RAINSMORE WORKSHOP

CHALLENGES OF MONITORING SMALL WATERS BODIES FROM SPACE

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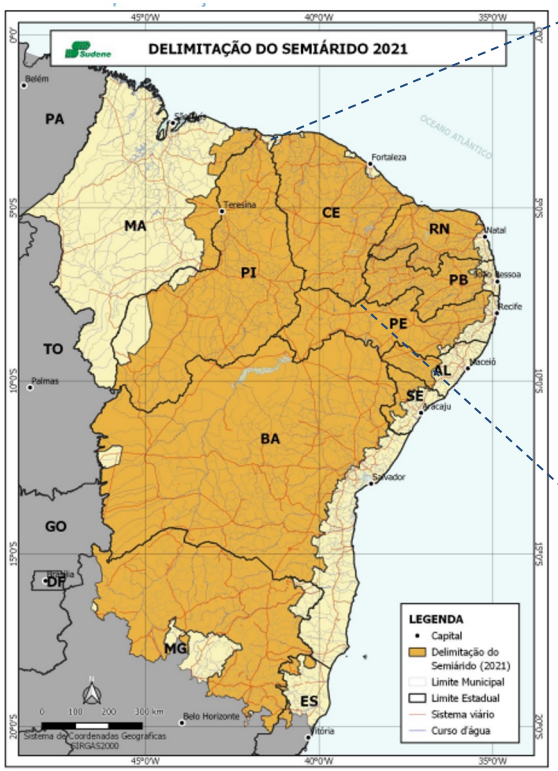
FUNCEME

(Meteorological and Water Resources Foundation)

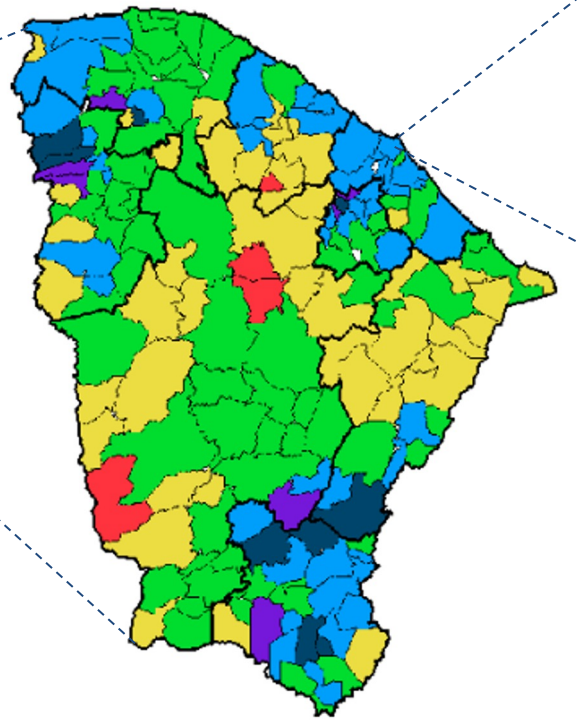
24 october 2022
Fortaleza, Ceará, Brazil

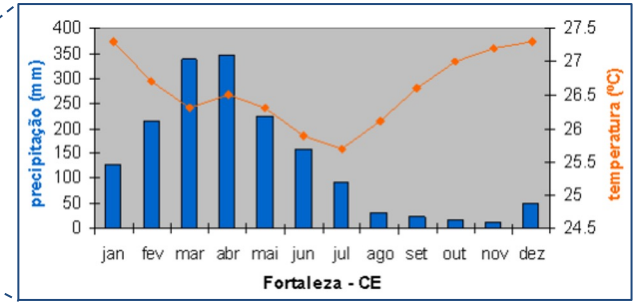
North East of Brazil



Ceará

Precipitation máx. (2021)

