

CalVal at Small Temperate Lakes

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French CalVal Team

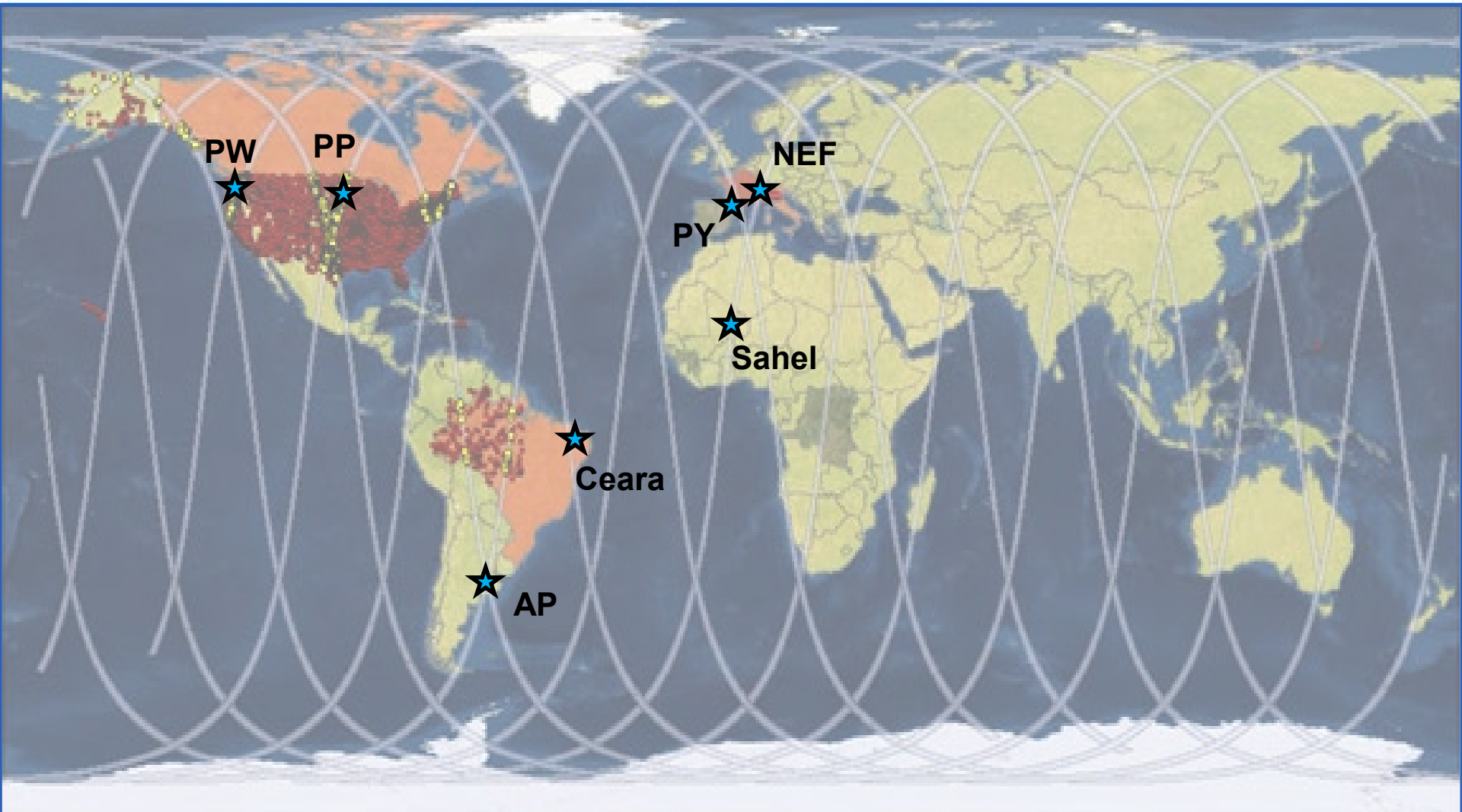


University of Colorado
Boulder



Small Temperate Lakes CaVal

PW - Pacific Northwest (US) AP – Argentina (US / Arg) Sahel (FR / BF) NEF - NE France (FR)
PP - Prairie Potholes (US) Ceara (FR / BR) PY - Pyrennes (FR)



Techniques

- US techniques

Water level:

- Pressure transducer installation, atmospherically-corrected (15-min)
- GNSS datum (1+ hour static GNSS survey)

Surface area:

- RGB+Near-infrared (NIR) aerial imagery, approx. 3x per site in US
- Manually-derived water mask

- French techniques :

- Pressure transducer installation, atmospherically-corrected / rulers (institutional or citizen science) (30-min)
- GNSS datum (3+ hour static GNSS survey)

