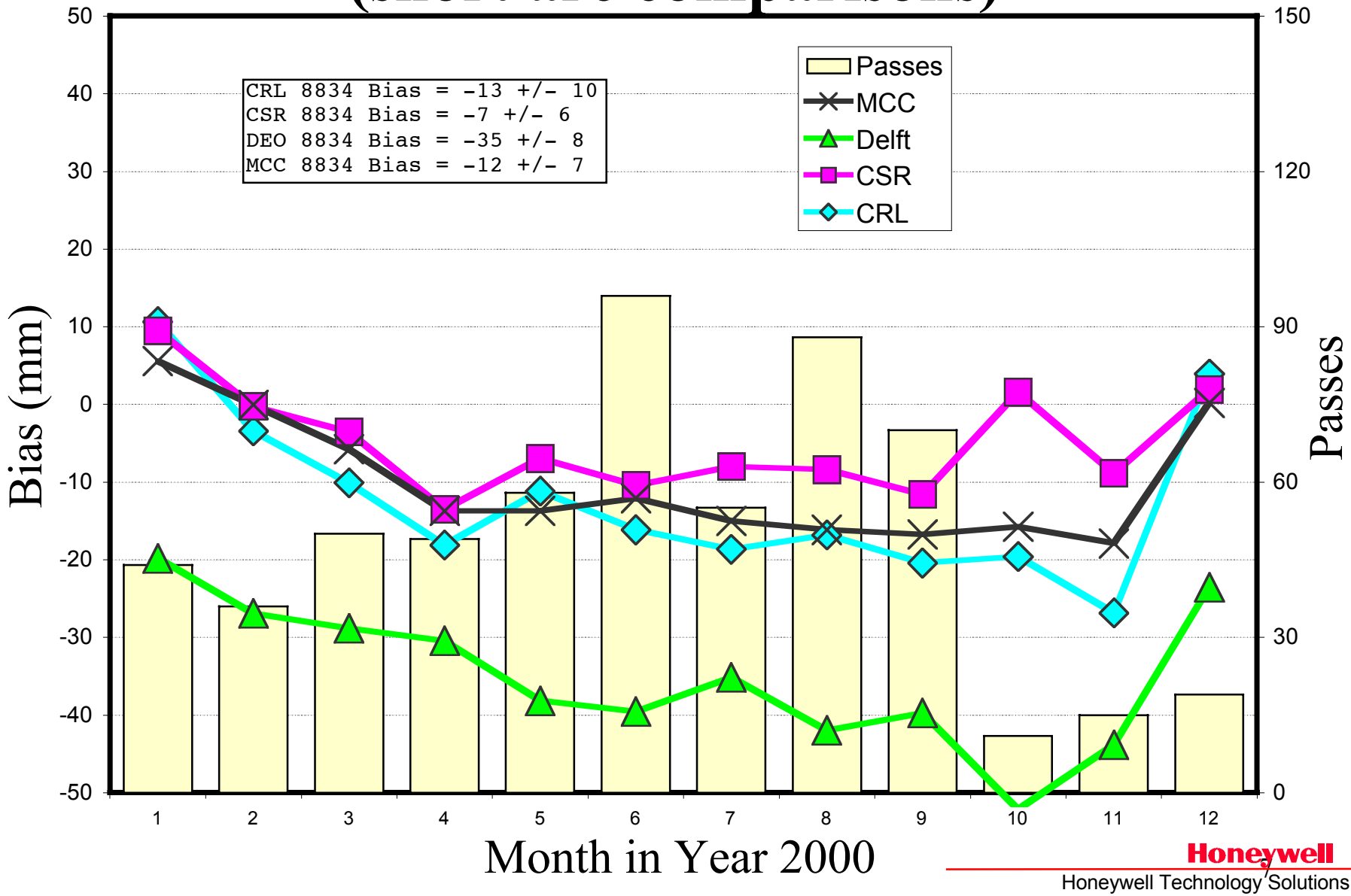
Graz Range Bias
(short arc comparisons)



Mt. Stromlo Range Bias
(short arc comparisons)

