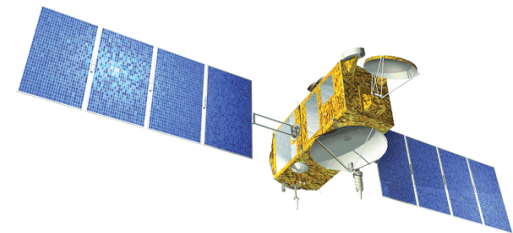
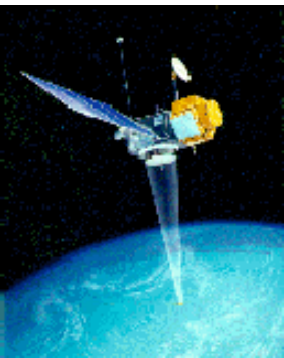




Sub-centimeter SLR precision with the SLRF2005/LPOD2005 network

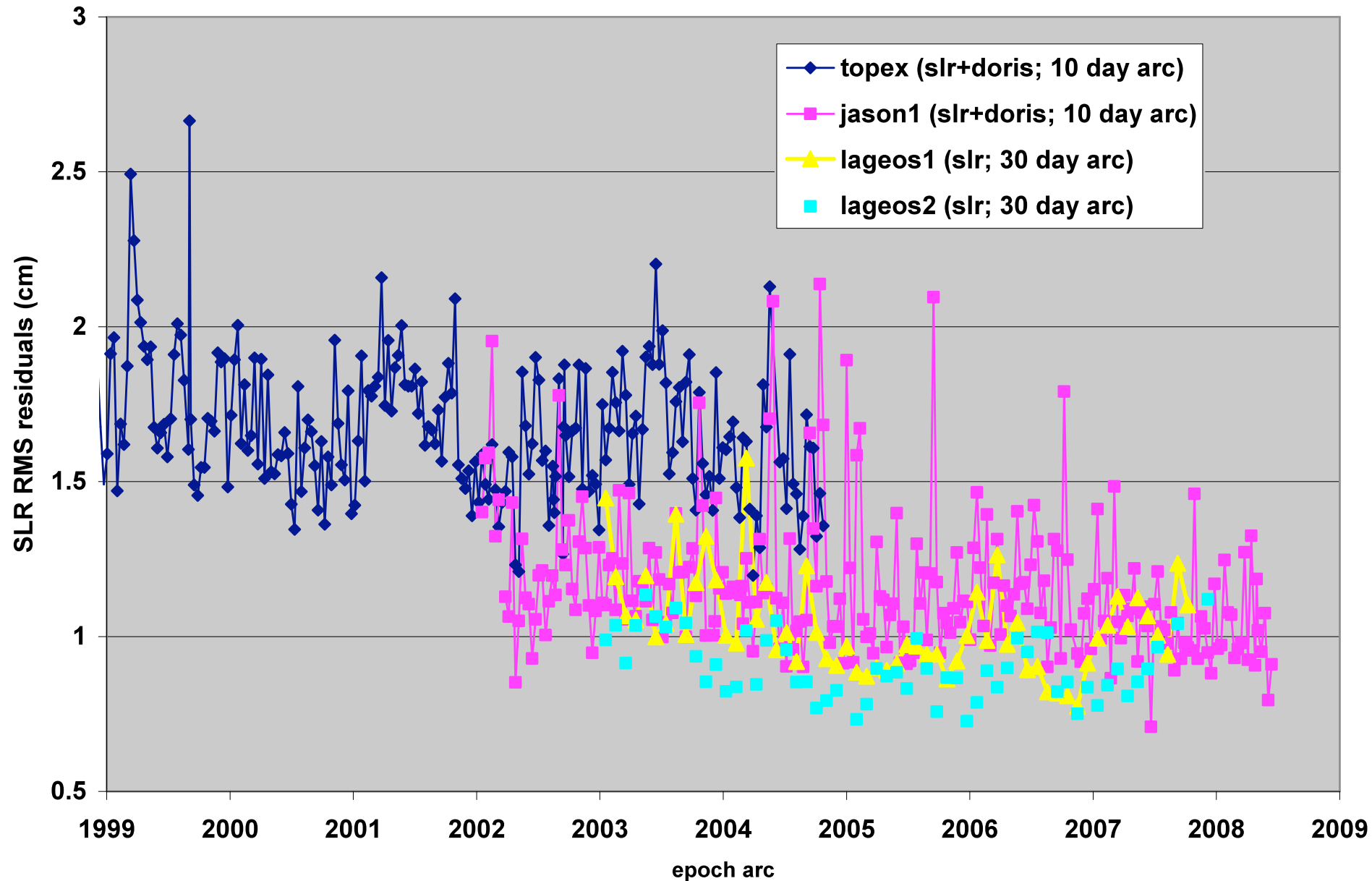
N.P. Zelensky, F.G. Lemoine, D.D. Rowlands,
S.B. Luthcke, D.S. Chinn, J.W. Beall, B.D.
Beckley, S.M. Klosko, P. Willis, V. Luceri

16th International Workshop on Laser Ranging
Poznan, Poland
October 13-17, 2008





SLR processing at GSFC





Consistent POD models across satellites

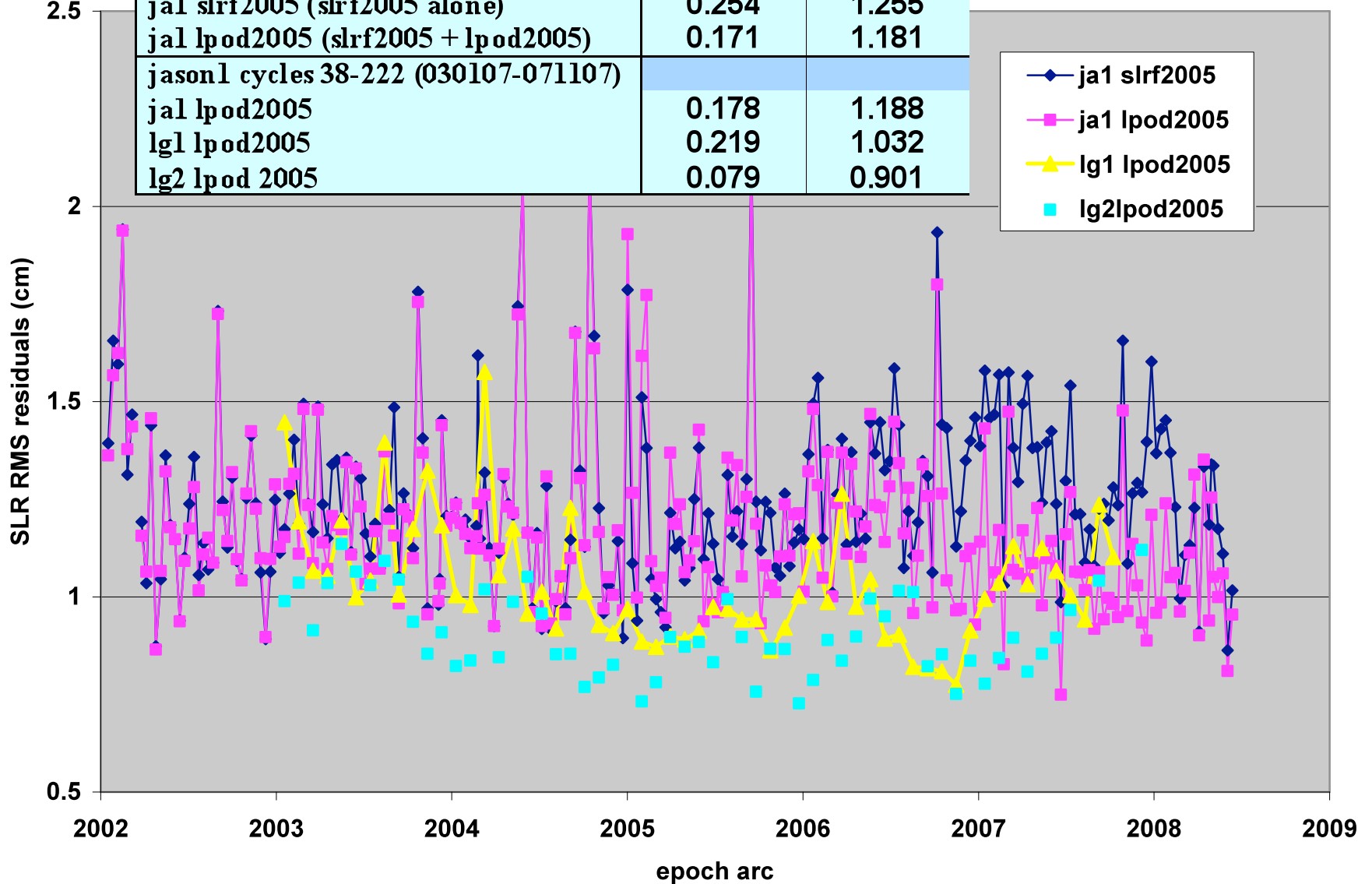
Models include:

Reference frame and displacement of reference points	
SLR	SLRF2005 + LPOD2005 (version 6)
DORIS	DPOD2005
Earth tide	IERS2003
Ocean loading	Got4.7 all stations
Tidal CoM &EOP	Got4.7; VLBI high frequency terms
Gravity	
Static	Eigen-Gl04s
Time varying	Linear C20-dot, C21-dot, S21-dot (IERS2003) + 20x20 annual terms from GRACE
Atmospheric	ECMWF, 50x50@6hrs
Tides	Got4.7 (ocean); IERS2003 (Earth)



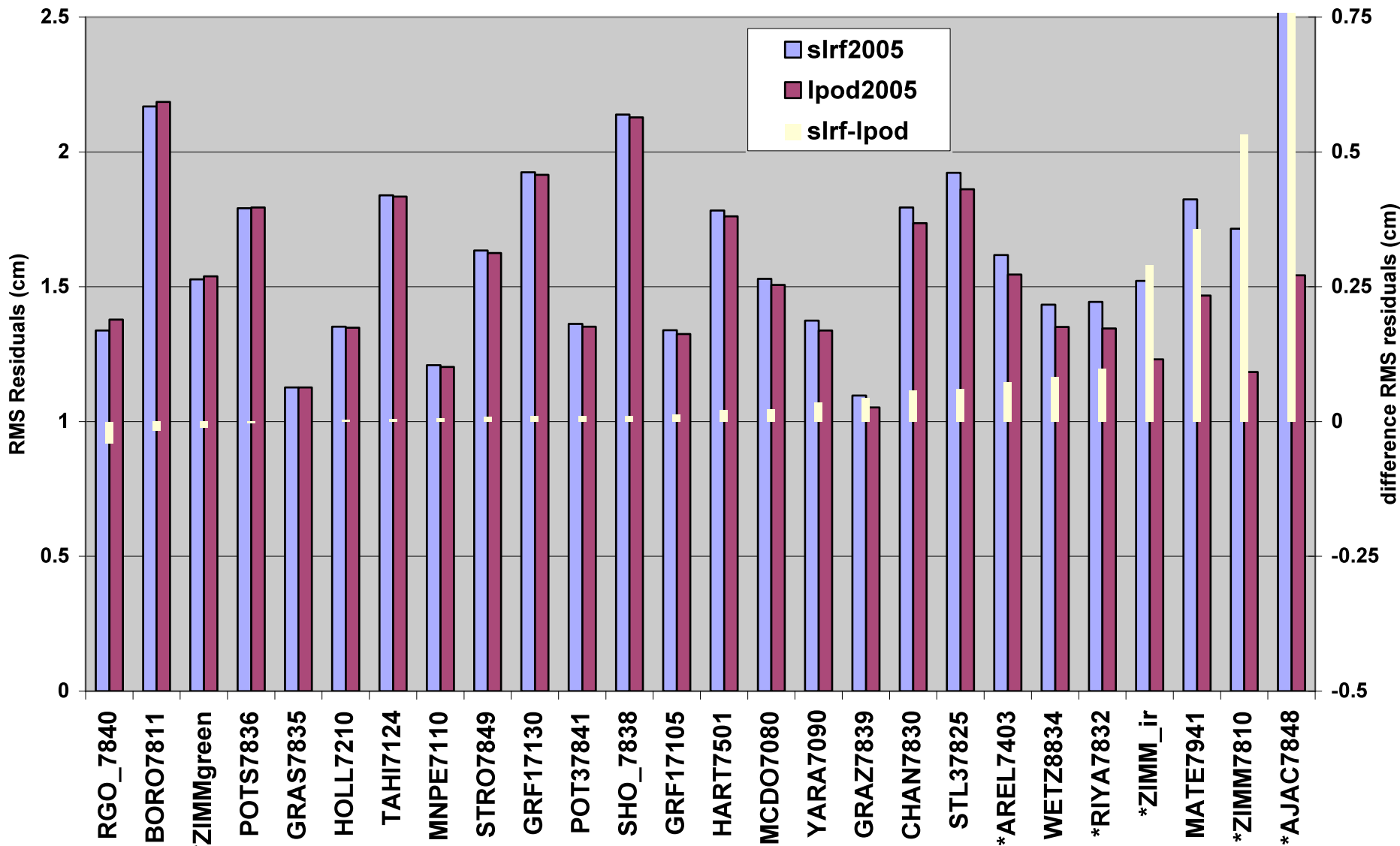
Inter-comparison span

SLR residual summary	Mean(cm)	RMS (cm)
jason1 cycles 1-237 (020115-080622)		
jal slrf2005 (slrf2005 alone)	0.254	1.255
jal lpod2005 (slrf2005 + lpod2005)	0.171	1.181
jason1 cycles 38-222 (030107-071107)		
jal lpod2005	0.178	1.188
lg1 lpod2005	0.219	1.032
lg2 lpod 2005	0.079	0.901