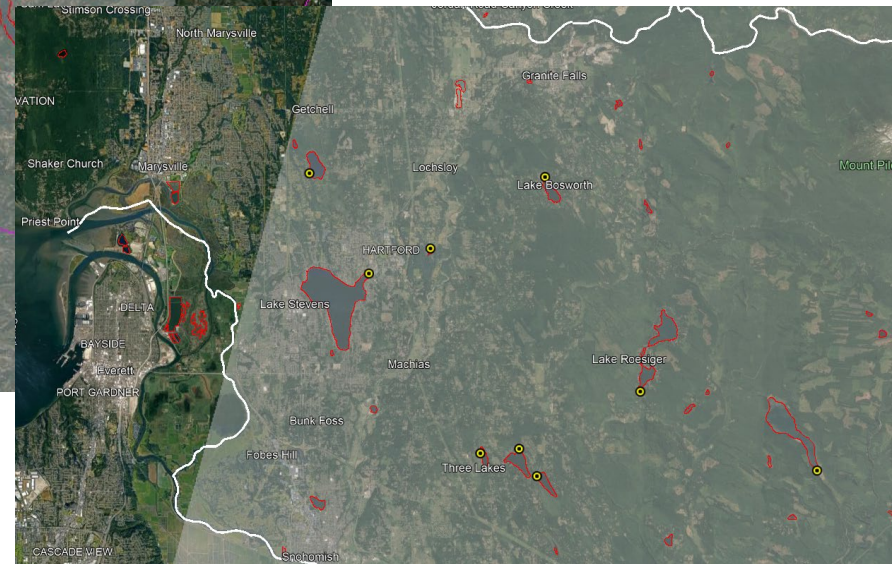
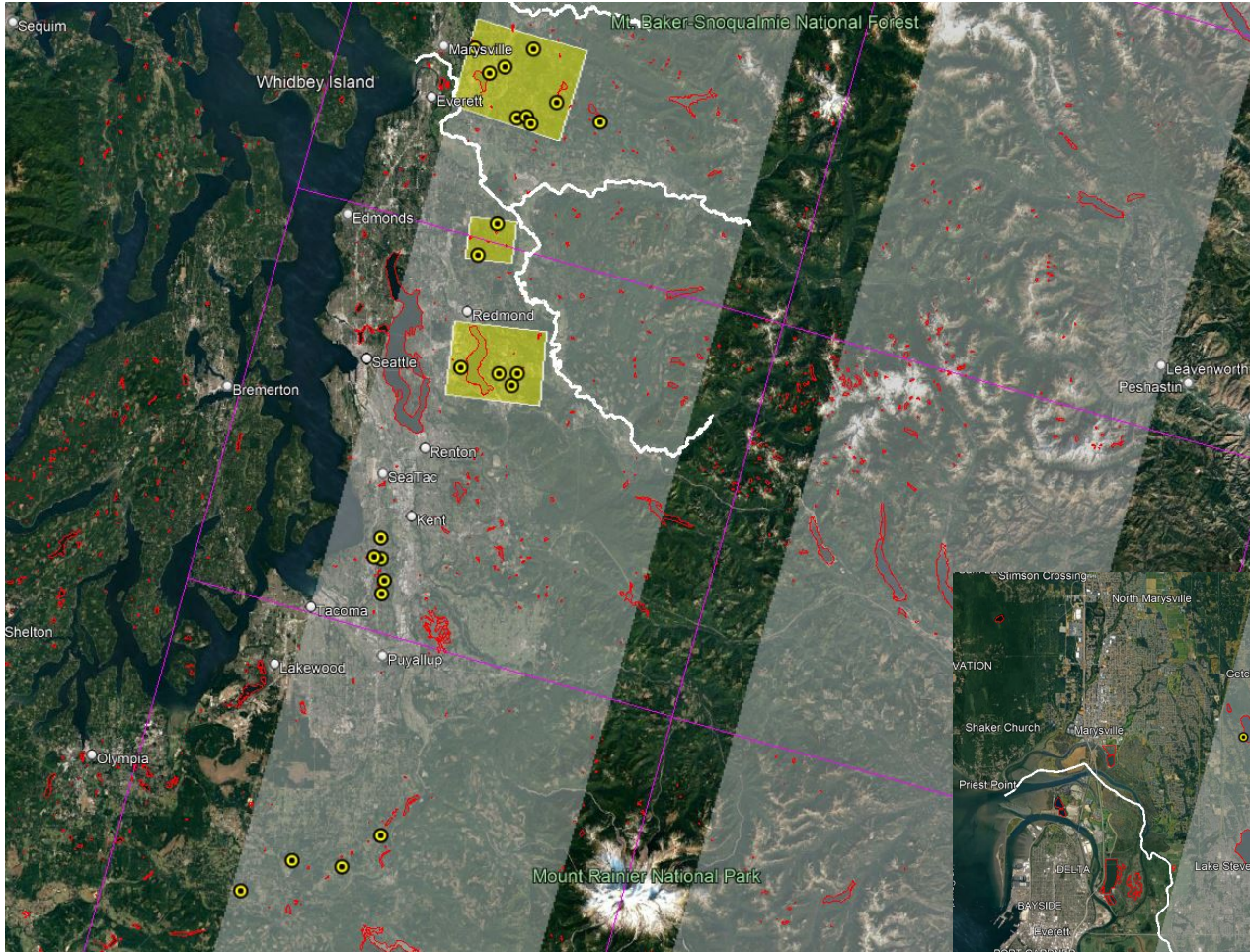
Surface area:

- Drone lidar DEM (Br site)
- HR sat imagery /Manually-derived water mask
- Airborne Scaterometer SWALLIS



