



14/06/2022

Doris differential processing

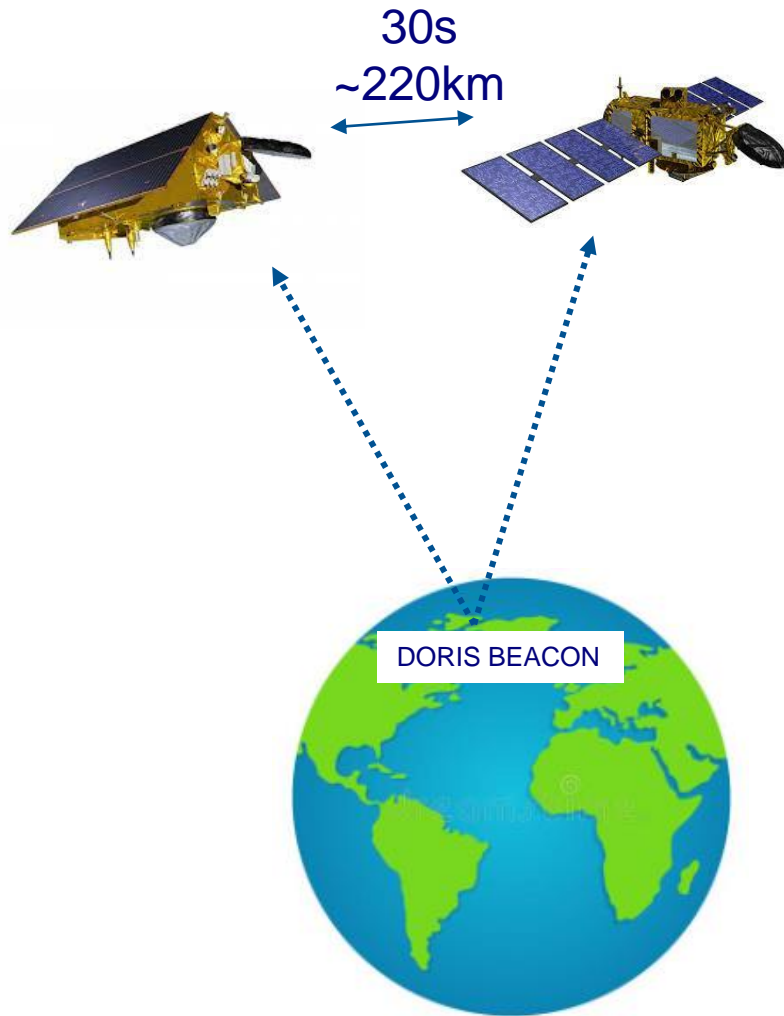
First results on the Sentinel 6A – JASON3 tandem phase

IDS AWG MEETING

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For both type of orbits, dynamic and reduced dynamic, a set of parameters associated to a DORIS beacon is adjusted:

Global / by pass	Beacon parameter	Comments
Global	Tropospheric gradient (North and East)	unit m, geometric propagation
	Vertical position station	unit m, coordinate correction, could have correlation with ZTD ?
By Pass	ZTD : vertical tropospheric delay	unit m, geometric propagation, could have correlation with vertical position station?
	Frequency	unit m/s, time propagation, could absorb on board OUS model remaining error ?
	Frequency drift	unit m/s ² , time propagation, for SAA only, to absorb local on board OUS model remaining error



Jason3 and Sentinel-6A satellites in tandem phase, separated by 30s

If we suppose sufficient overlap of measurements for each beacon pass , could we take benefits to commonly adjust :

ZTD parameter ?