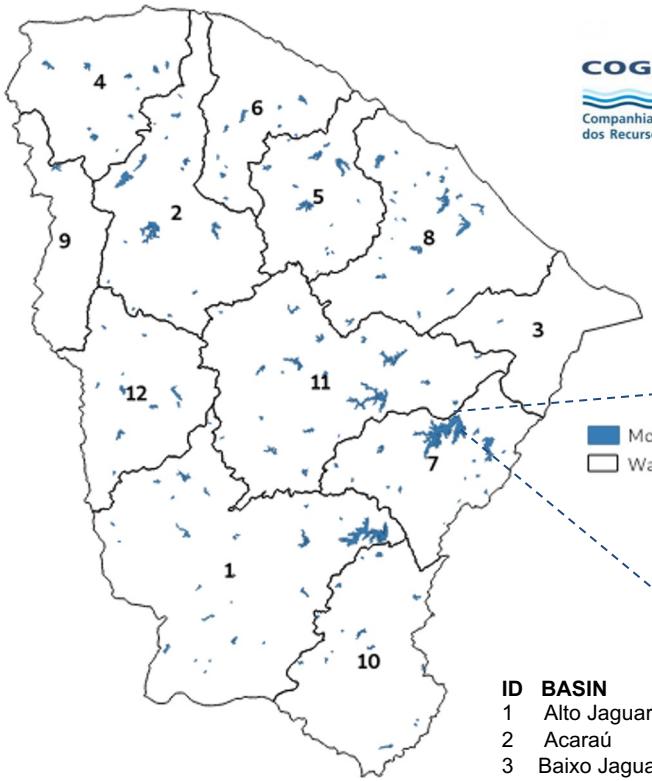




Fonte: Funceme, 2022.

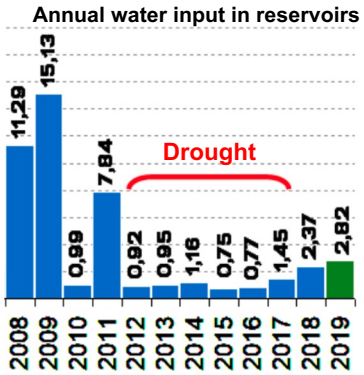
High temperatures
Scarce rainfall (< 800mm)
Long periods of drought