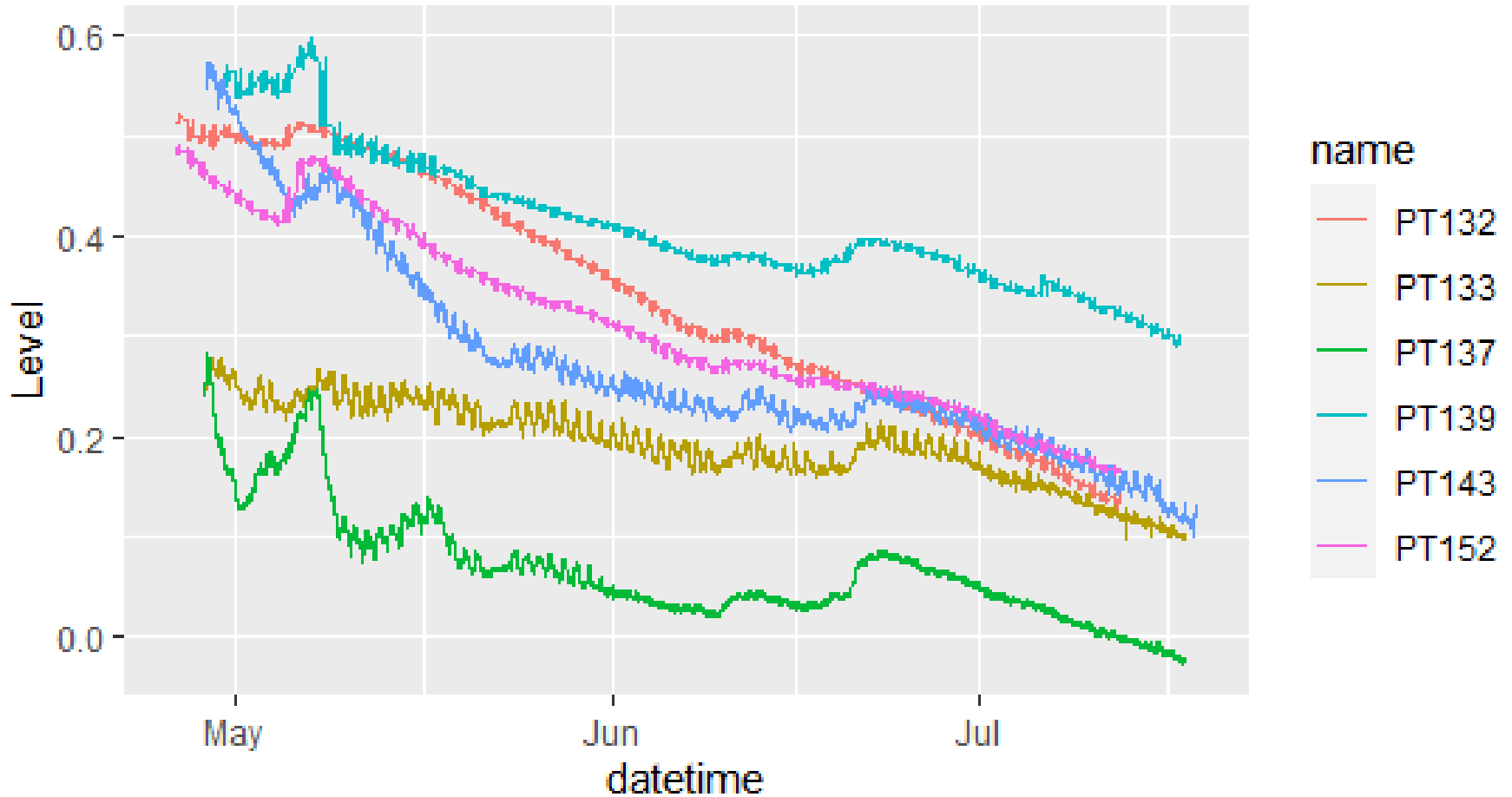
Pacific Northwest (PW) – US CalVal site

- Pass 13
- 27 lakes (0.07 – 23 km²)