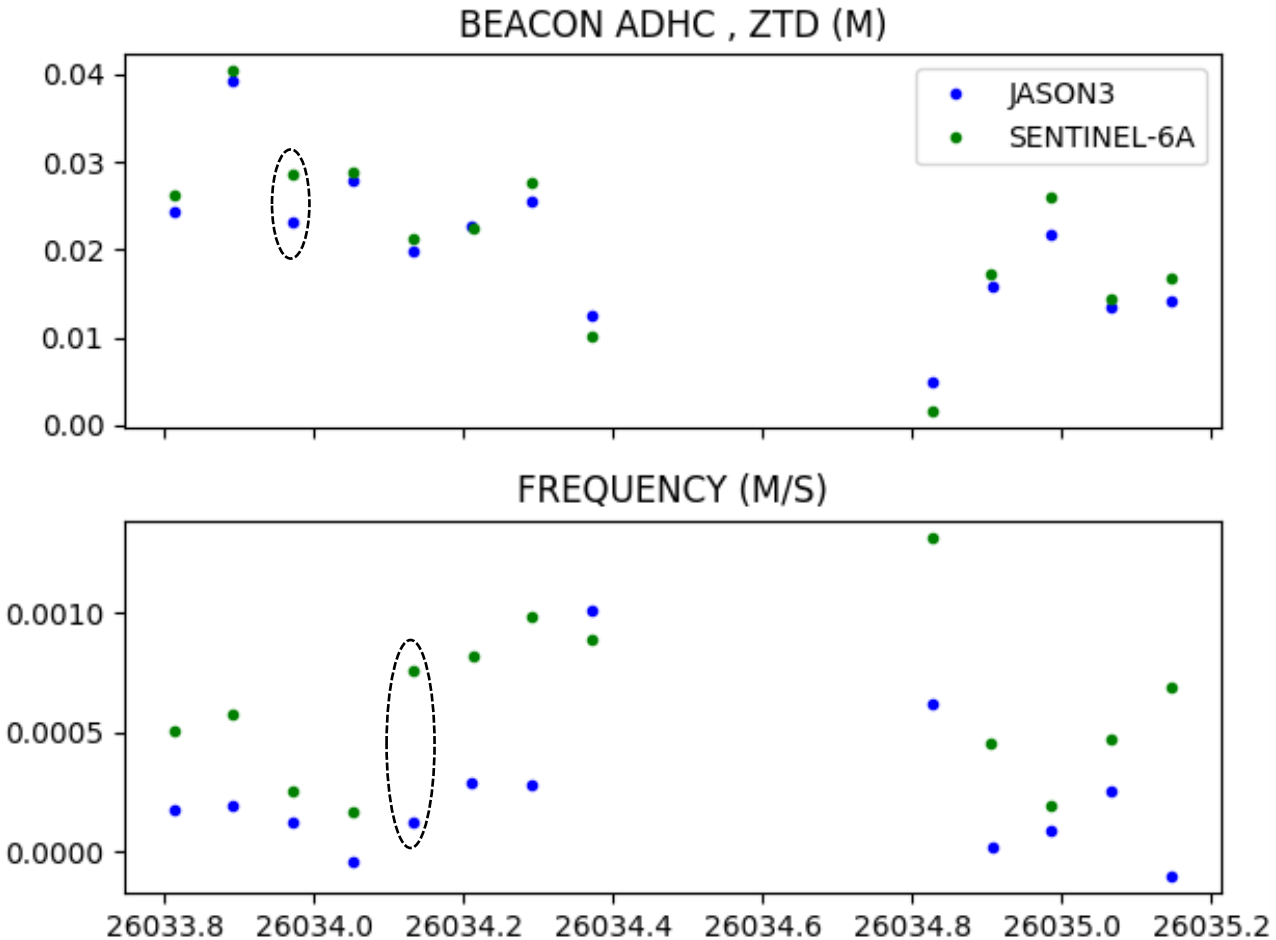
vertical beacon position and/or tropospheric gradient ?

frequency ? and frequency drift ? (specific to each satellite)

This common adjustment will improved :