Ceará Water Resources

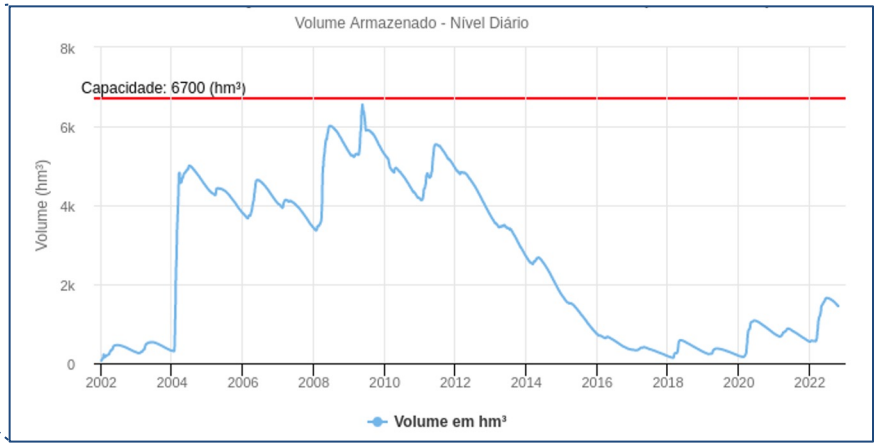


COGERH
Companhia de Gestão dos Recursos Hídricos

157 Monitored reservoirs



Monitoring system - *Castanhão*



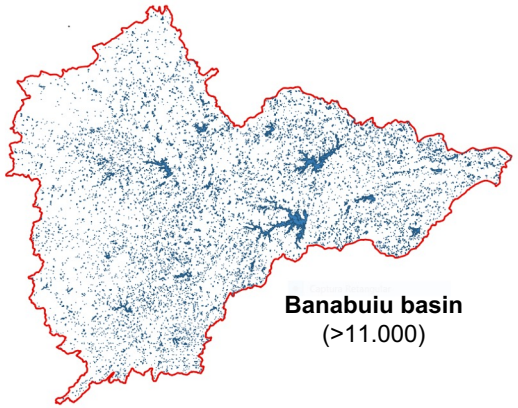
ID	BASIN
1	Alto Jaguaribe
2	Acaraú
3	Baixo Jaguaribe
4	Coreaú
5	Curu
6	Litoral
7	Médio Jaguaribe
8	Metropolitana
9	Serra da Ibiapaba
10	Salgado
11	Banabuiú
12	Sertões de Crateús

Fonte: Cogerh, 2022.

Remote Sensing in the Monitoring

Need to monitor thousands of reservoirs in Ceará sensitivity to climate variability

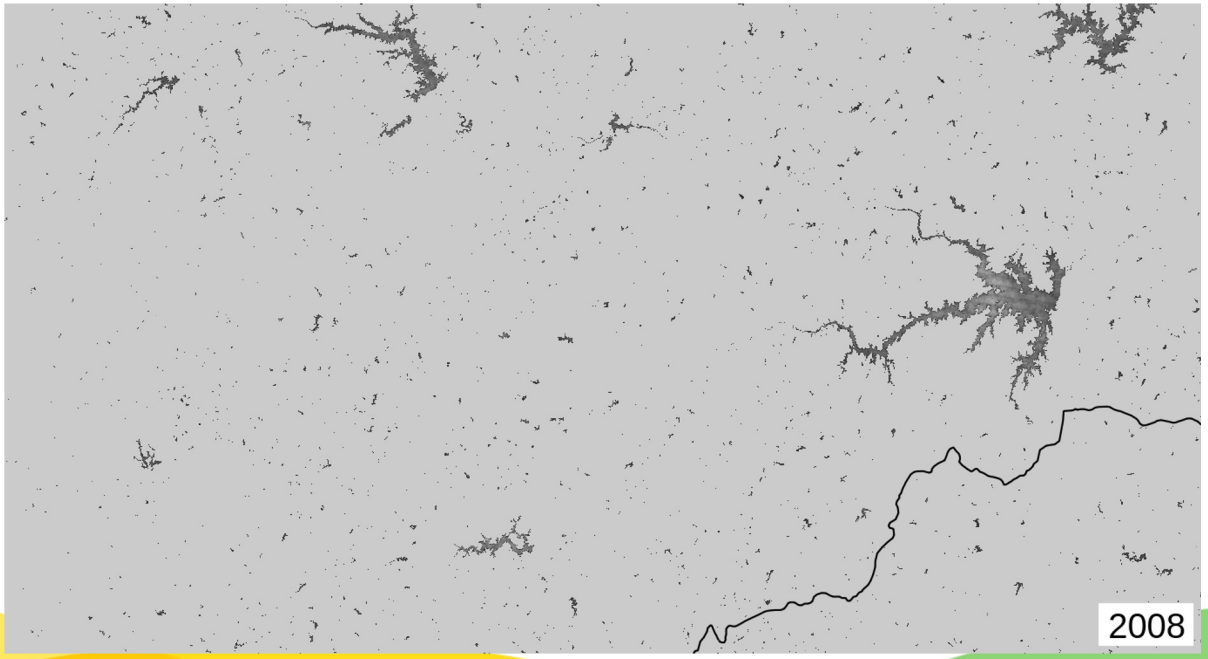
FUNCEME Landsat USGS

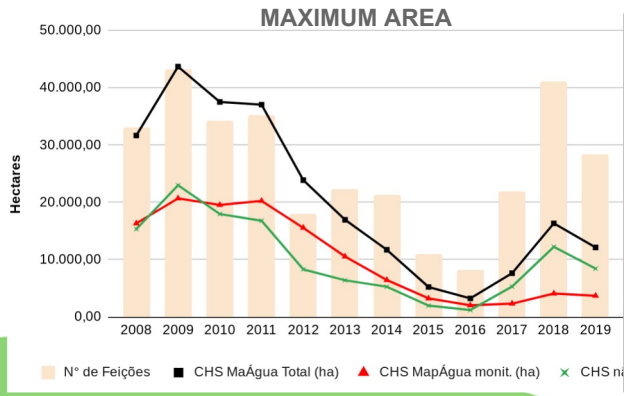


Mapagua Project (Automatic Mapping of Water Bodies)