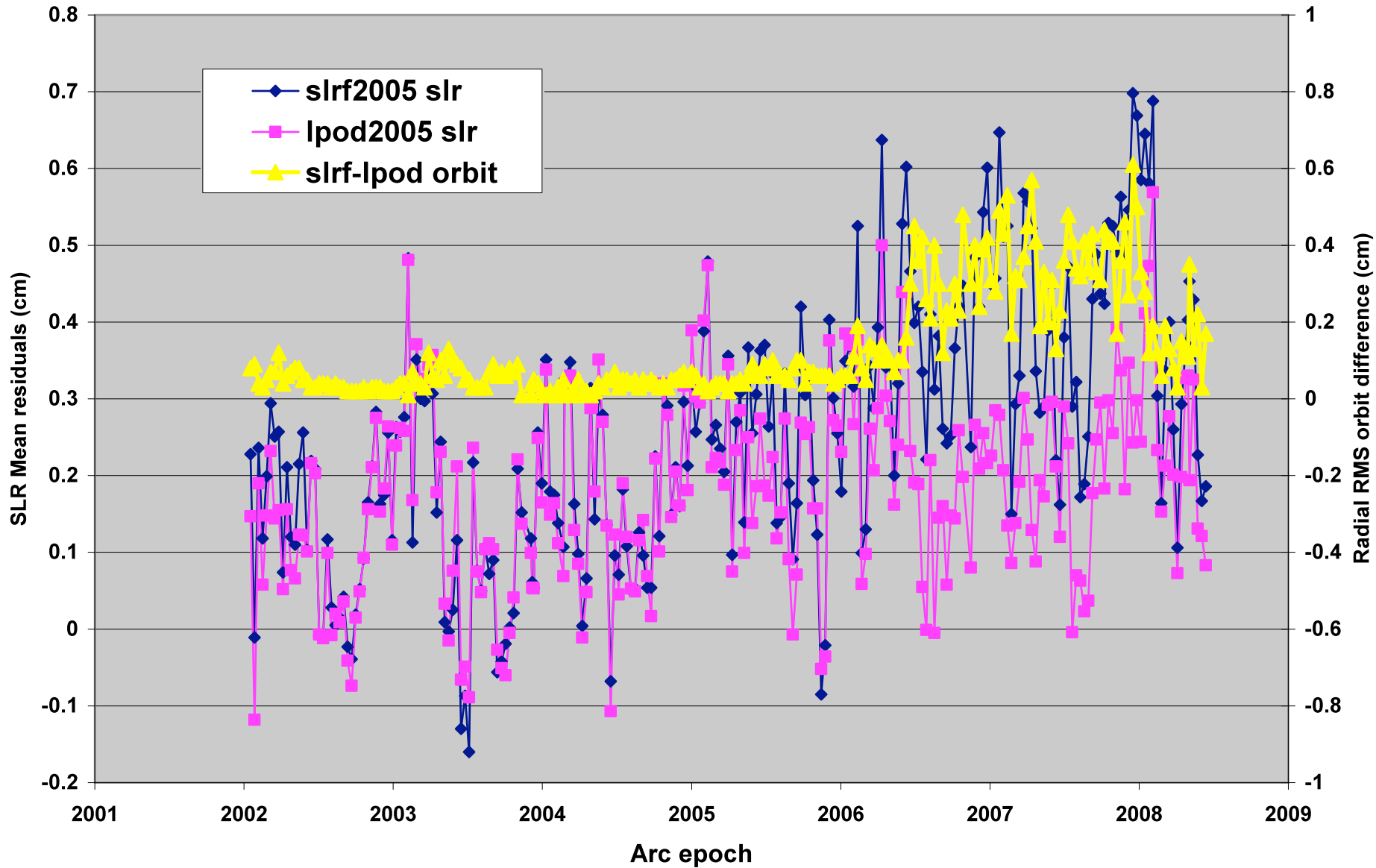
Jason1 station performance; cycles 1-237; 24 primary stations