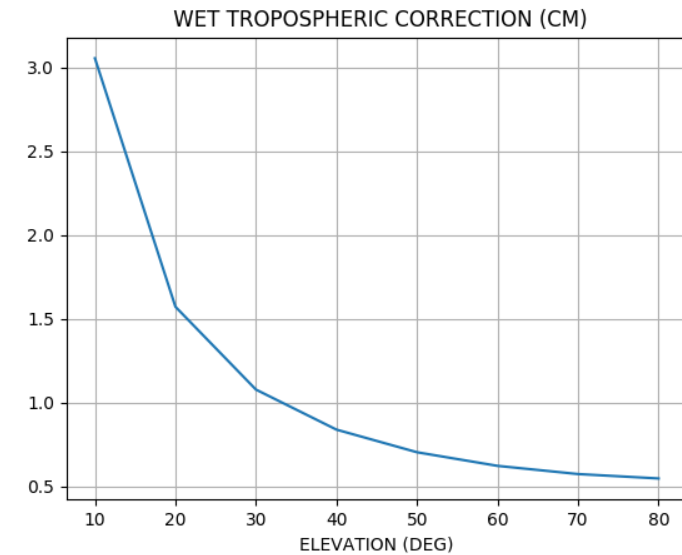
parameter covariance ? ($\sim 1/\sqrt{2}$) in case of same number of measurement for both satellite ?

orbit performance ? could have an impact some mm ?



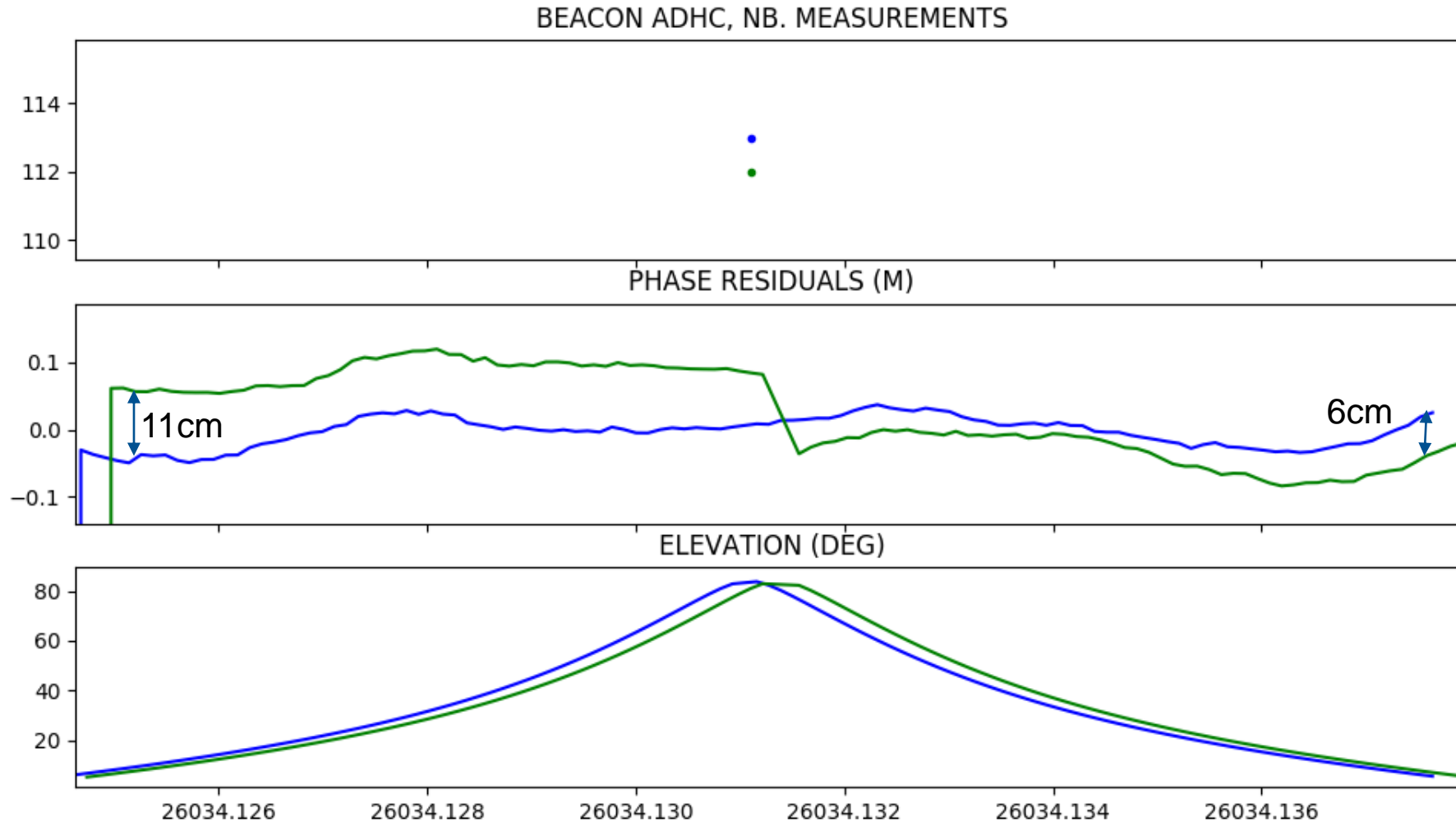
Example on ADHC ANTARCTICA / TERRE-ADELIE (not a 'SAA BEACON')