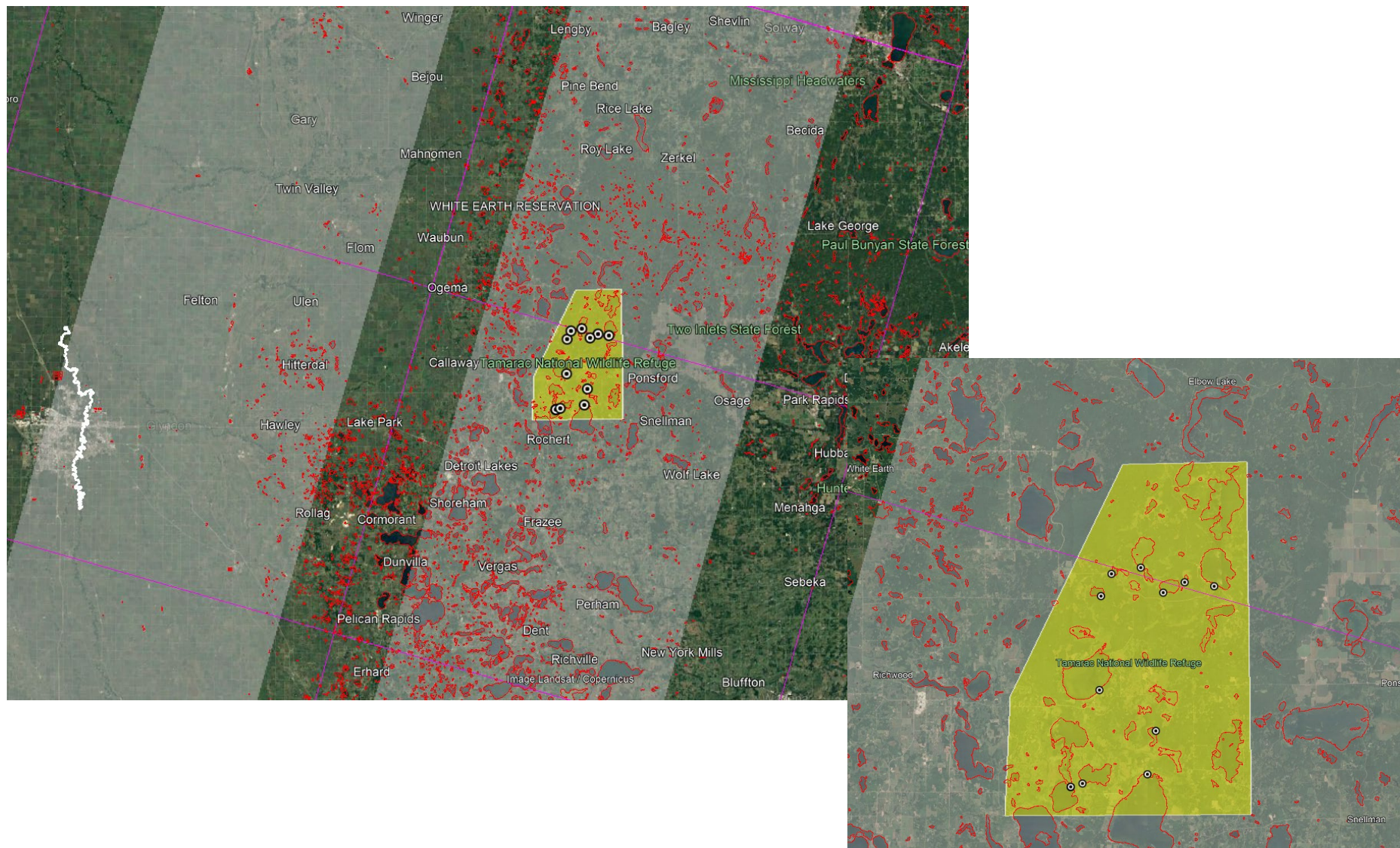
Pacific Northwest (PW) – US CalVal site

- Water levels from pressure transducer observations (in meters)

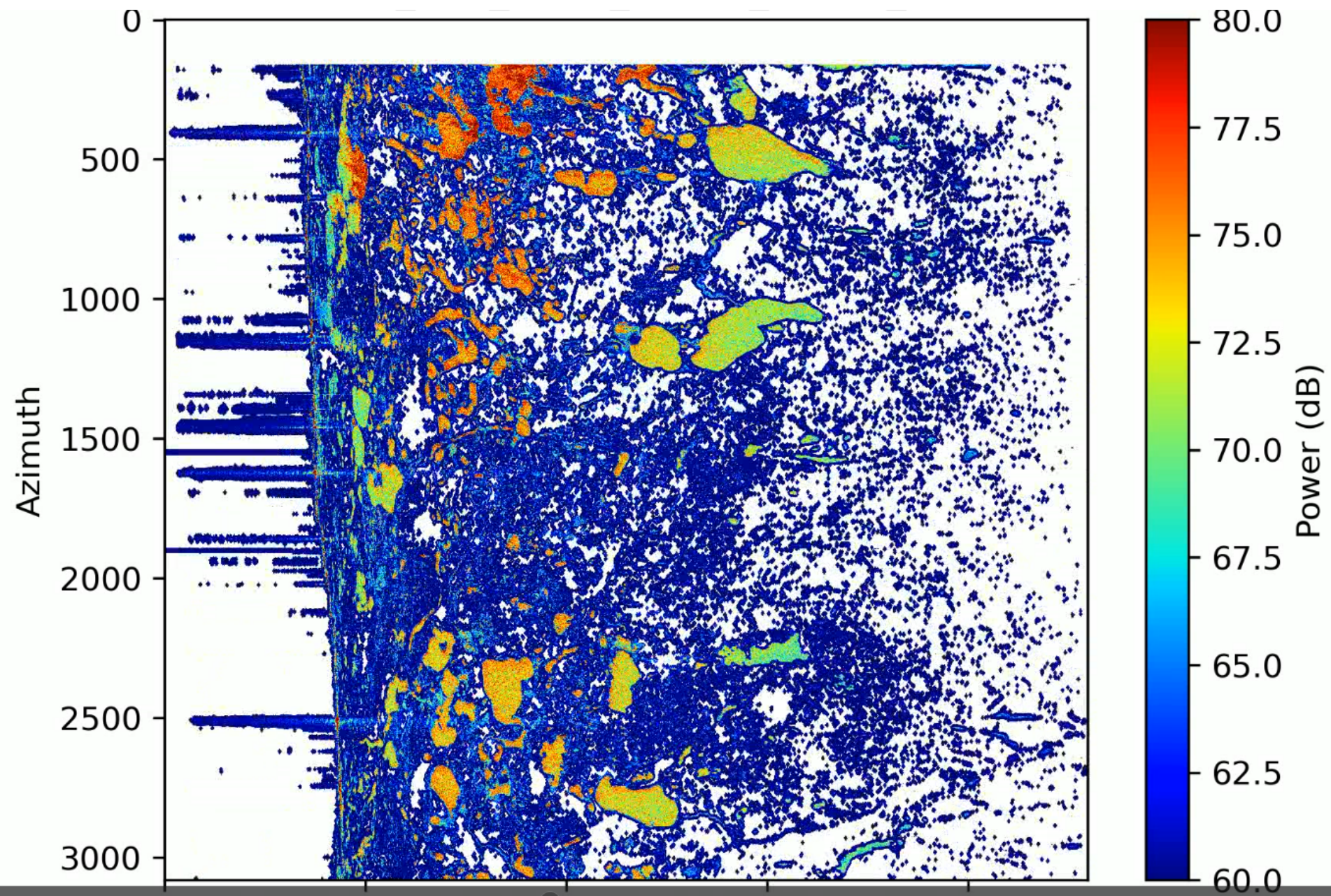


Prairie Potholes (PP) – US CaVal site

- Pass 11
- 13 lakes (0.04 - 13.2 km²)



Prairie Potholes (PP) – US CalVal site



Preliminary results,

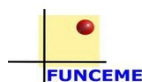
In interaction with
Claire Pottier
Damien Desroche
Roger Fjortof

Hervé Yasou et al. for Alsace/NE
France sites

JF Creteaux et al. for Pyrénées

M Grippa et al. for Sahel

M Gosset/R Reis for
Brasil NE



See posters (M
Grippa ; F
Girard)

Brasil NE : an exemple of international collaboration

- academic collaboration from France / Brasil (IRD/UFC)
- regional/state/federal operational institutions (FUNCEME/COGERGH CPRM)
- a new cal/val site decided and set up in 2022 !



> 100 000 reservoirs !

2023 : exceptionally wet season !