* LPOD2005

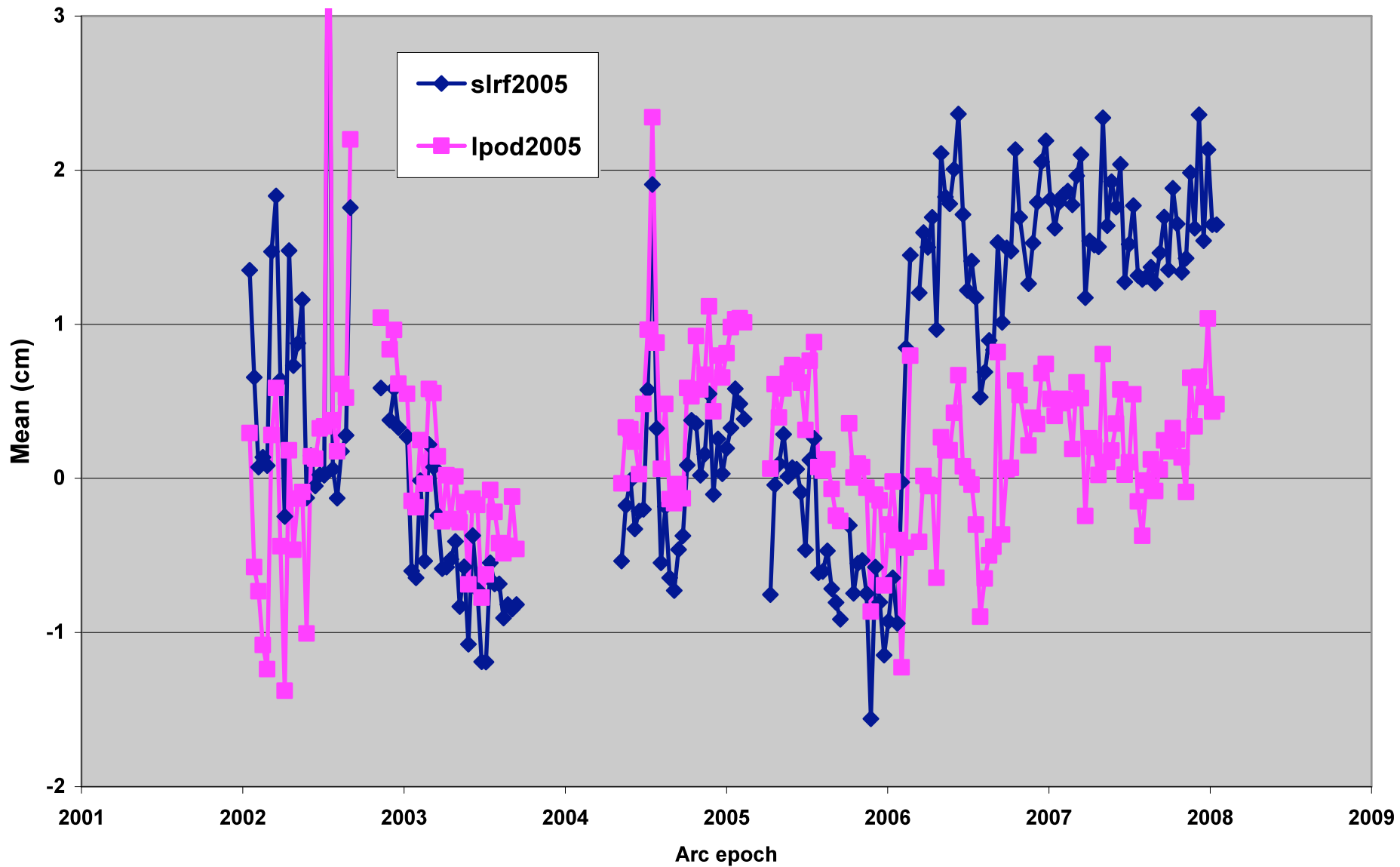


Station position/bias mis-modeling affects Jason1 orbit



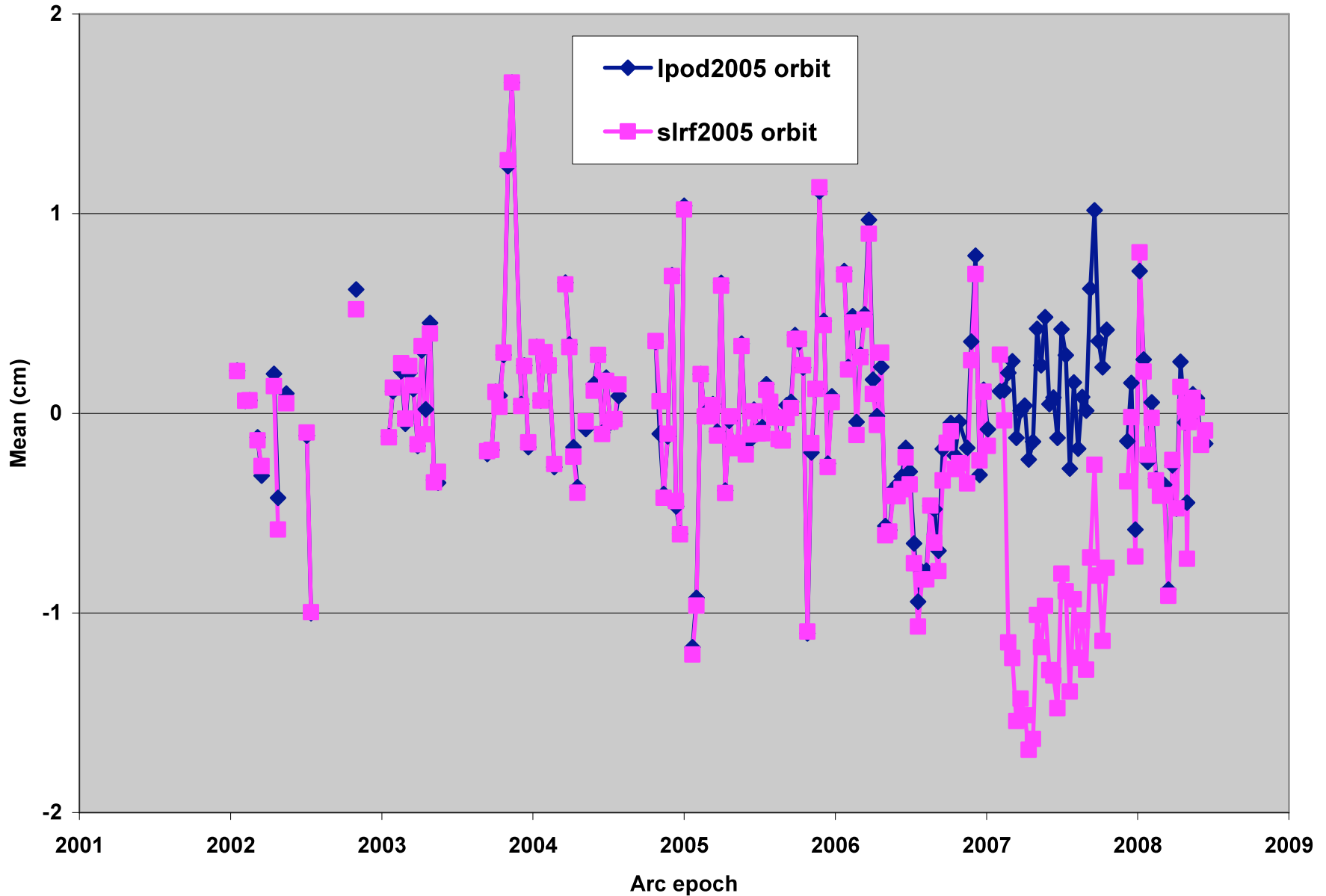


Jason1 Zimmerwald (blue) mean SLR residuals



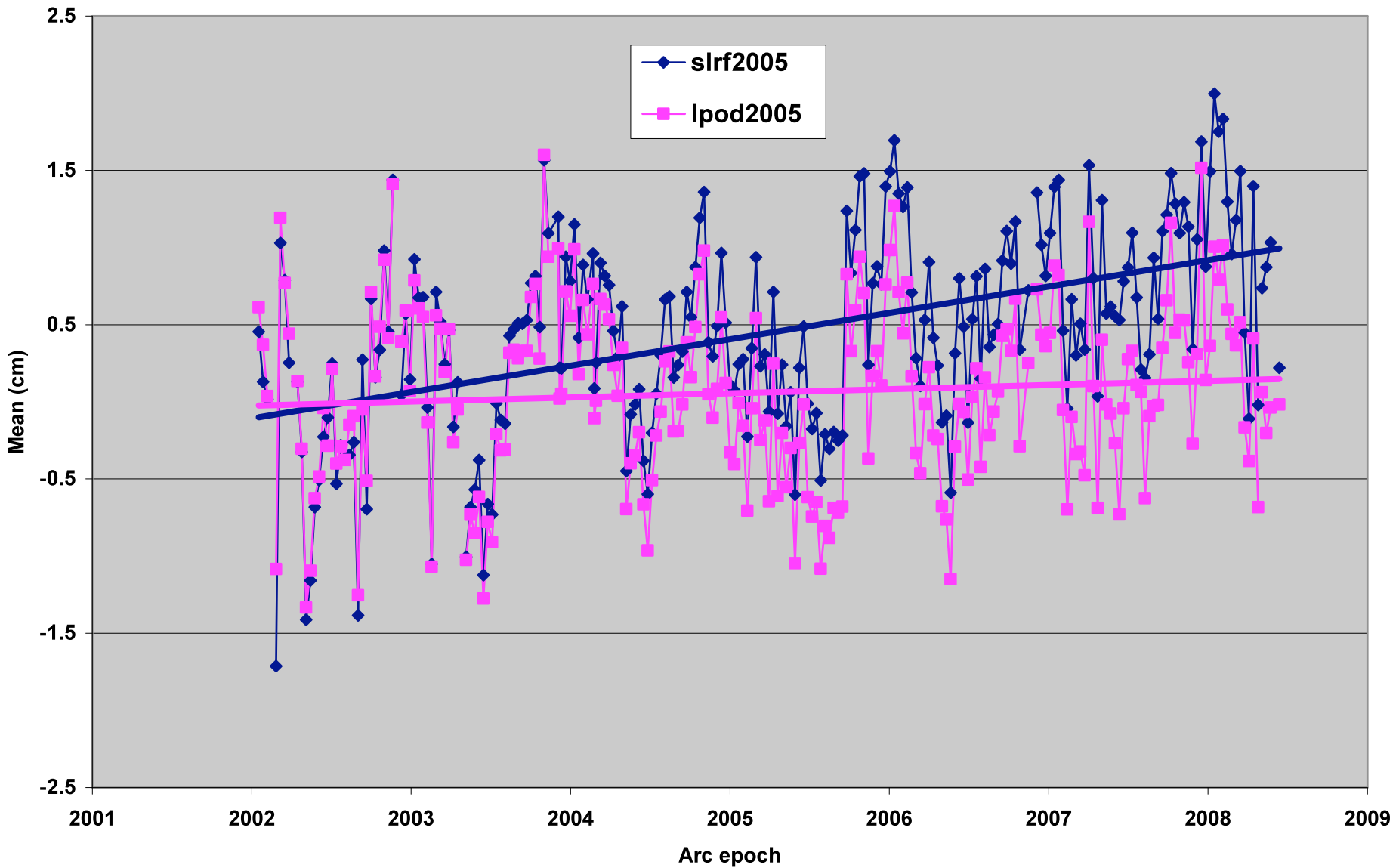