3rd pass , ZTD gap= 5.4mm, using mapping function → ∇ cm of difference on phase measurement at low elevation :



5th pass, frequency gap = 6.3×10^{-4} m/s on 15mn duration → bias ~ 60cm on phase measurement at the end of the pass (very high!, should be seen on residuals...), common adjustment of frequency should give mean value, so a final bias on ~30cm (15cm at the beginning/end of pass)

OBSERVATIONS ON ADJUSTED PARAMETERS



*Very significant frequency gap on 5th pass : to be associated to the gap of ~10cm on the phase residuals?
absorb by another adjusted parameter ?*

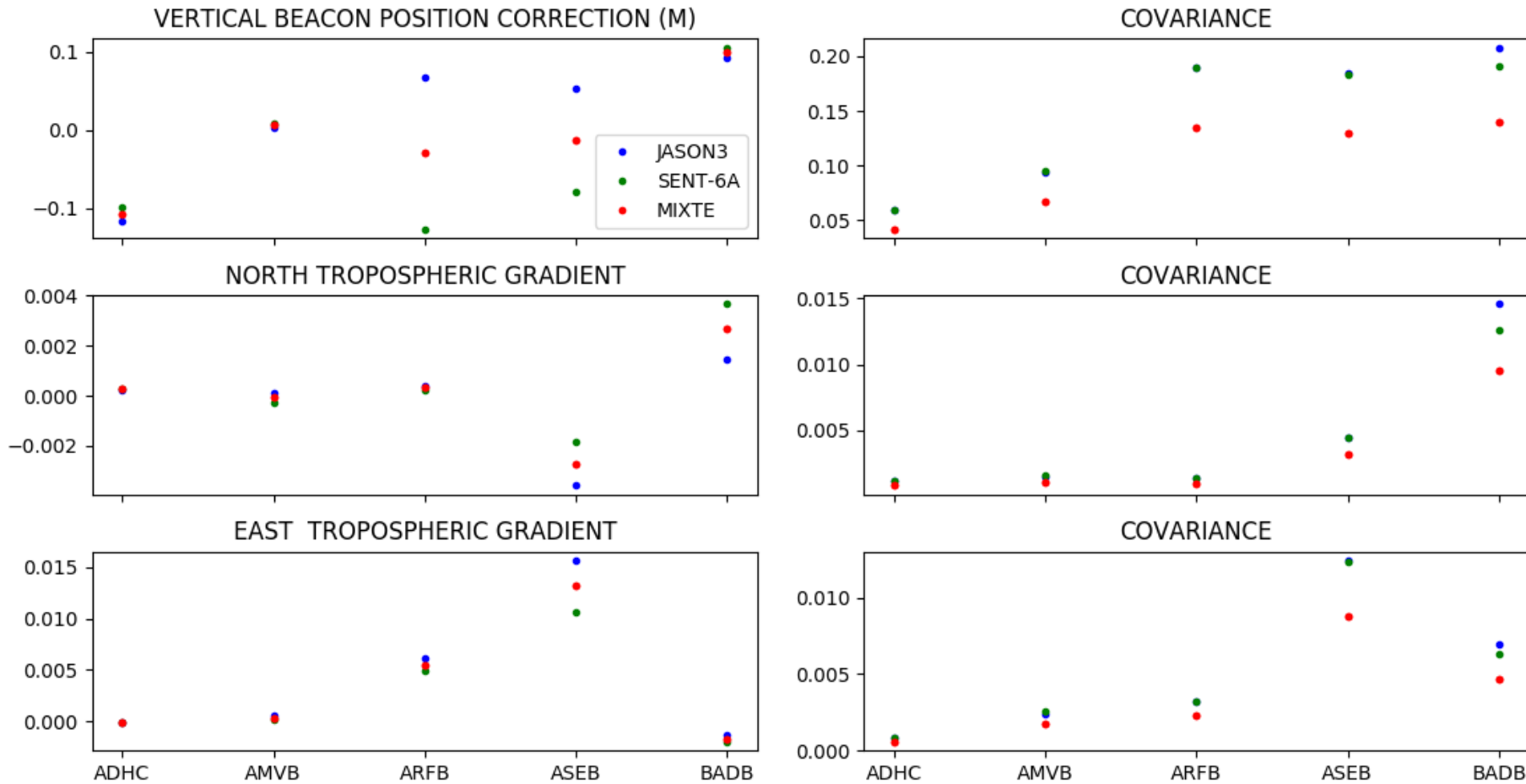
COMBINATION PARAMETERS

Combined parameters are (global) vertical position and tropospheric gradients, (pass) ZTD