SPATIAL AND TEMPORAL EVOLUTION OF THE RESERVOIR AREA

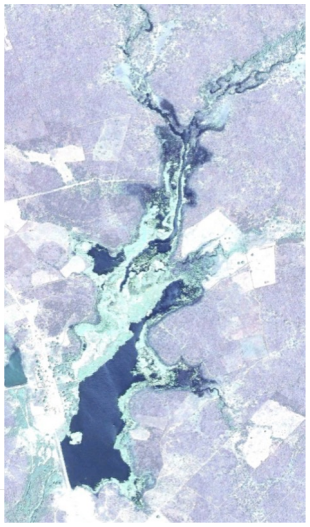
Drought: 2012 to 2017



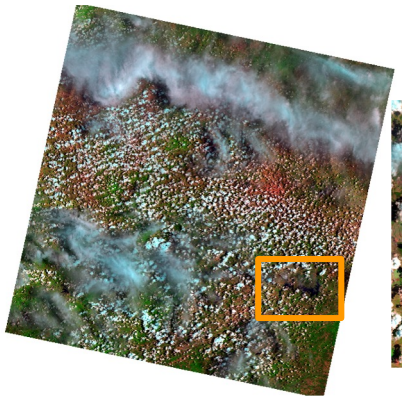


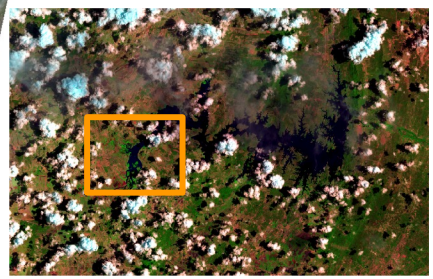
Remote Sensing in the Monitoring CHALLENGES