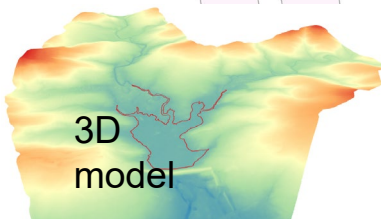
Good dynamics during cal/val site



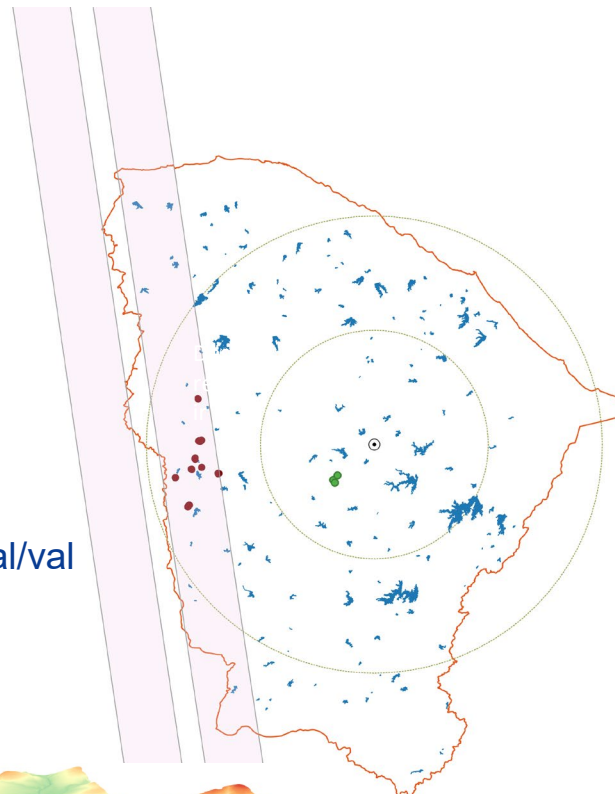
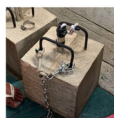
ago/22



fev/23



3D model



FUNCEME historical/on going data base :
 -157 state monitored – daily reading of rules (17 under cal/val)
 -weather radar

SWOT equipped reservoirs since sept 2022
 -8 small reservoirs equipped for cal/val
 -3 more for the science phase

