Sentinel Processing Prototype

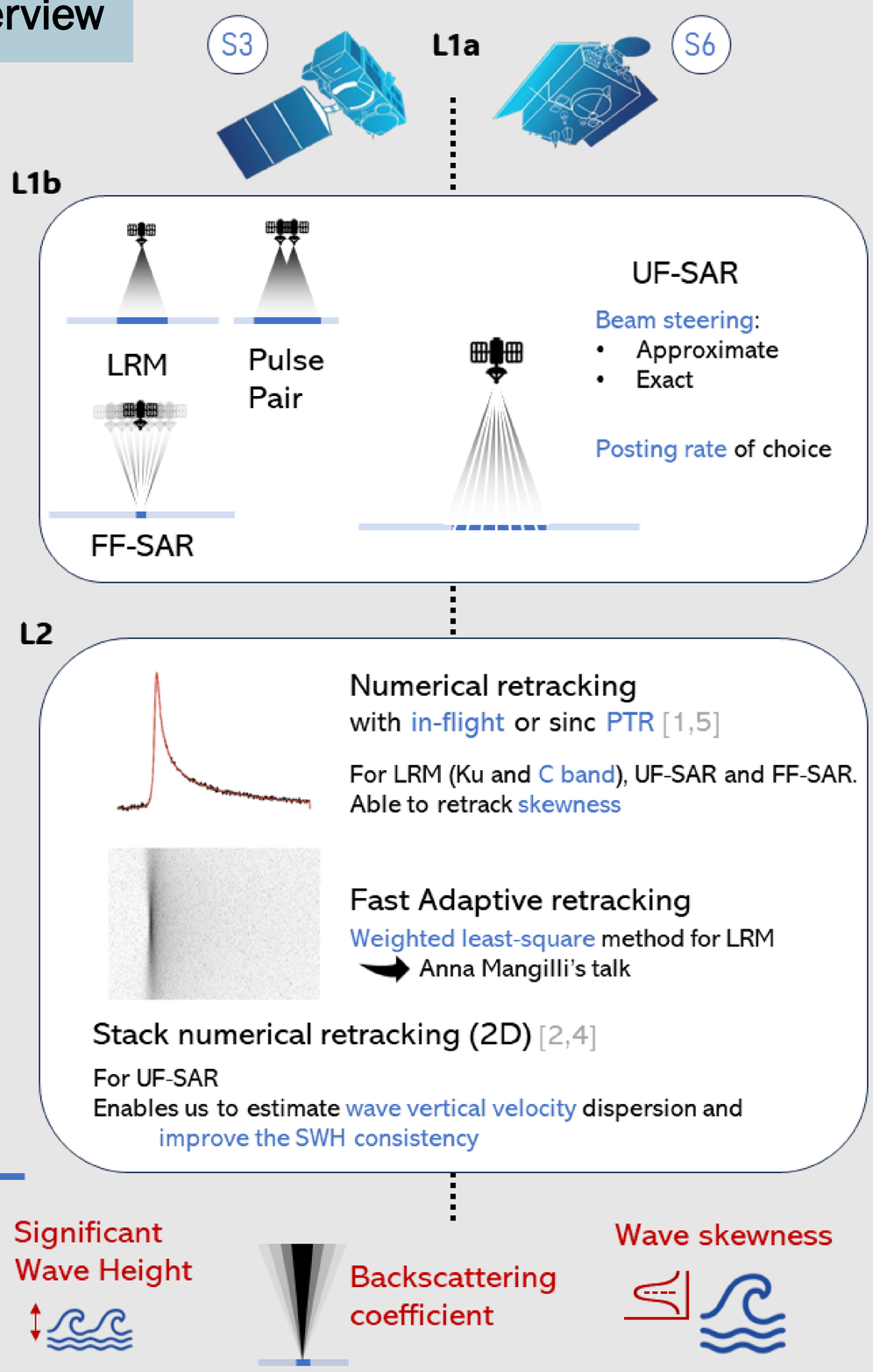
New processing capabilities in the SPP chain for improving the Sentinel-3 and Sentinel-6 altimetric parameter estimates

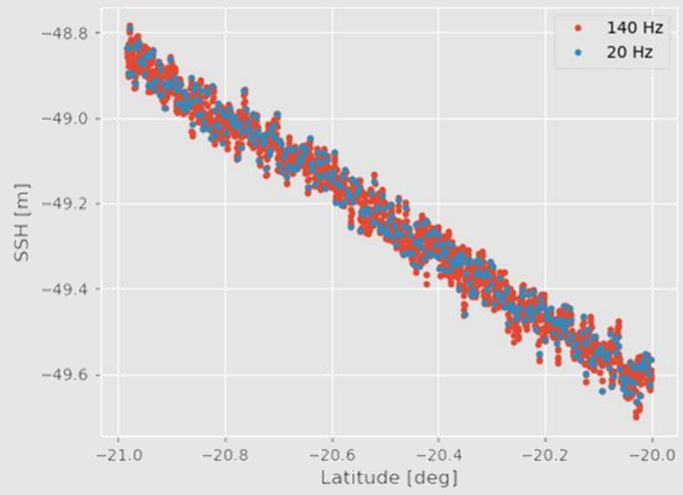
L. Rodet[1] (lrodet@groupcls.com), S. Dinardo[1,2], S. Amraoui[1], T. Moreau[1], A. Mangilli[1], M. Alves[1], C. .Maraldi[3], F. Boy[3], N. Picot[3]