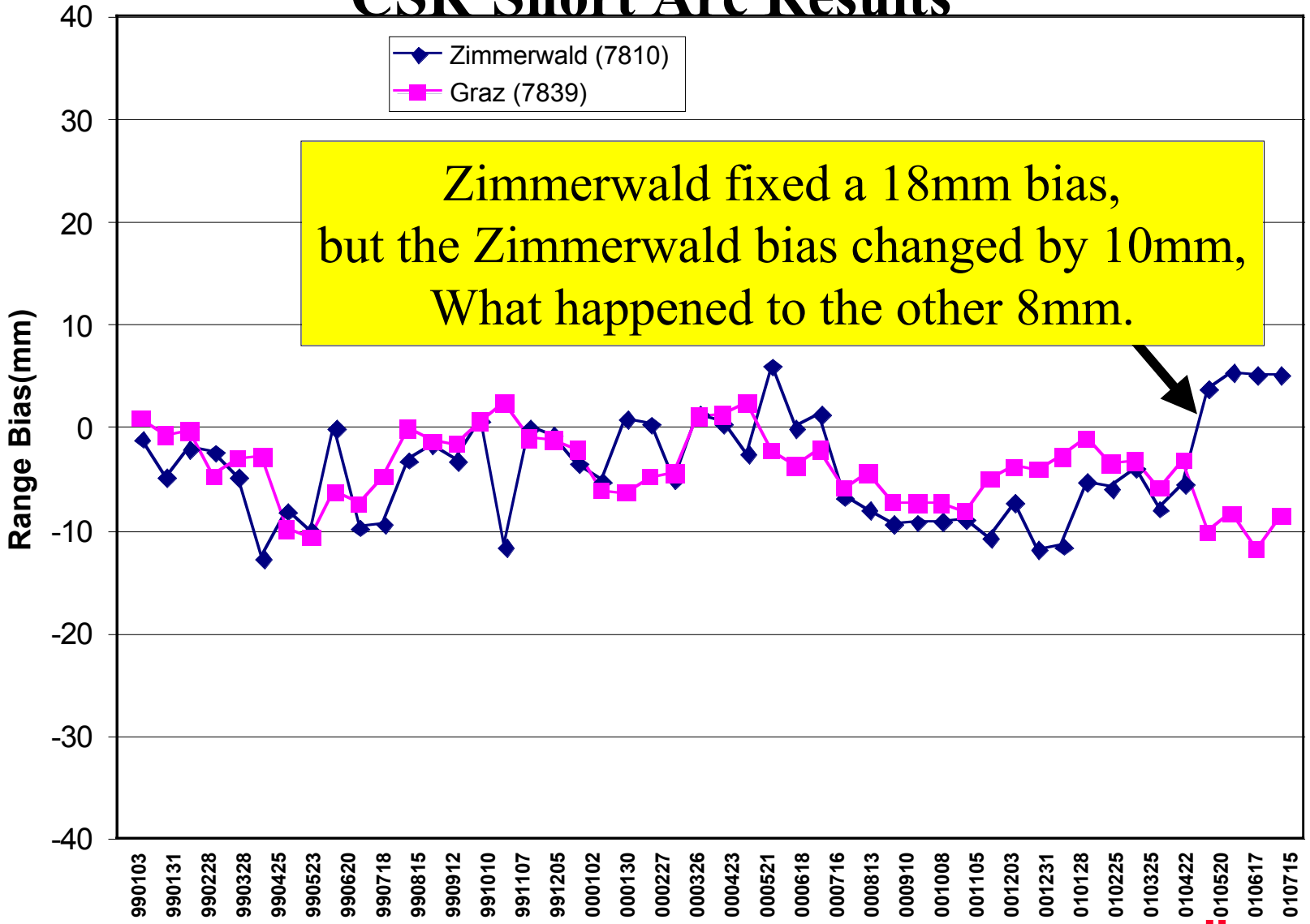


Wettzell Range Bias
(short arc comparisons)