Drone Survey for High Resolution DEM and lake contour



Bothymetry

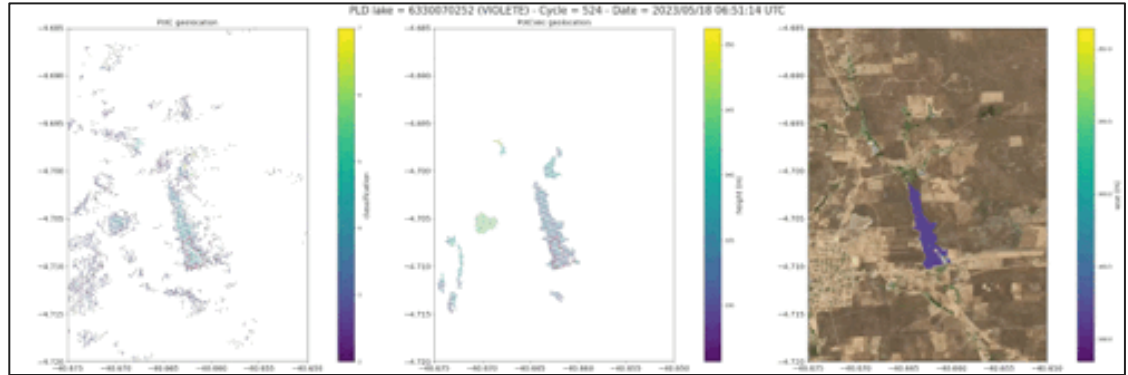


Absolute leveling / referencing of gauges with GNSS

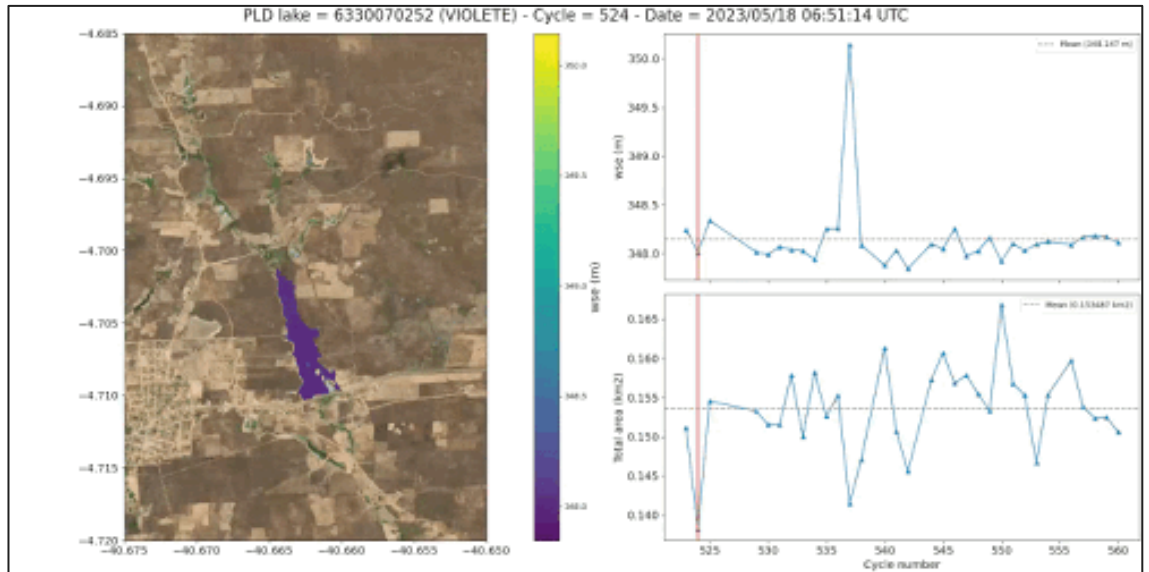


See poster

(very) PRELIMINARY
Analysis of SWOT lakes products and pixc



Violetta (15 ha)
Seen in PLD
Seen by swot Obs

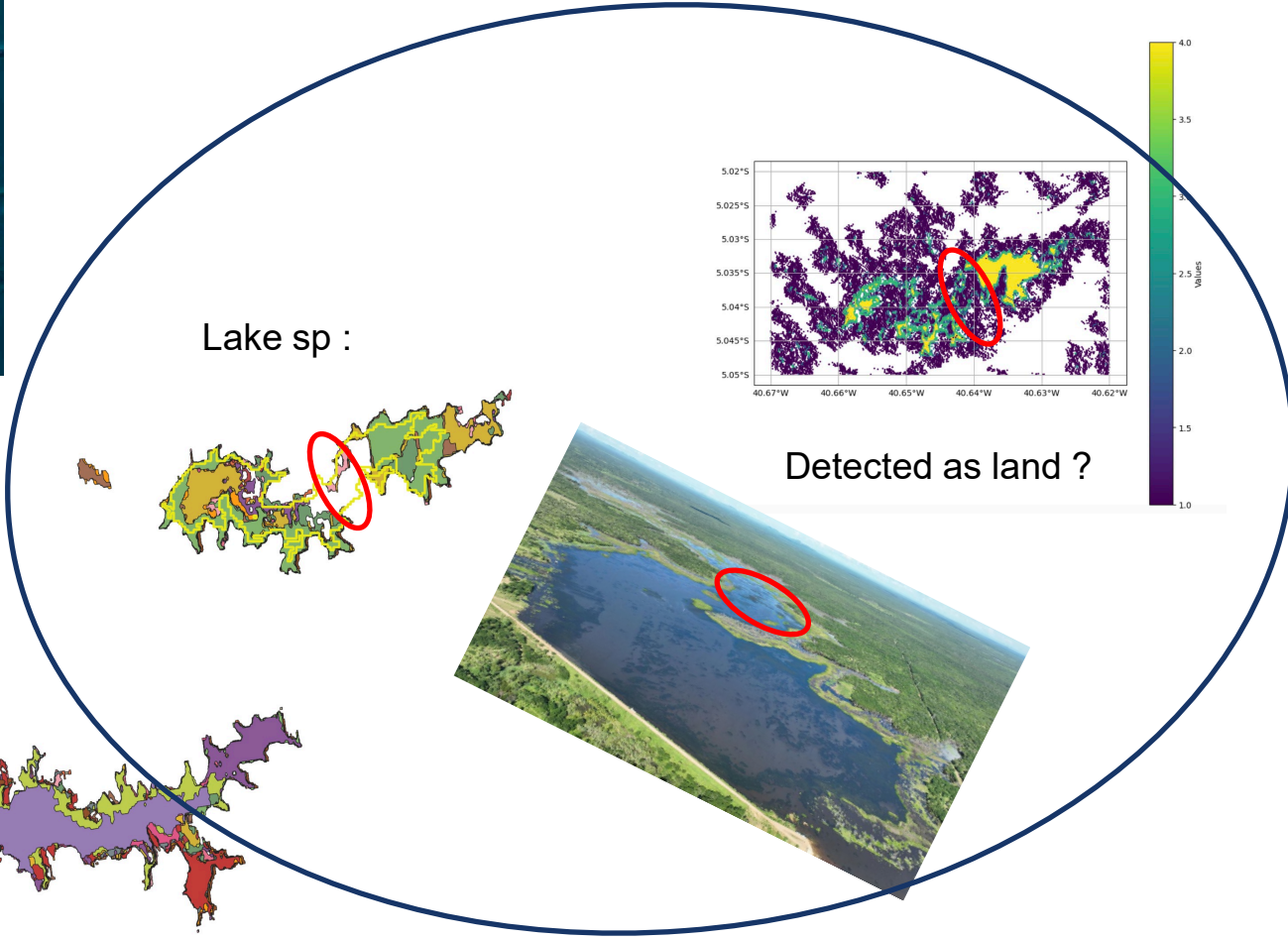


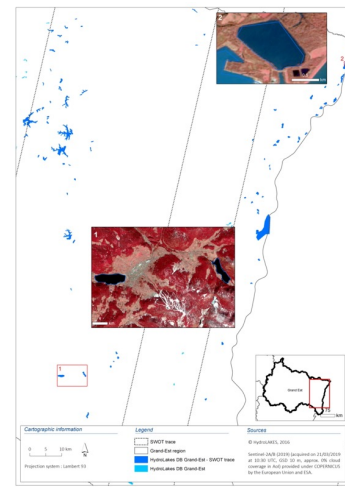
Courtesy Claire Pottier

(very) PRELIMINARY
Analysis of SWOT lakes products and pixc

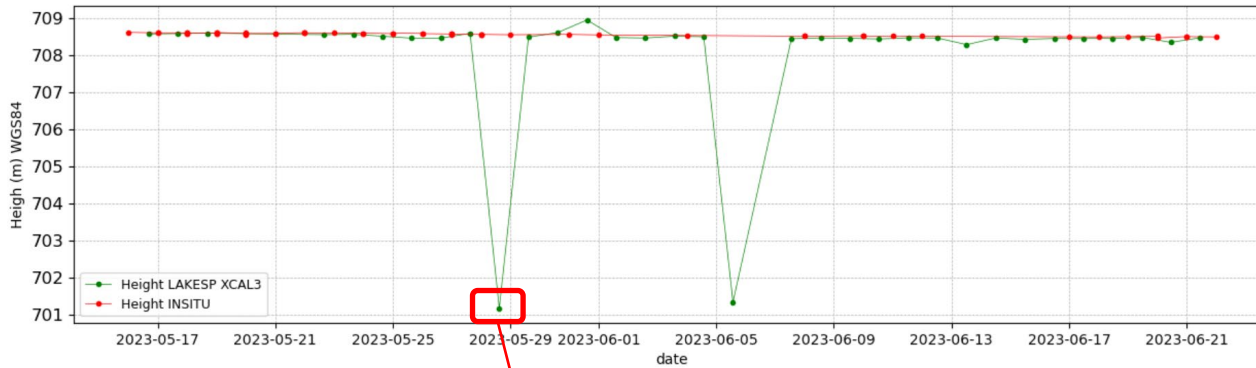
Polmares (100+ ha)

Not in PLD
Only partially seen as
unassigned
Dark water ? Why ?