Example slrf2005-only Jason1 orbit corrupts Matera (7941) evaluation



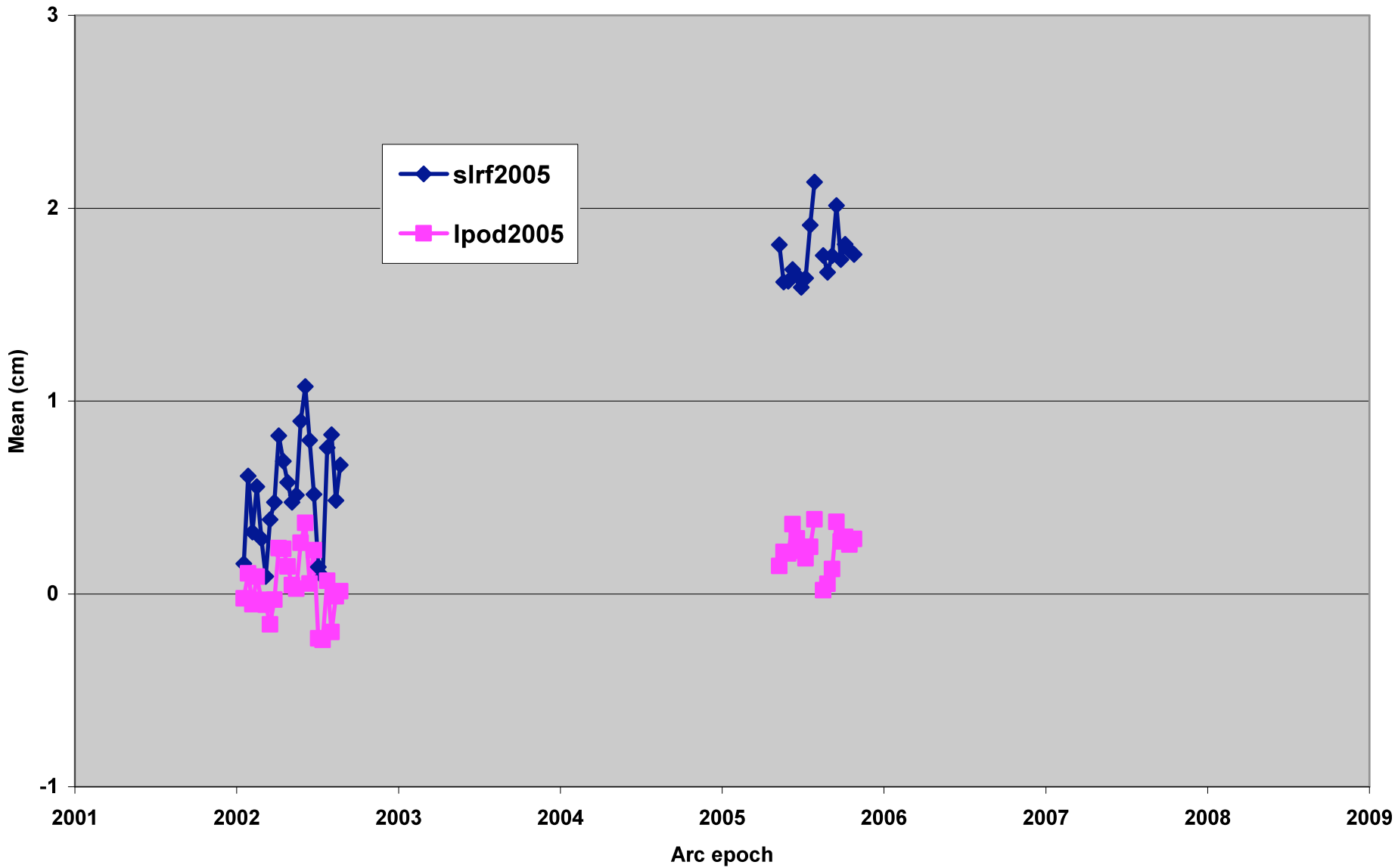


Jason1 Riyadh mean SLR residuals





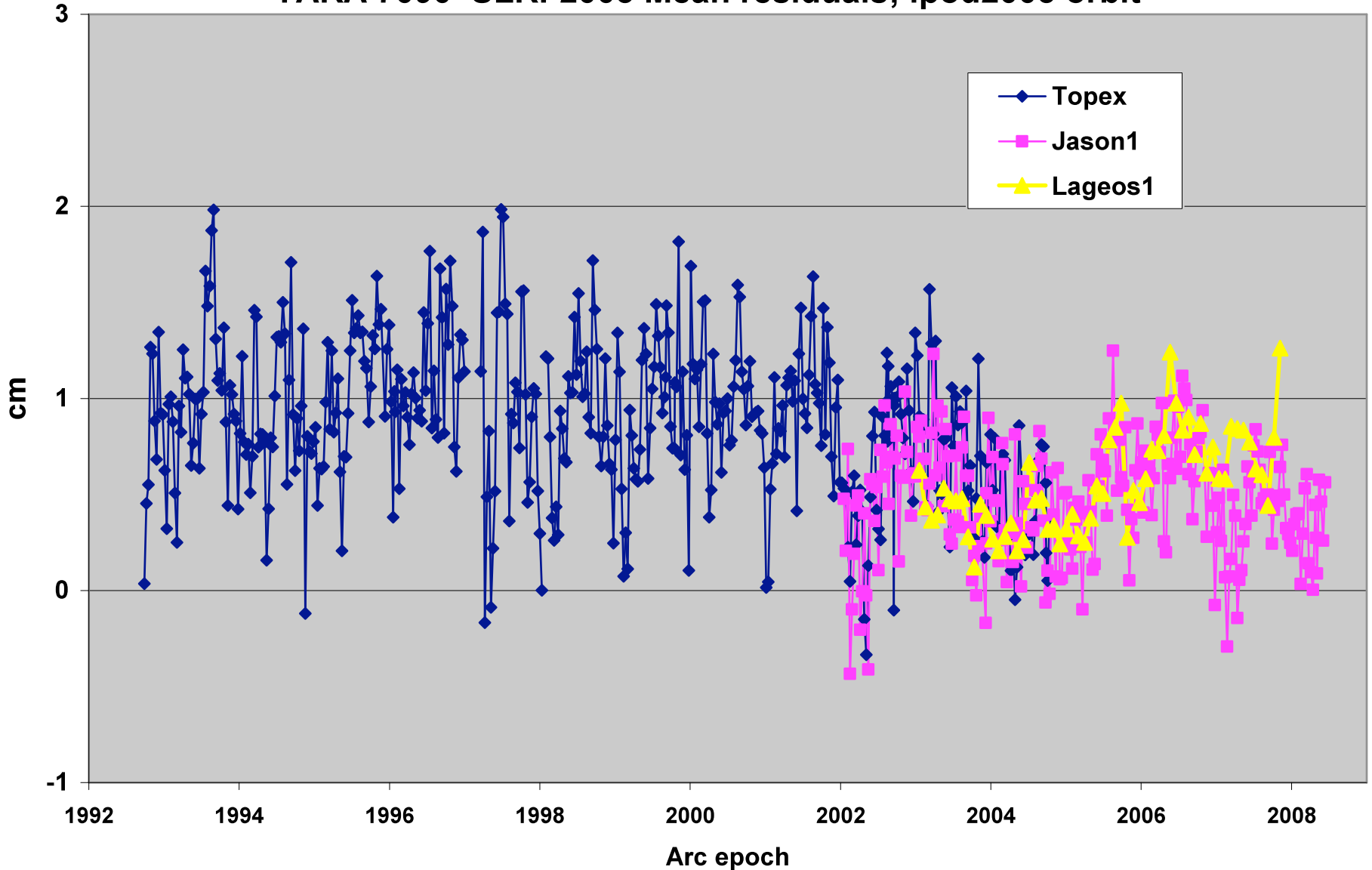
Jason1 Ajacio mean SLR residuals