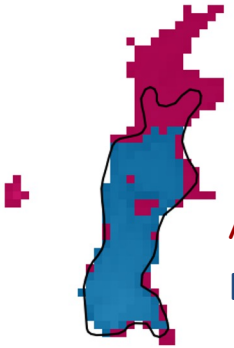
65% < 0.6 ha (6 pixels)
Banabuiú basin



Spatial resolution







ALL YEAR

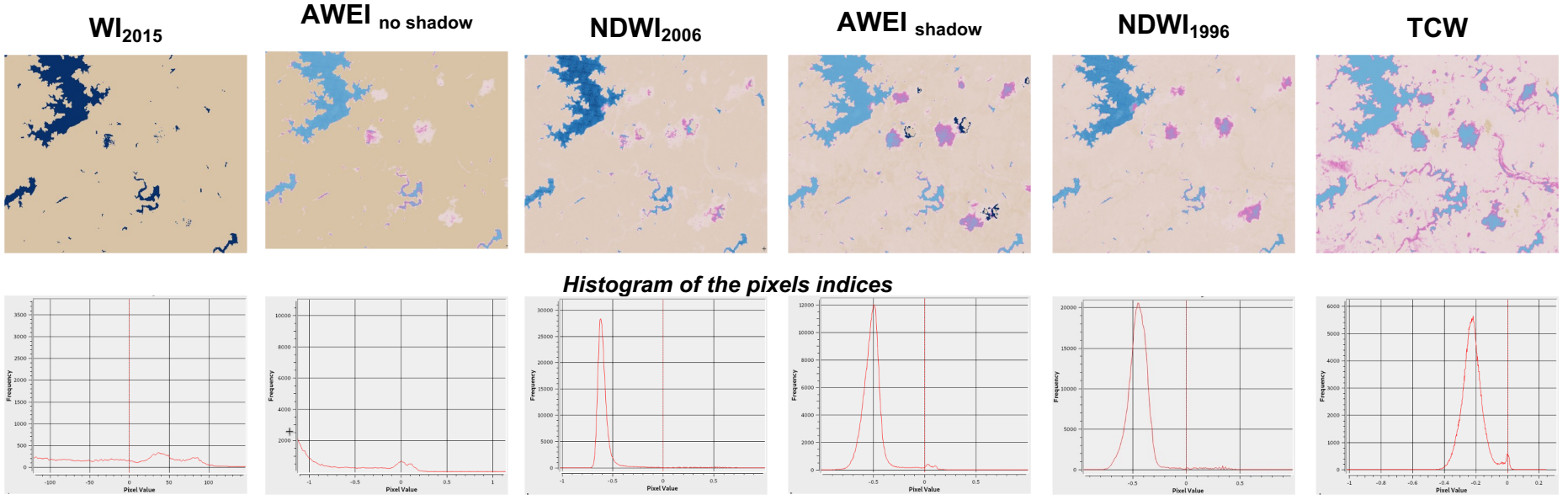
DRY SEASON

Cloud cover > Rainy season > Max area
Optical sensor

Fonte: Mapagua

Remote Sensing in the Monitoring CHALLENGES

Sensitivity of the different index to extract water from pixels