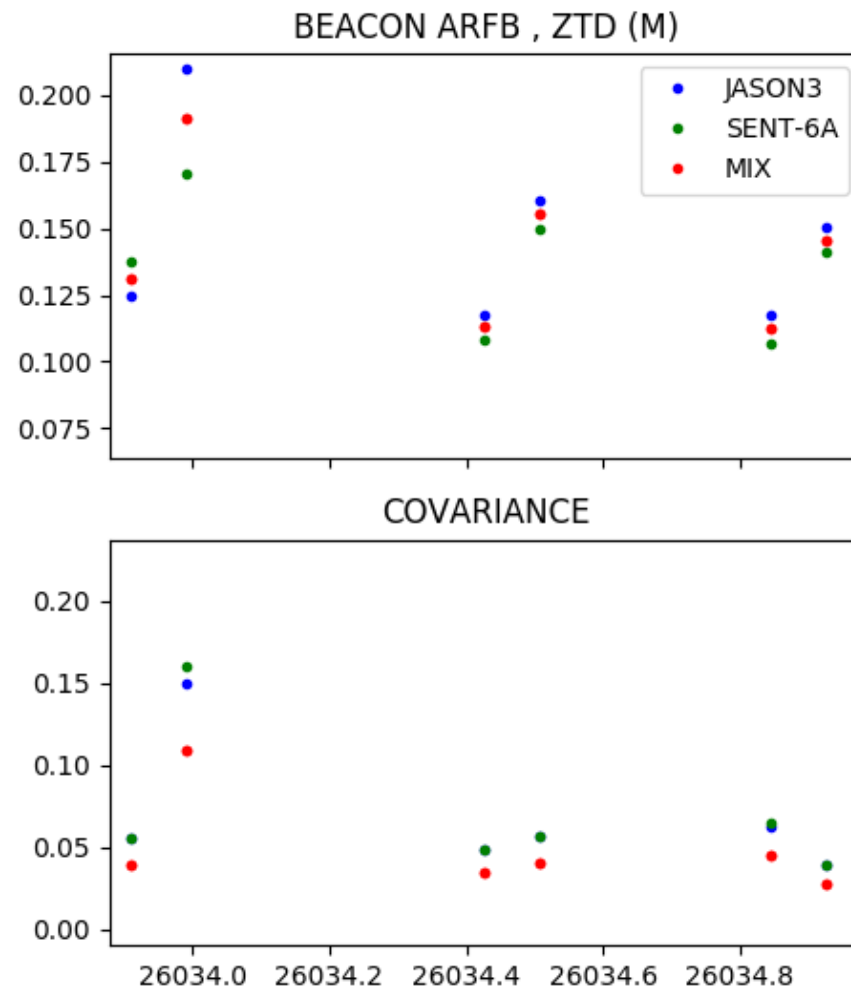
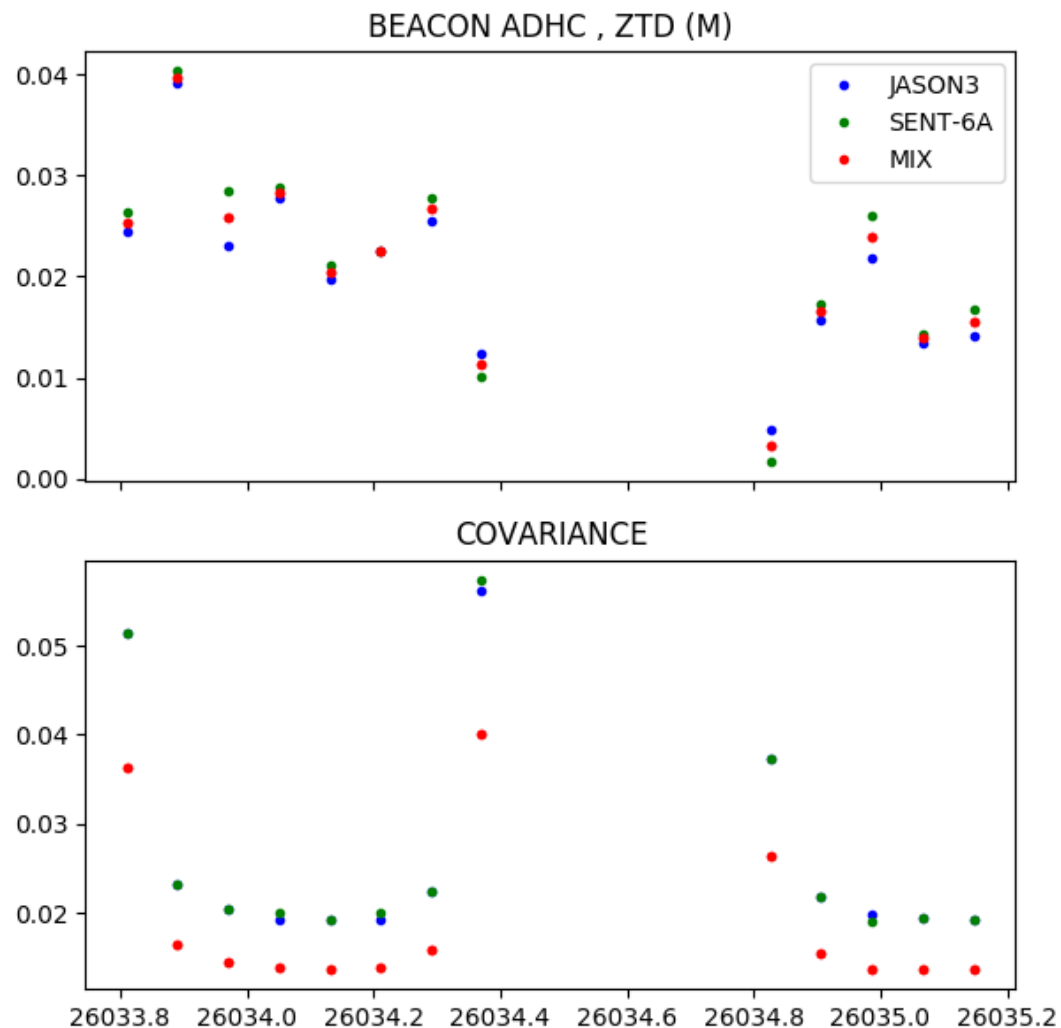
As expected for global combined parameters :