Yarragadee mean SLR residuals

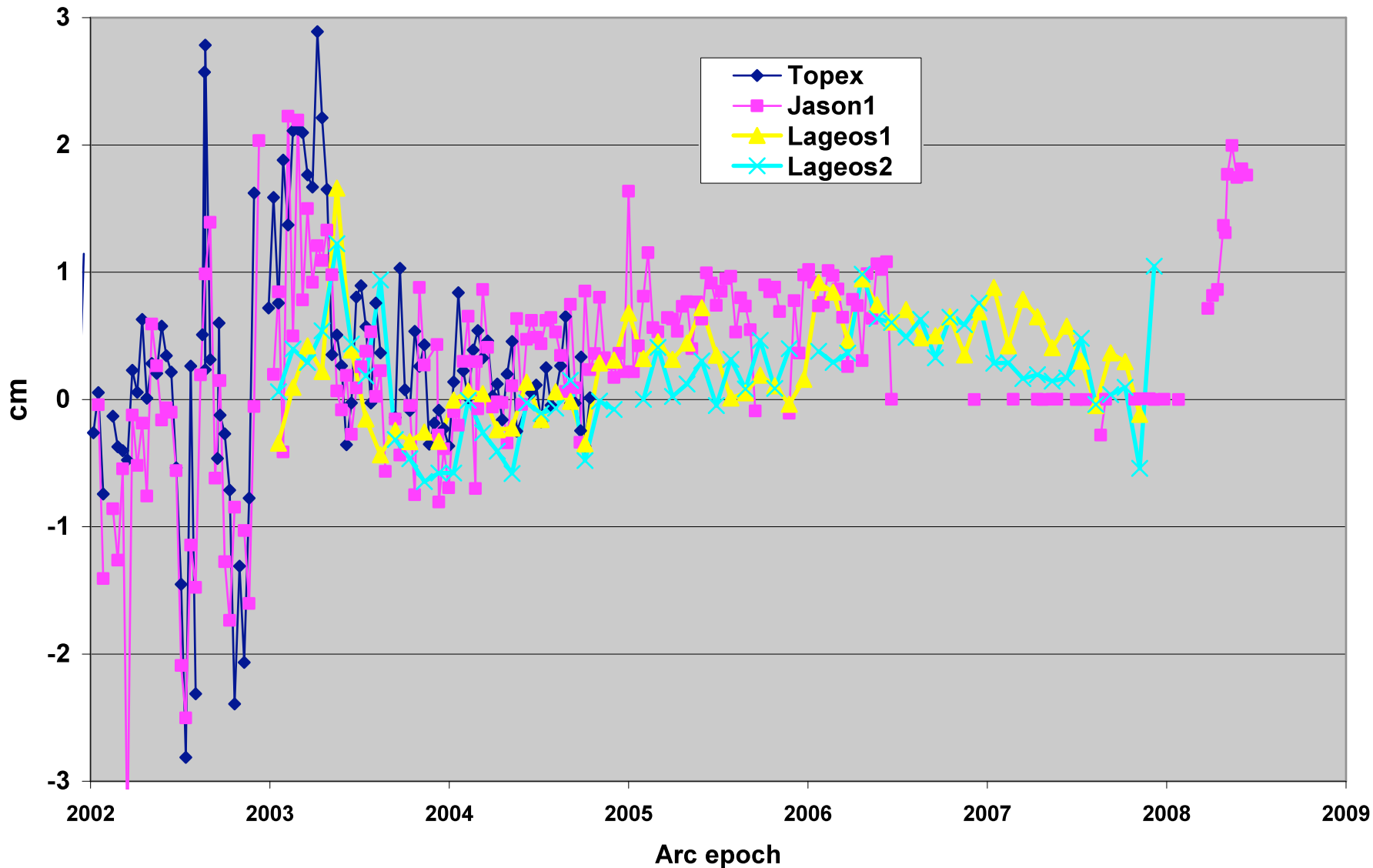
YARA 7090 SLRF2005 Mean residuals; Ipod2005 orbit





Wettzell mean SLR residuals

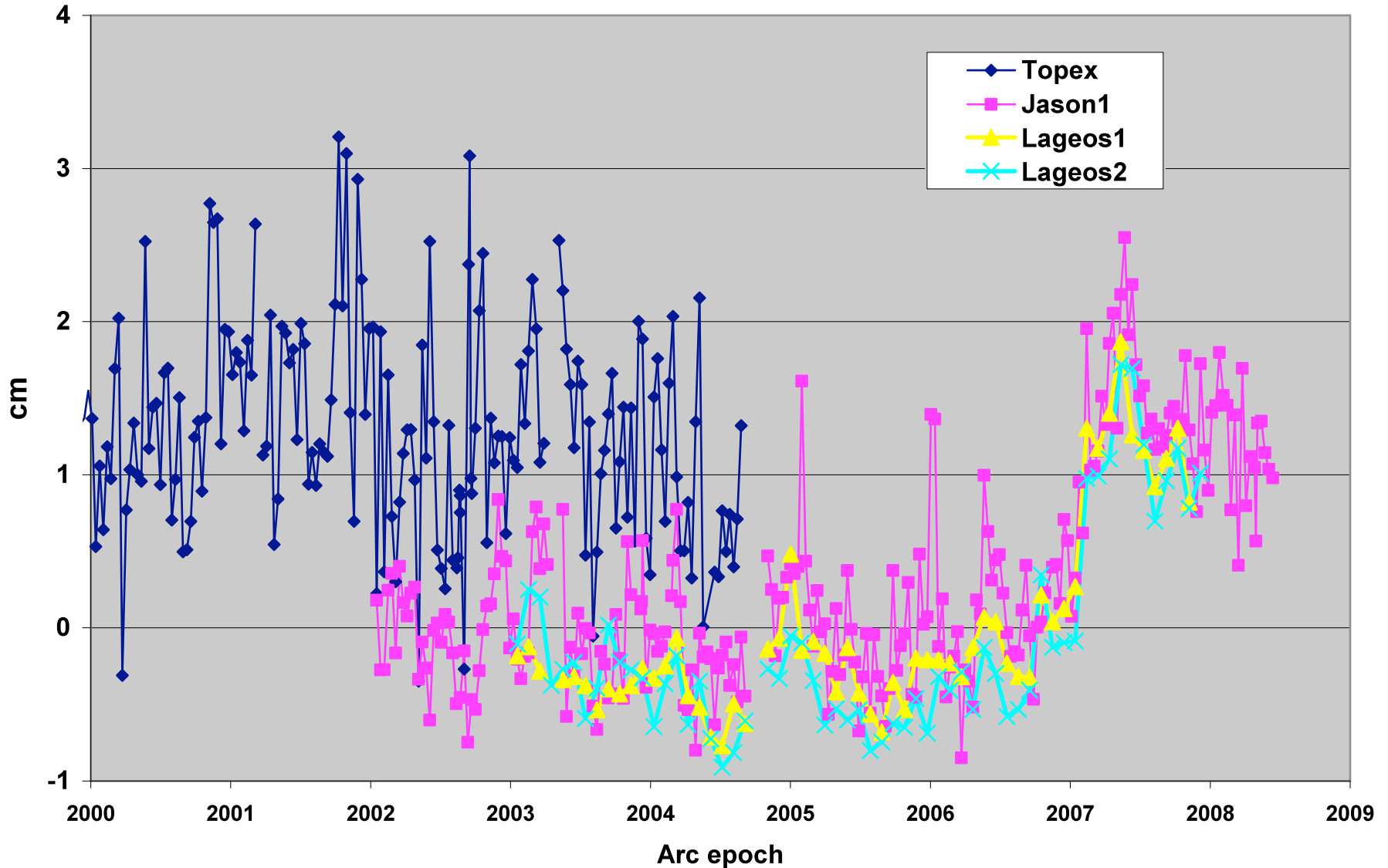
WETZ 8834 SLRF2005 Mean residuals; Ipod2005 orbit