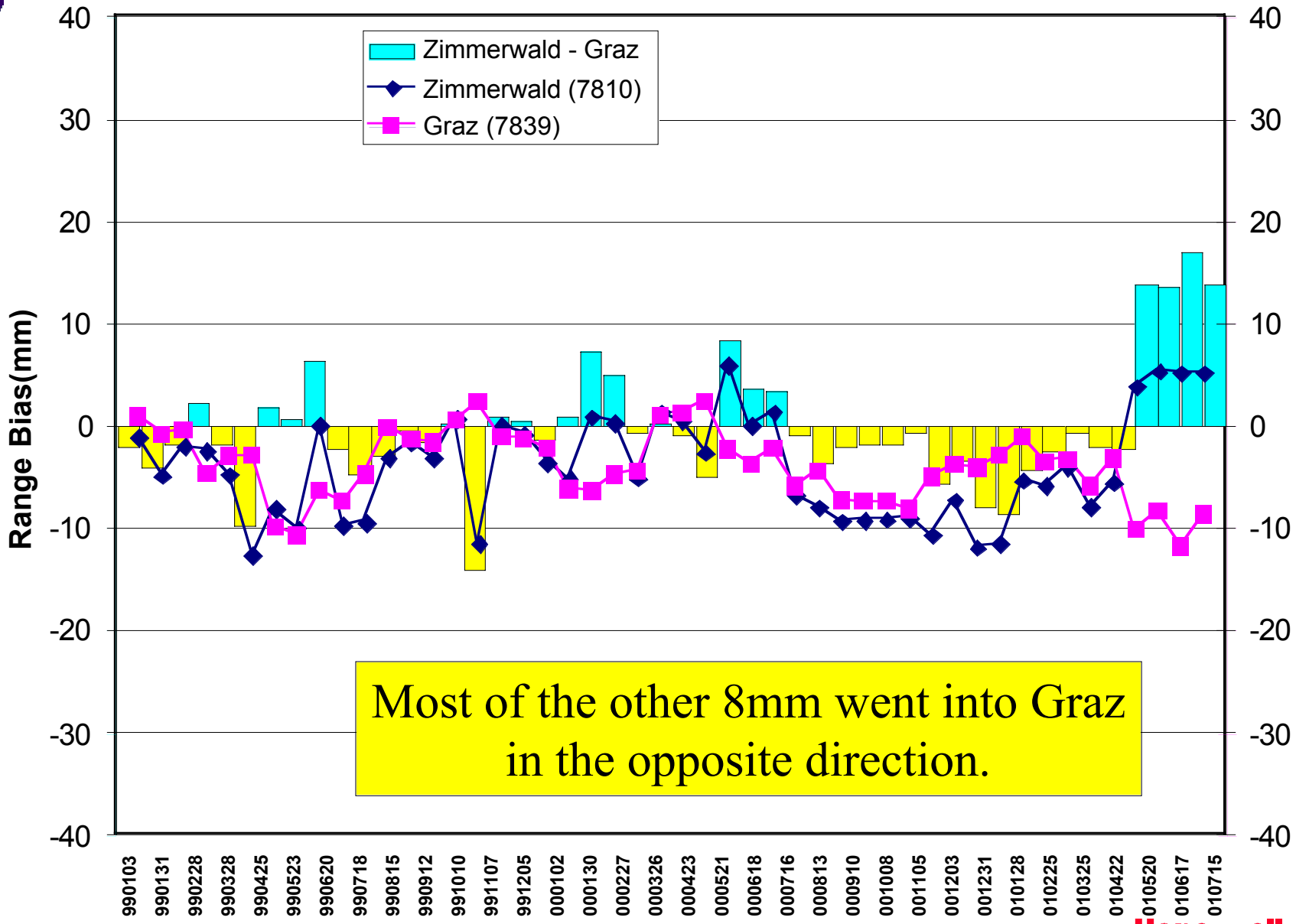
Zimmerwald and Graz

CSR Short Arc Results



Bias Detection

Zimmerwald and Graz Results

