



SWOT Science Team Meeting 2023 - 19-22 September 2023

Normandie CalVal Campaign

Raz Blanchard and Baie des Veys

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CalVal Sites

Baie des Veys

- macro tidal (8m)
- 37 km²

Raz Blanchard

- Strongest European tidal current
 12 knots (22 km/h)
- Tidal turbine



LiDAR Flight campaigns

4 LiDAR SWOT flights

- SWOT 1 May 25th
- SWOT 2 May 26th
- SWOT 3 June 15th
- SWOT 4 June 16th

2 planes

- Piper PA 31 (Pixair F-HODB)
- Merlin (Pixair F-GPXR)







Flight conditions

- SWOT1&2
- Flight speed : 150 nd
- Constant speed
- Flight height : 800 m
- Good weather conditions

- SWOT 3 & 4
- Flight speed : 200 nd
- Constant speed
- Flight height : 600 and 800 m
- Anticylonic weather conditions



Flight plans

SWOT 1



SWOT 2



Flight plans

SWOT 3



SWOT 4



LiDAR Ground Track



LiDAR GNSS processing

Trajectory processed by GINS and integer Precise Point Positioning (iPPP)

 \Rightarrow centimetric accuracy antenna position

Calibration on Ground Control Points (GCP) close to Cherbourg

 \Rightarrow LiDAR calibration between 5 to 8 cm to GCPs

	Plane GNSS position		LiDAR calibration (cm)
Flight Name	Phase RMS (cm)	Mean standard deviation of h from the covariance matrix (cm)	dZ standard deviation between LiDAR and GCPs
SW0T1	1.0	0.9 +/- 0.4	5.7
SW0T3	1.1	1.2 +/- 0.4	6.9

Preliminary results

SSH

- SWOT LR precal
- LIDAR SWOT 3

Difference Z (LiDAR) and SSH_KaRIn

- 2*2 km LiDAR buffer size
- centimetric standard deviation



Rayon du buffer (m)

Semaphore, La Hague : Video monitoring and GNSS for reflectometry



Points

Video monitoring



Water level Variability during a tidal Cycle



Baie des Veys Instruments

pt3

tore idat of

Two Objectives: validation of SWOT water level and intertidal topography measurements in intertidal bays The instruments :

_pt4

- Pressure sensors (Water Height 4Hz) for all points
- ALTUS (Erosion/Accretion 15 seconds) for pt1,
 2, &3
- ADCP (Current velocity 300 seconds) for pt3 and pt4
- Turbidity (15 seconds) for all points



2 flights at 50 m altitude: 18/04/2023 and 30/08/2023

Water level from pressure sensors and comparison with SWOT data



PIXC product in 2D and waterlines from Sig0



What's Next ?

- Validating SWOT waterlines by comparing them to Sentinel-2 waterlines extracted from images acquired at the same tidal stage
- Building Intertidal DEM from SWOT CALVAL observations and comparing to the Drone-derived DEM and the Sentinel-derived DEM
- Setting up a hydrodynamic model for the Baie des Veys using the in-situ data to extend the validation possibilities spatially
- Exploiting the rest of the in-situ data and go deep into comparisons for both sites



Geoloc issues before 13 May 2023

Cycle 462 (17/03/2023)



Some cycles during March/April

Cycle 572 (04/07/2023)



Some cycles starting from 13 May 2023

Showing the geoloc issues at the beginning of the CALVAL phase using the water mask from SWOT_L2_HR_LakeSP product