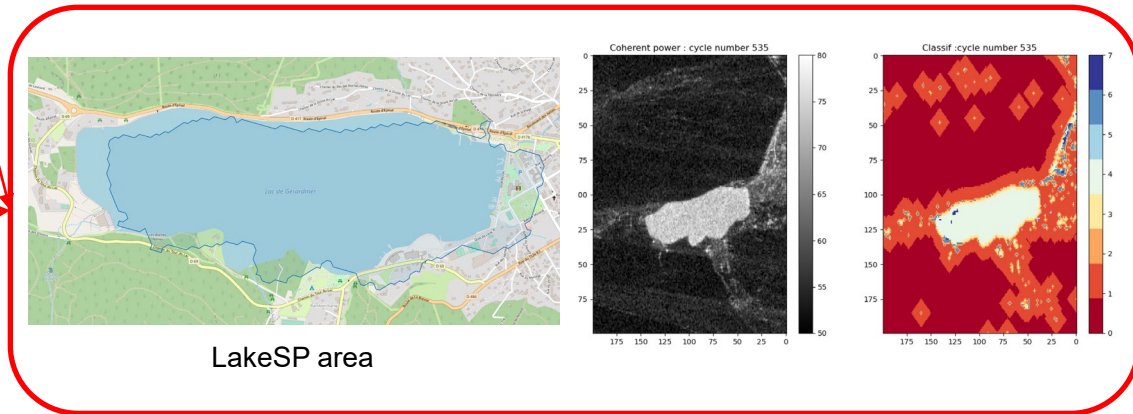




Gerardmer (In Situ = OECS)



count	40.000000
mean	0.612823
std	1.953350
min	0.001868
25%	0.030501
50%	0.047949
75%	0.092612
max	7.382649



Very good statistics for the WSE error compared to in situ (apart from isolated outliers/events)

CaVal lakes Alsace-Lorraine and along the Rhine

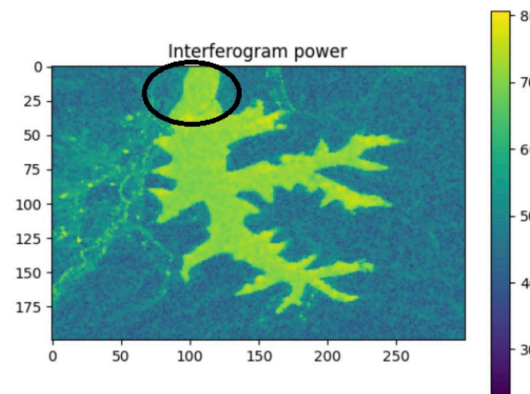


Rare case of Water/water layover : Pierre Percée Lake

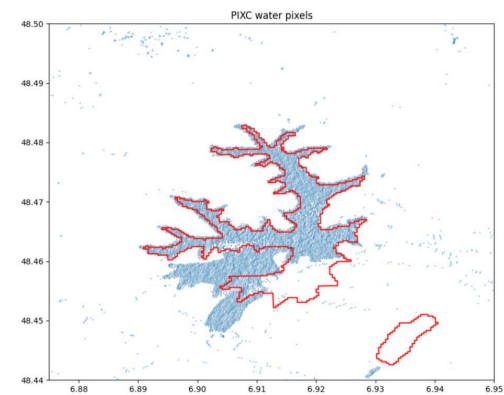


Two lakes:
Altitude's difference of 80m

Two lakes merged on SAR



PICX water pixels



Mountain lake: LOCSS/OECS projects in the Pyrénées

OBSERVATIONS des LACS
par le Public et par Satellites

Merci de nous envoyer la photo
du niveau de l'eau sur la règle
en indiquant la date, l'heure et
nom de code "JFR2" au
+33 6 18 71 48 91