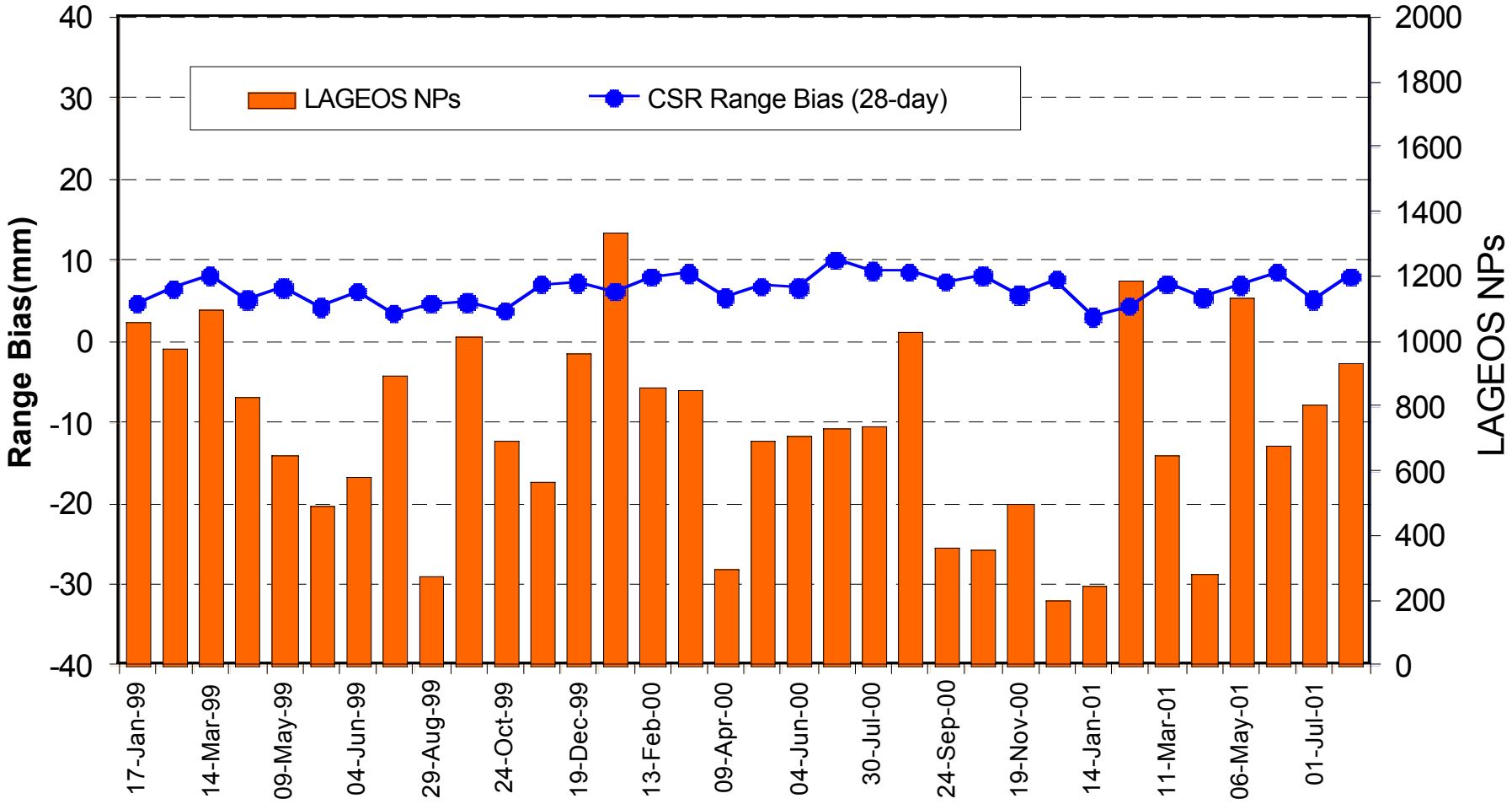


Most of the other 8mm went into Graz in the opposite direction.