Herstmonceux mean SLR residuals

RGO 7840 SLRF2005 Mean residuals; Ipod2005 orbit





Conclusions

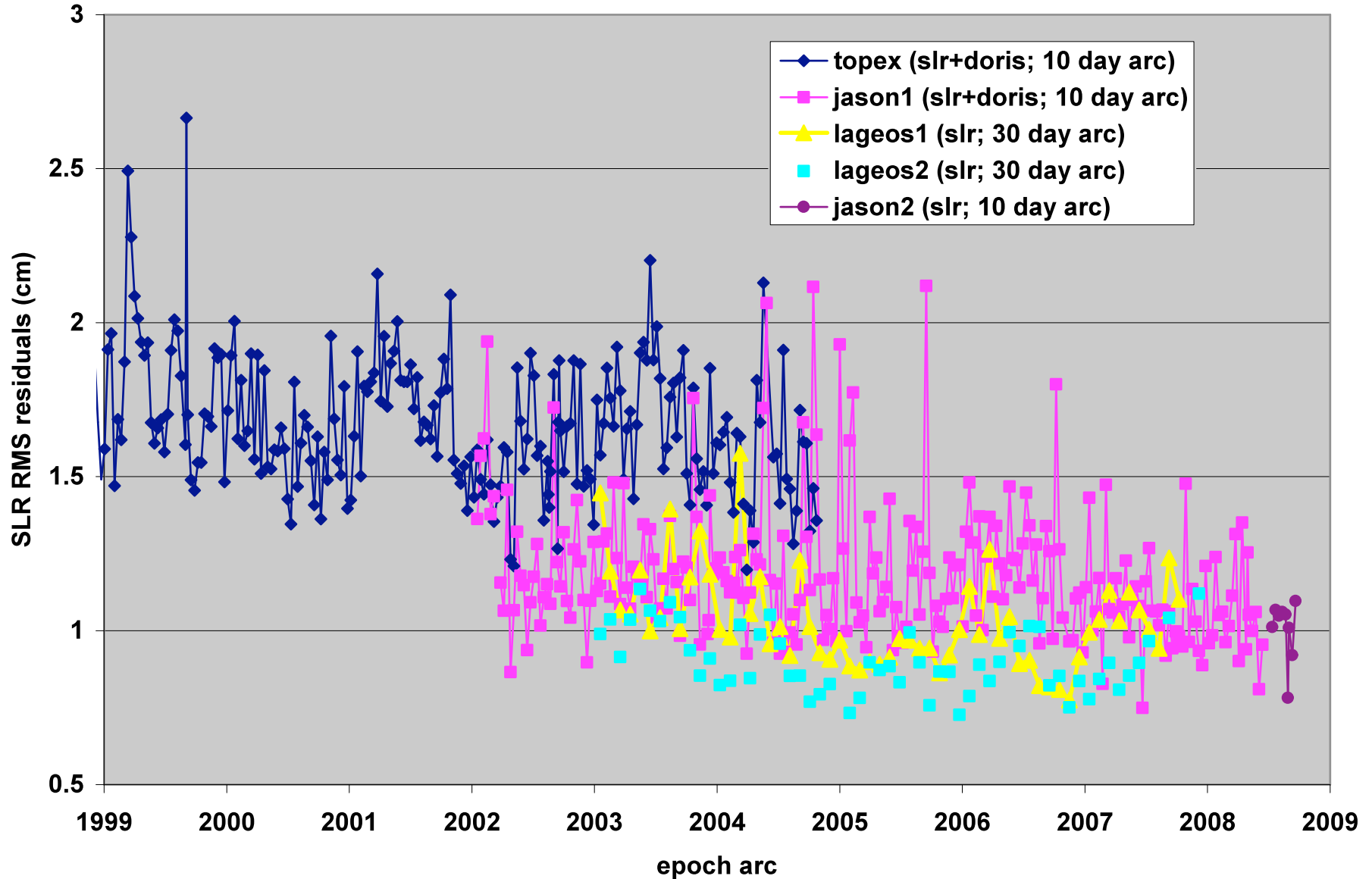
- SLR processing now at the 1-cm level for Jason and Lageos, and 1.5-cm for Topex
- At this level differentiating between station biases and position /velocity error is difficult, but critical for further improvement.
- LPOD2005 significantly improves primary stations Zimmerwald, Riyadh, and Ajacio.
- Herstmonceux shows a 1.2 cm bias beginning about Feb 12, 2007. Wettzell shows 1-cm level mean residuals and a possible trend.
- Such analysis applied to all the primary stations will be presented at the upcoming OSTST November 2008 meeting.