www.locss.org



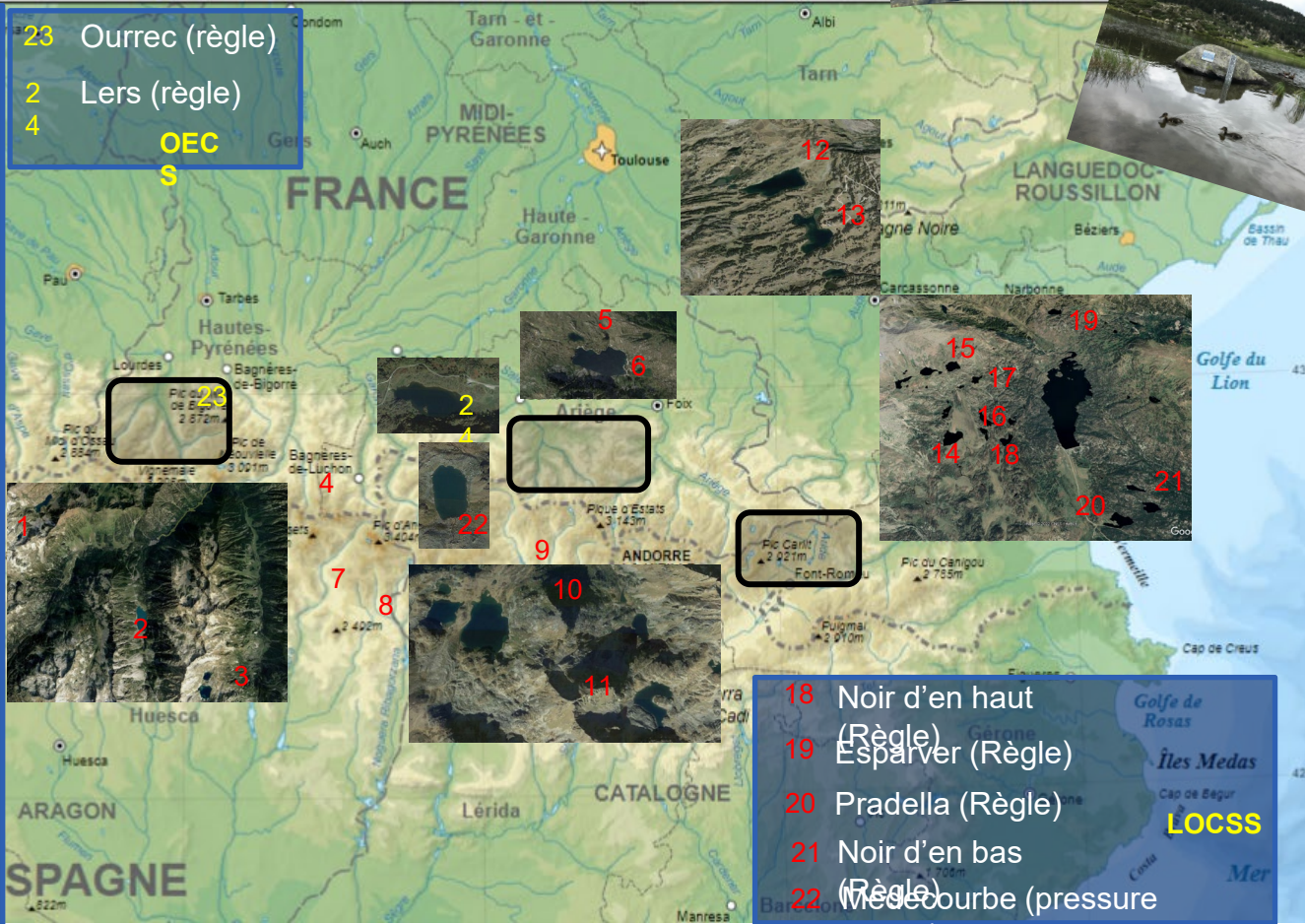
- 1 Ilheou (pression
- 2 gauge)
- 3 gauge)
- 4 Estom (pression
- 5 gauge)
- 6 Espingo (ruler)
- 7 Etang mort (ruler)
- 8 Etang Majeur
- 9 Fontargente (ruler &
- 10 gauge)
- 11 Fontargente (ruler &
- 12 gauge)
- 13 Estanyols (ruler)
- 14 Estanyols (ruler)
- 15 Juclar (ruler)
- 16 Estany Gros (ruler)
- 17 Estany de Mig
- 18 (ruler)
- 19 Trebens (ruler)
- 20 Comassa (ruler)
- 21 Dougne (ruler)

23 Ourrec (règle)

2 Lers (règle)

4

OEC



- 18 Noir d'en haut (Règle)
 - 19 Esparver (Règle)
 - 20 Pradella (Règle)
 - 21 Noir d'en bas
 - 22 (Règle)
- LOCSS

First (very) preliminary results on 2 ruler gauges in the Ariège

Low Fontargente

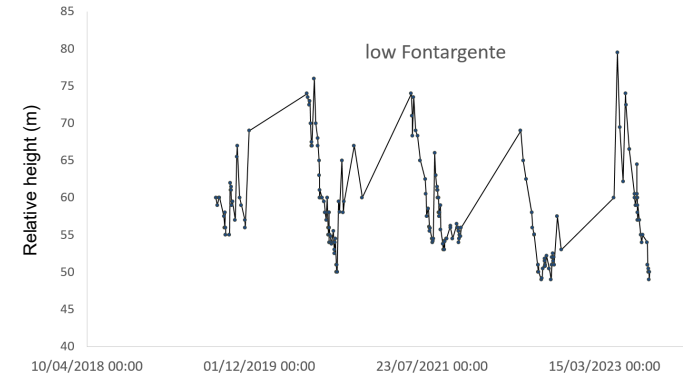
	SWOT	LOCSS
25/05/2023	2194,642	2195,08
03/06/2023	2195,05	2195,11
17/06/2023	2194,517	2195,05
02/07/2023	2195,06295	2195,00

5 to 60 cm of difference

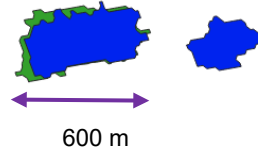
High Fontargente

High Fontargente

	SWOT	LOCSS
17/06/2023	2203,371	2204
02/07/2023	2204,18836	2203,948



Cy 570 Green
Cy 544 Grey
Cy 530: Blue



More than 5000 photos received in 4 years



Elements of conclusion

- Thank you to all the teams : in the field and behind the computers !!!
- Very preliminary
- Great detection – down to very small lakes
- Evidence of good consistency in WSE between in situ and SWOT
 - exemples in pyrénéan lakes
 - statistics in NE France (40 obs - 75th quantile < 9 cm)
 - good results in small lakes – on target !! Or better
- Evidence of some (expected) issues :
 - Dark water / lakes or part of lakes not seen etc...
 - Layover



ON going and NEXT steps

- Extend the comparisons – on latest processed data + more sites
- Statistics by size/type of lakes / environment.
- Analyze unassigned / pixc to understand better non detection.
- Discussion with project teams
- Improve PLD (on going)