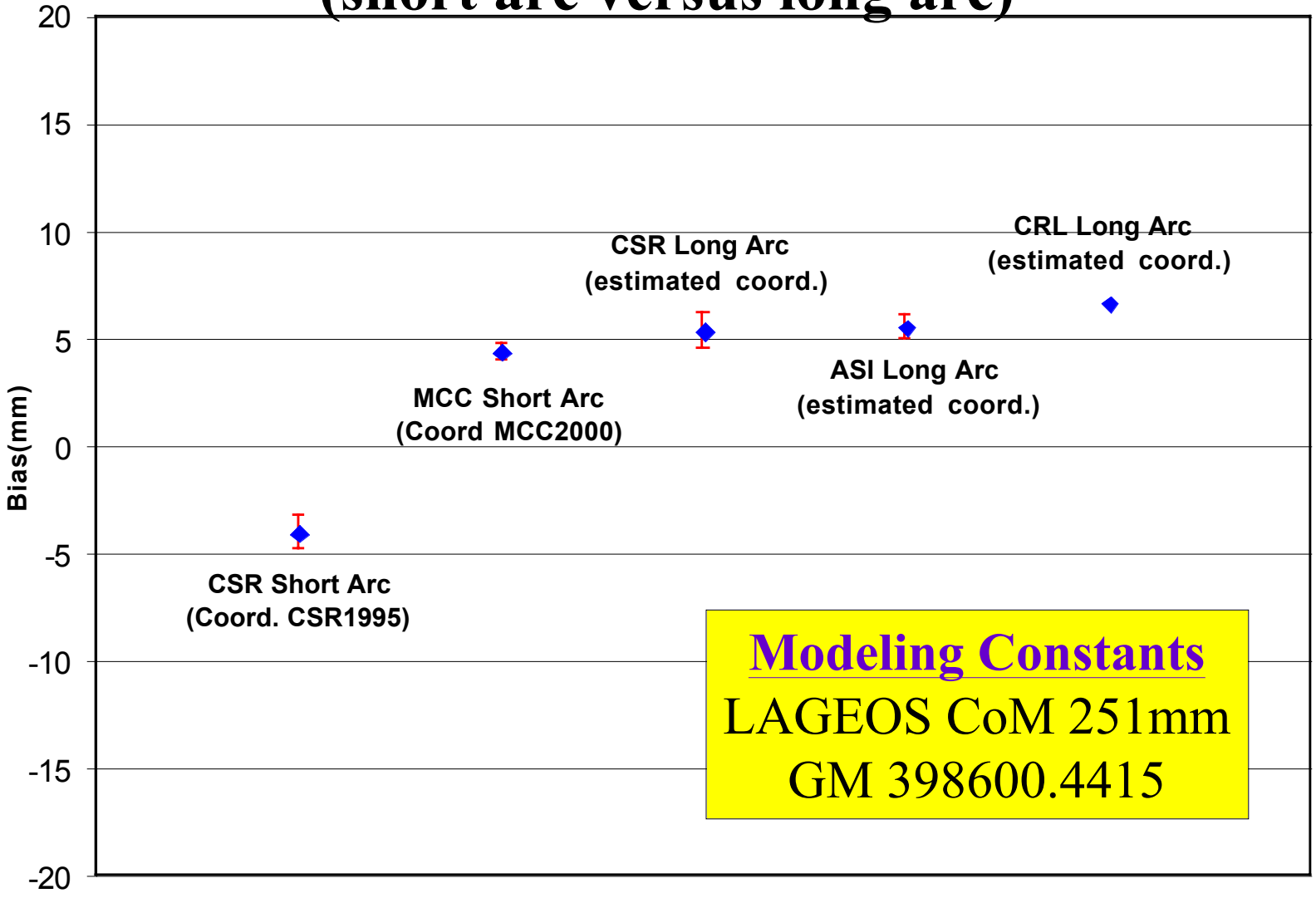
Short Arc Conclusions

- Individual pass results can vary significantly between analyst centers
- Also, monthly mean range biases can differ significantly from the Analysis Centers (AC),
  - The prime cause of this is coordinate differences
- But, the monthly bias trends between ACs track each other to the 5-10mm level.
- A change in a site's bias influences the 'apparent bias' in neighboring sites (in the opposite direction).