Adjusted values are kind of barycenter of reference values

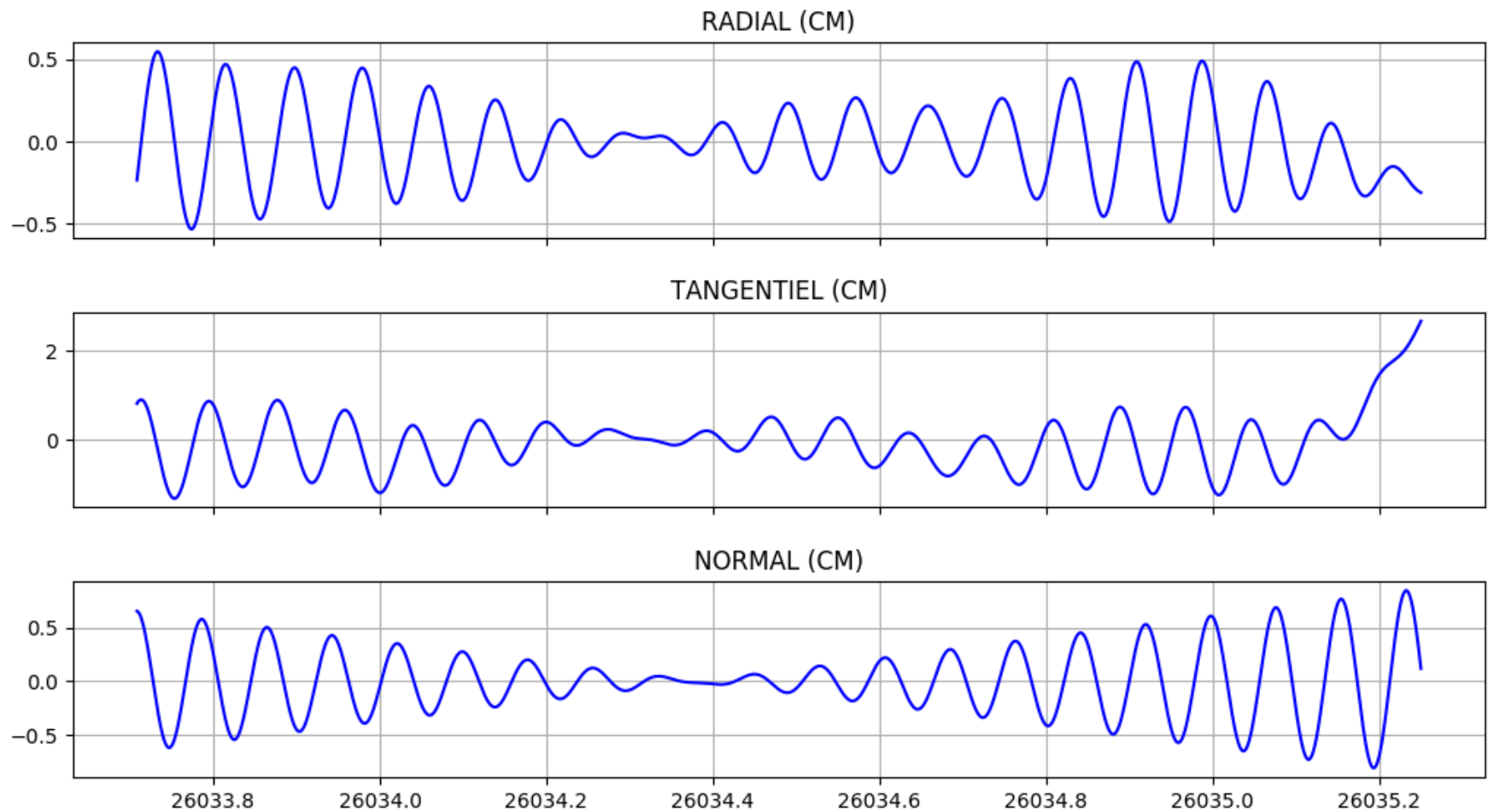
Covariance values are improved for combine parameters



Same observation for combined ZTD



Impact on Sentinel-6A orbit sub-centimetric, with slight degradation of SLR RMS (1.69cm → 1.75cm)



First results need to be consolidated for
OSTST (IDS WORKSHOP),

to be continued ...

Thanks for your attention