BACKUP

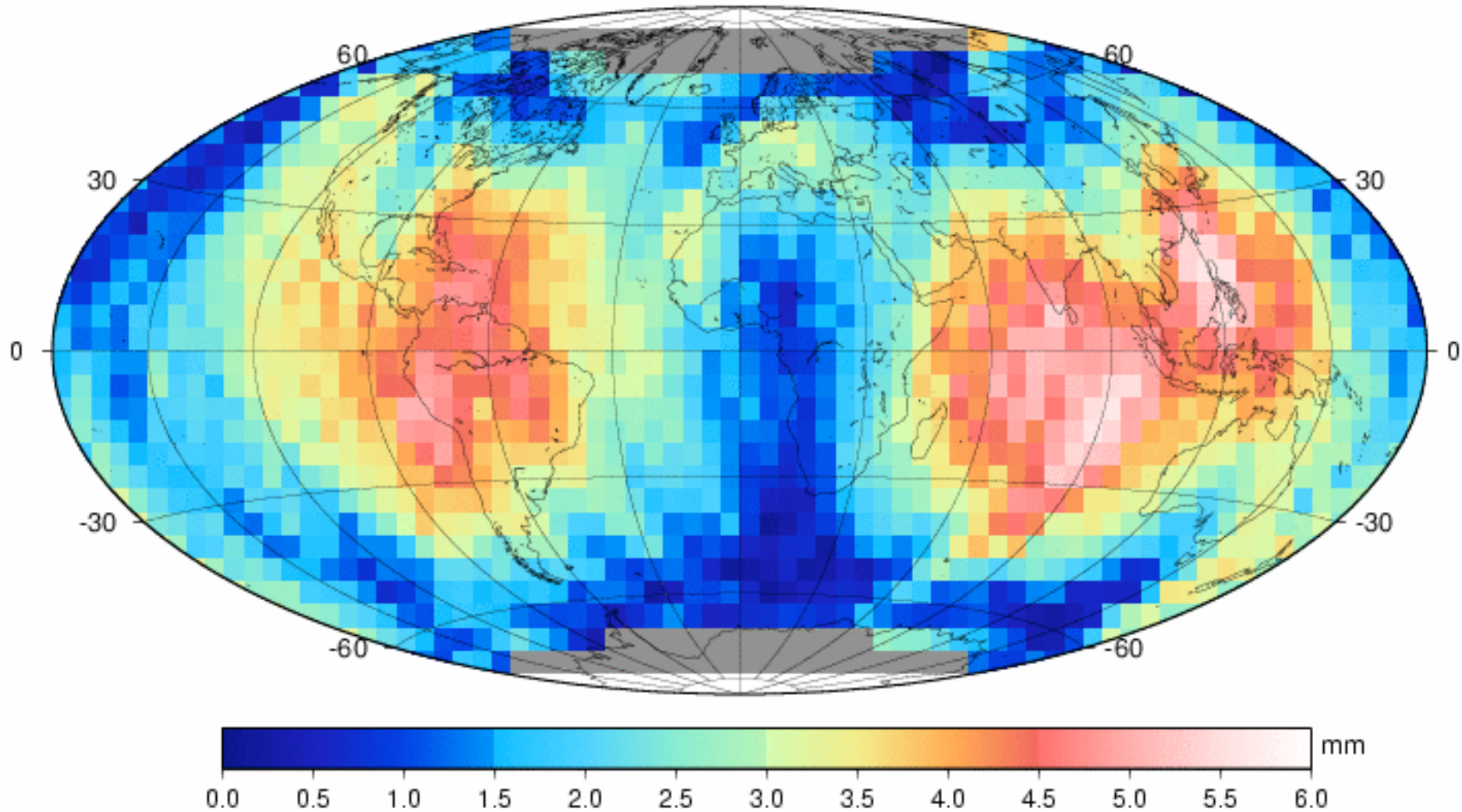


SLR processing at GSFC



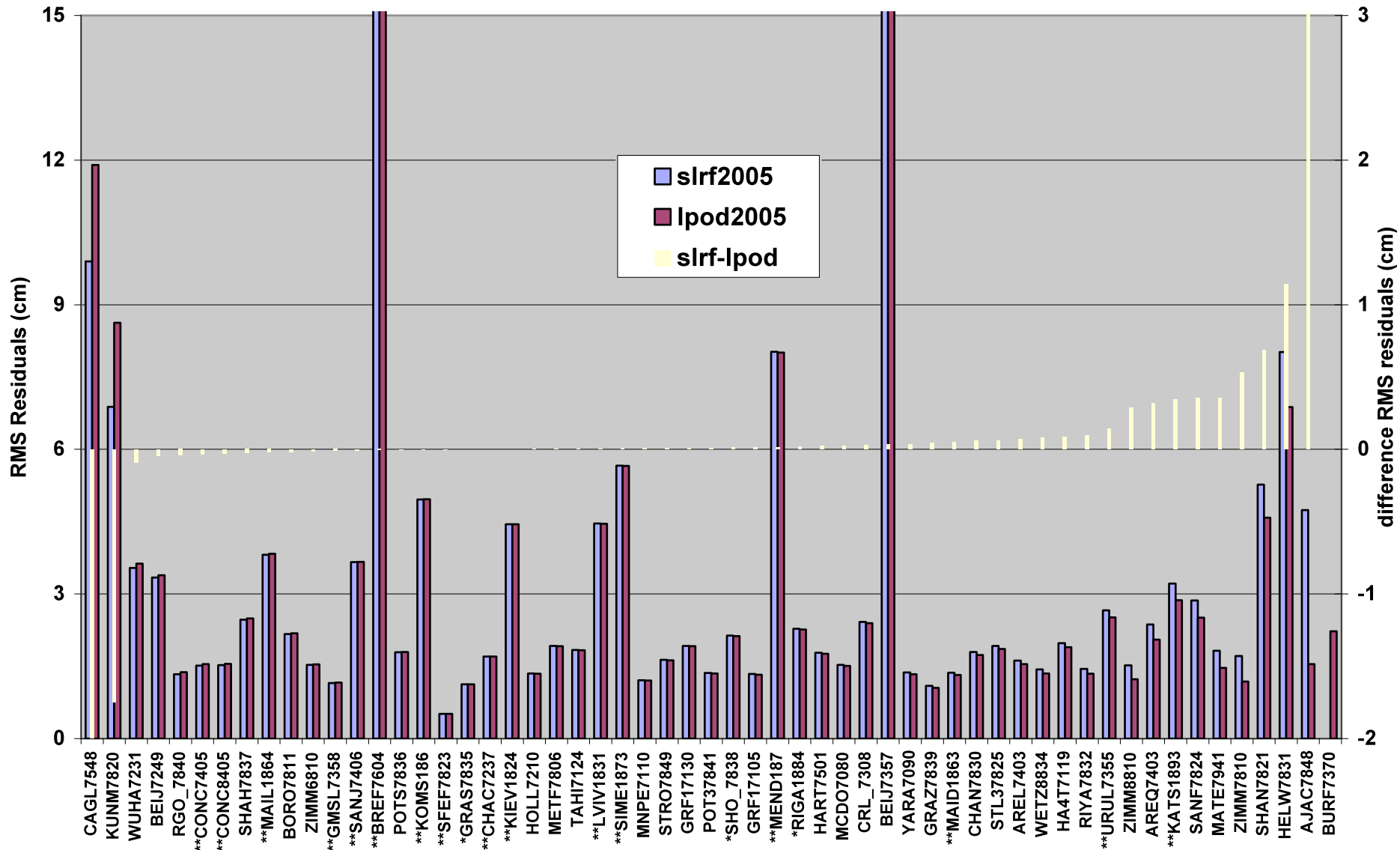


Jason1 radial 5-mm annual amplitude due to time varying gravity





Jason1 station performance; cycles 1-237; all 57 stations



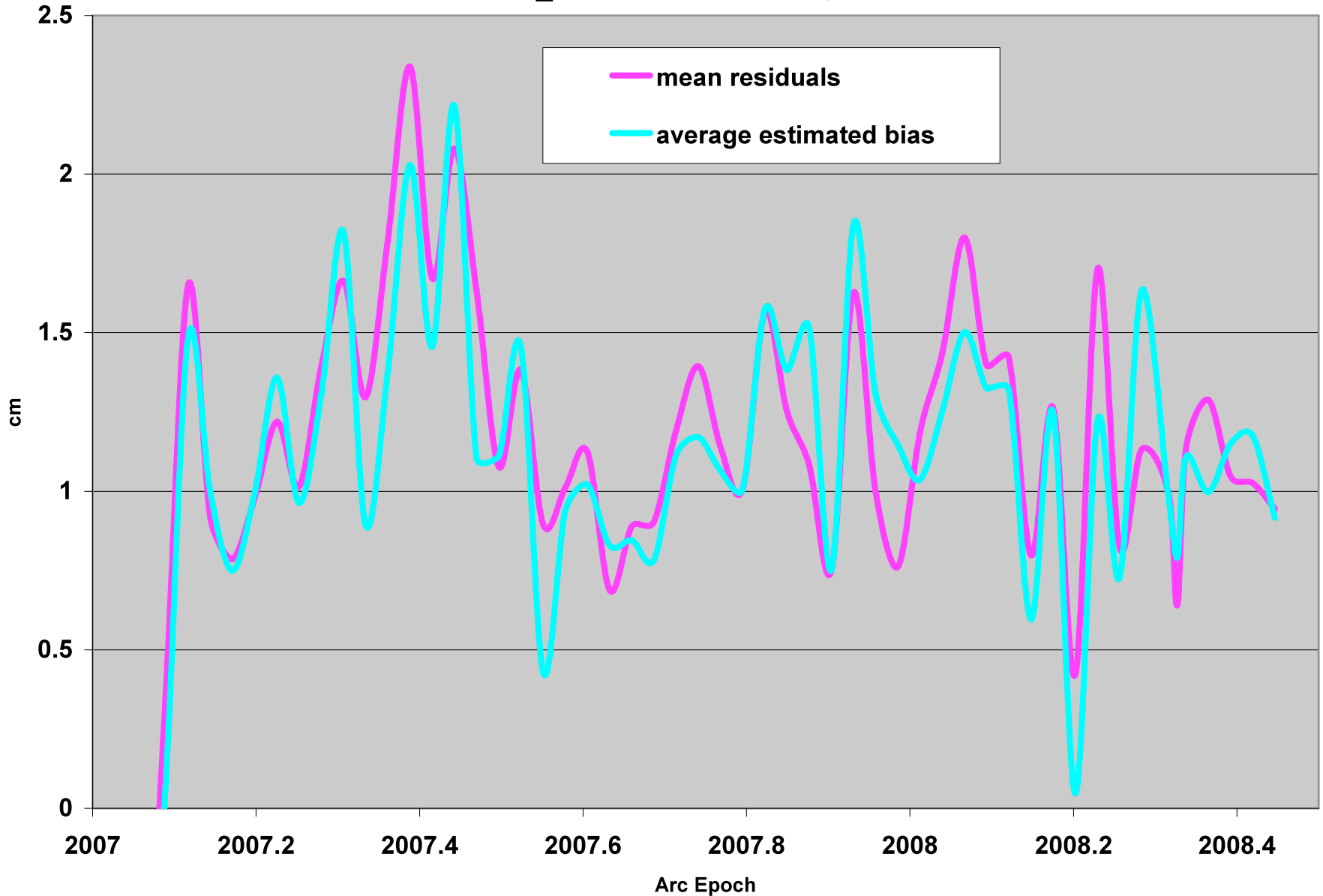
** adjust bias per pass;

* adjust bias per arc



Mean SLR residuals correspond to range bias

Jason1 RGO_7840 SLR residuals; slrf2005 orbit





Goddard SLRF2005 mean residuals

GRF 7105 Mean SLR residuals