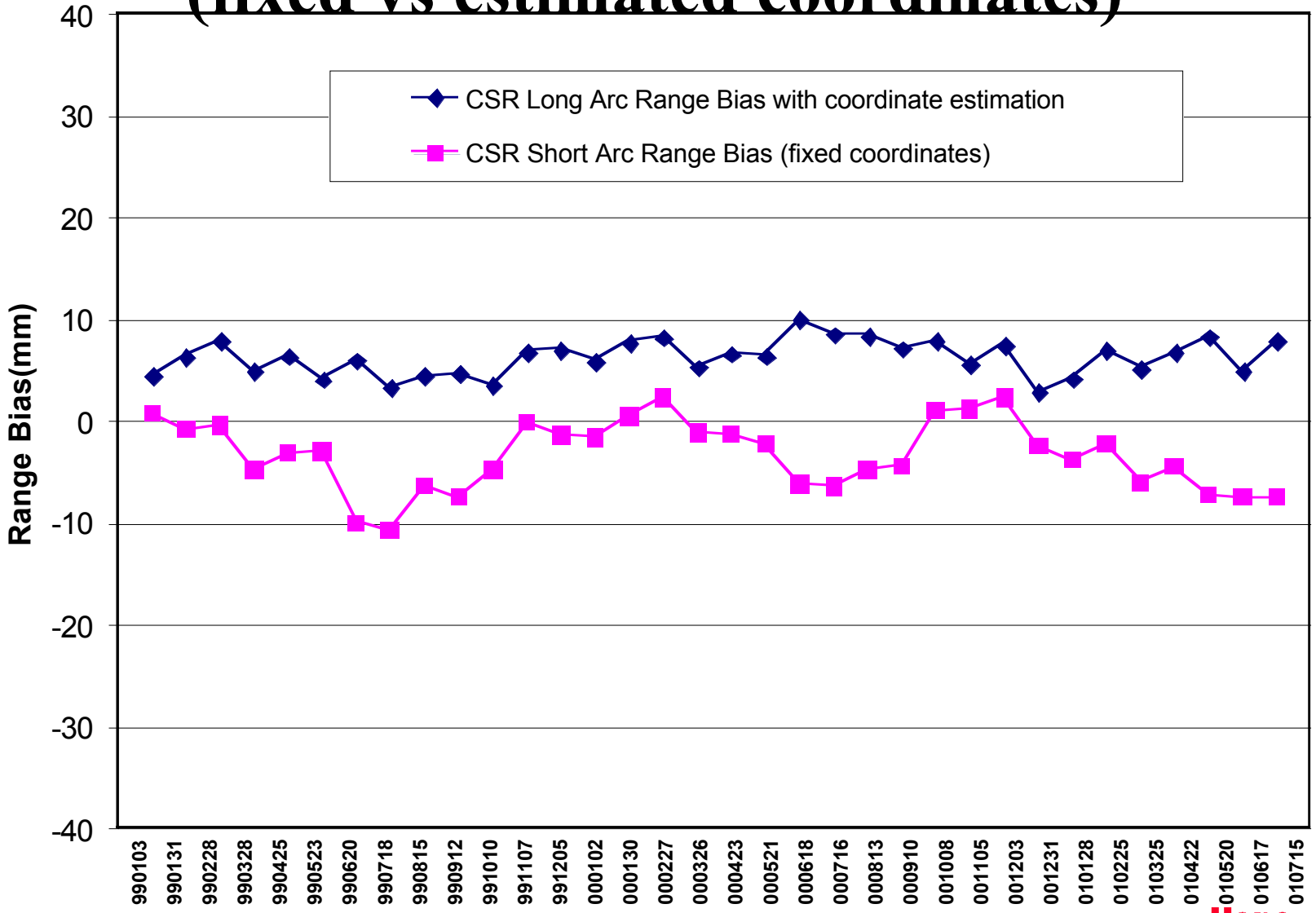
Graz Range Bias
(long arc 28-day coordinate solutions)



1999 Graz Range Bias Comparison
(short arc versus long arc)



Graz Range Bias Comparisons
(fixed vs estimated coordinates)



Conclusions

- When coordinates are fixed, range bias trends reflect site height movement (i.e. seasonal trends in RB are artificial)
- To get the BEST absolute range bias results you need to estimate coordinates and RBs simultaneously.
- The Analysis WG has an action to develop a consolidated range bias report.