[1]CLS, [2]EUMETSAT, [3]CNES

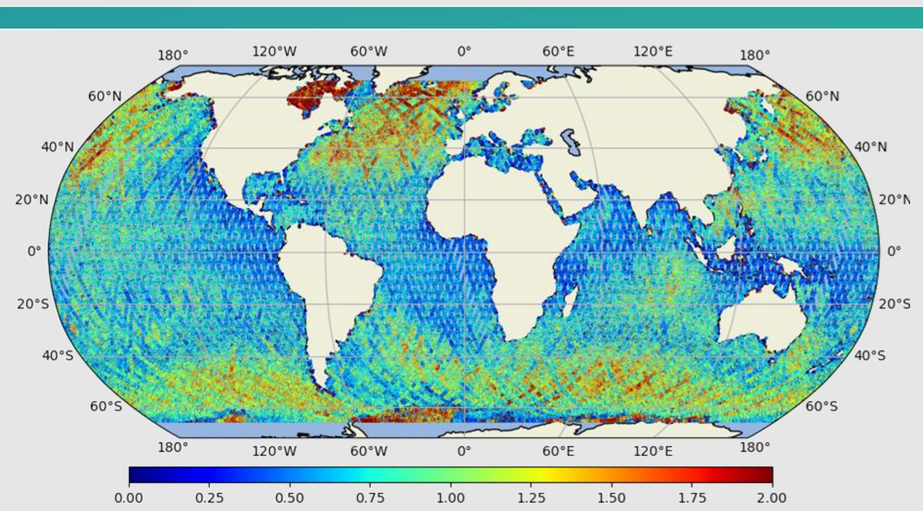
The Sentinel Processing Prototype (SPP) is a multi-chain (LRM, UF-SAR, FF-SAR, Pulse-Pair, Transponder) processor in which the novel algorithms developed in the CNES/CLS R&D activities are implemented. It is used to validate different thematical applications, in view of promoting them for an implementation in the operational ground segment.
Initially designed to handle Sentinel-6 M-F (S6) data, it can now process Sentinel-3A/B (S3) data using the same algorithms. We present here an overview of the full scope of SPP, with some studies that highlight recently implemented capabilities.

SPP overview



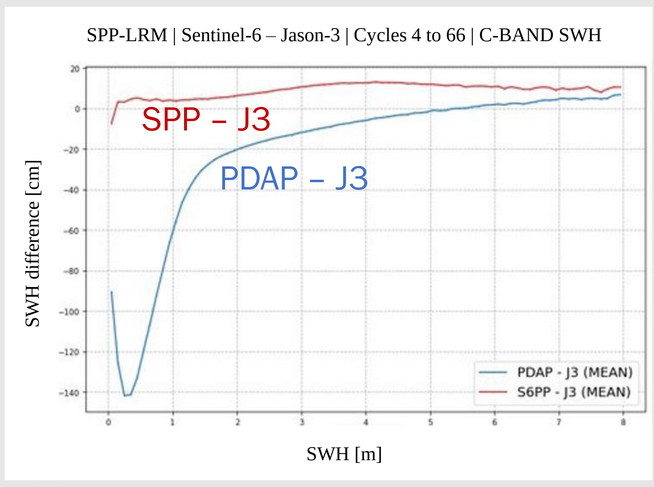


Increasing the posting rate to 140 Hz could help us properly sample swell-induced Seal Level Anomaly signal [3]. Some solutions are currently analyzed to go back to classical 20-Hz sampling while ensuring the decorrelation between echoes [6].



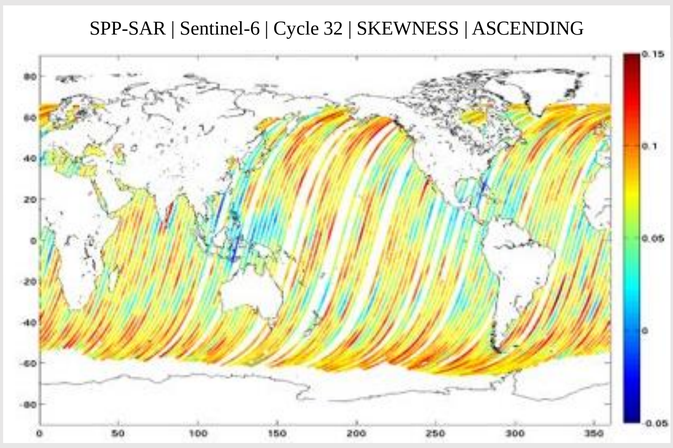
By retracking the full 2D stack [2] instead of the 1D multilook, we can correct the HR bias in Significant Wave Height and access the vertical wave velocity dispersion [4], which is related to fundamental properties of the wave spectrum.

SPP gives a very good match with Jason-3 (J3) data (better than PDAP) for Sentinel-6 C-band processing.



Recommendations were made to improve the operational chain, for a better dual-frequency consistency.

The estimation of the wave skewness is found to be of high interest for end-users. This parameter exhibits high geographical variability closely linked with sea state. Differences are observed between HR and LR processing that raise the need to compute a dedicated Sea State Bias (SSB) correction for each altimeter mode.



References

[1] Buchhaupt, C et al. (2018) https://doi.org/10.1016/j.asr.2017.11.039
[2] Buchhaupt C. et al. (2020) https://doi.org/10.1016/j.asr.2020.07.015
[3] Rieu P. et al. (2020) https://doi.org/10.1016/j.asr.2020.09.037
[4] Buchhaupt C. et al. (2023) https://doi.org/10.1016/j.asr.2022.12.034
[5] Dinardo, S. et al. (2023) https://doi.org/10.1016/j.asr.2023.07.030
[6] Ehlers, F. et al. (2023) https://doi.org/10.1016/j.asr.2023.02.043

CLS
COLLECTE LOCALISATION SATELLITES

cnes