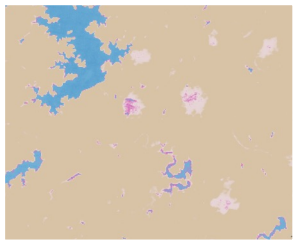


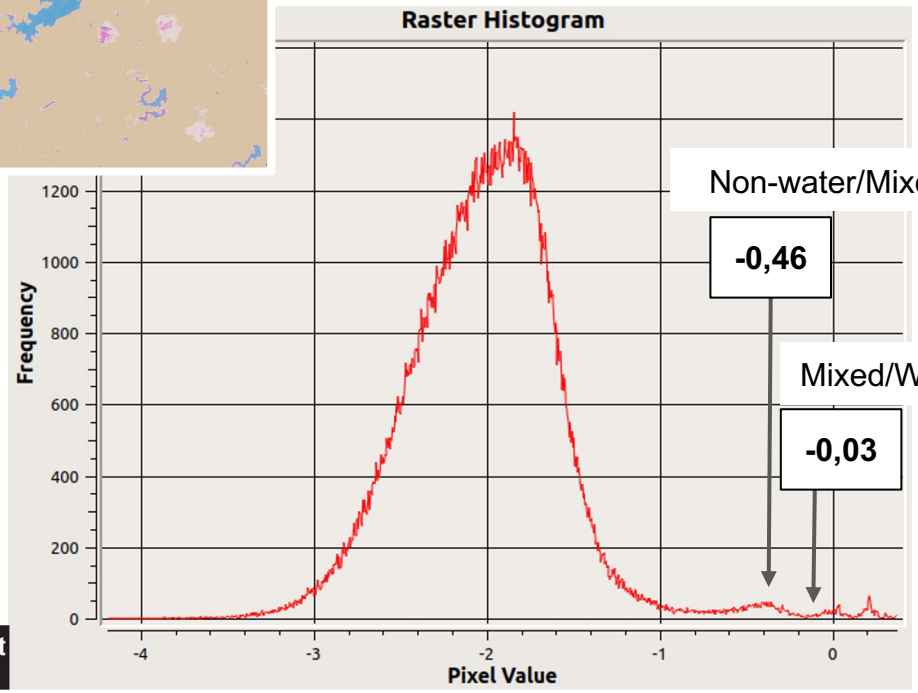
Landsat USGS

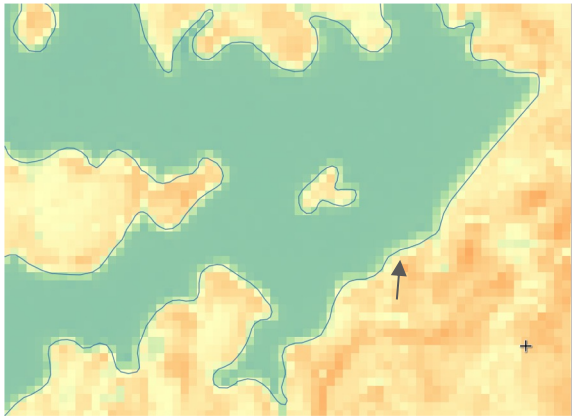
Remote Sensing in the Monitoring CHALLENGES

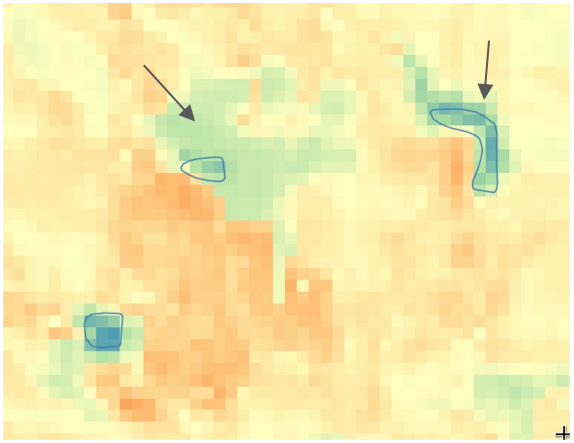
Threshold analysis

WI_{2015}





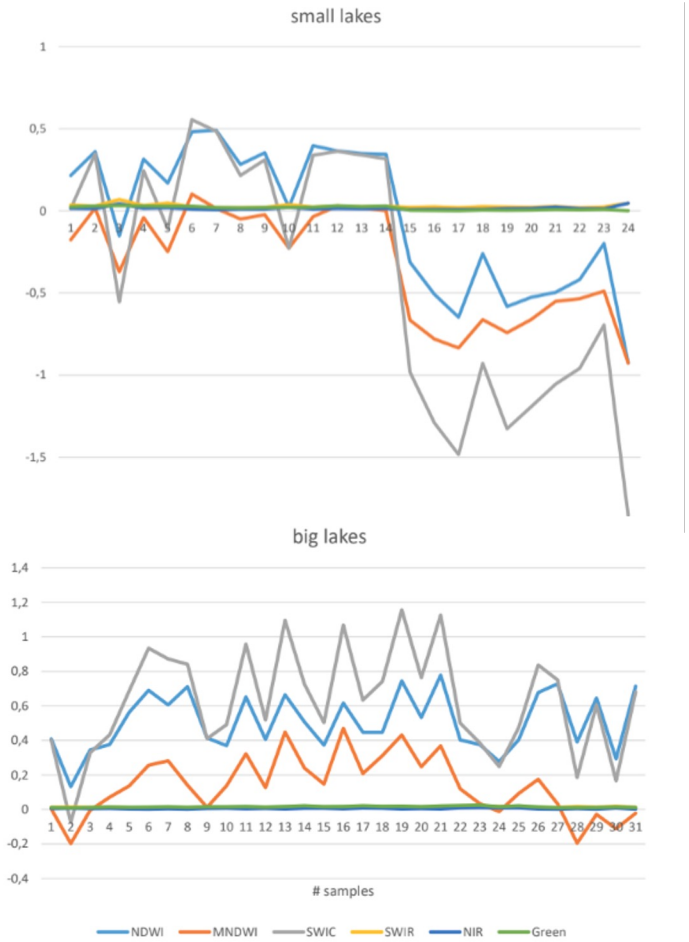


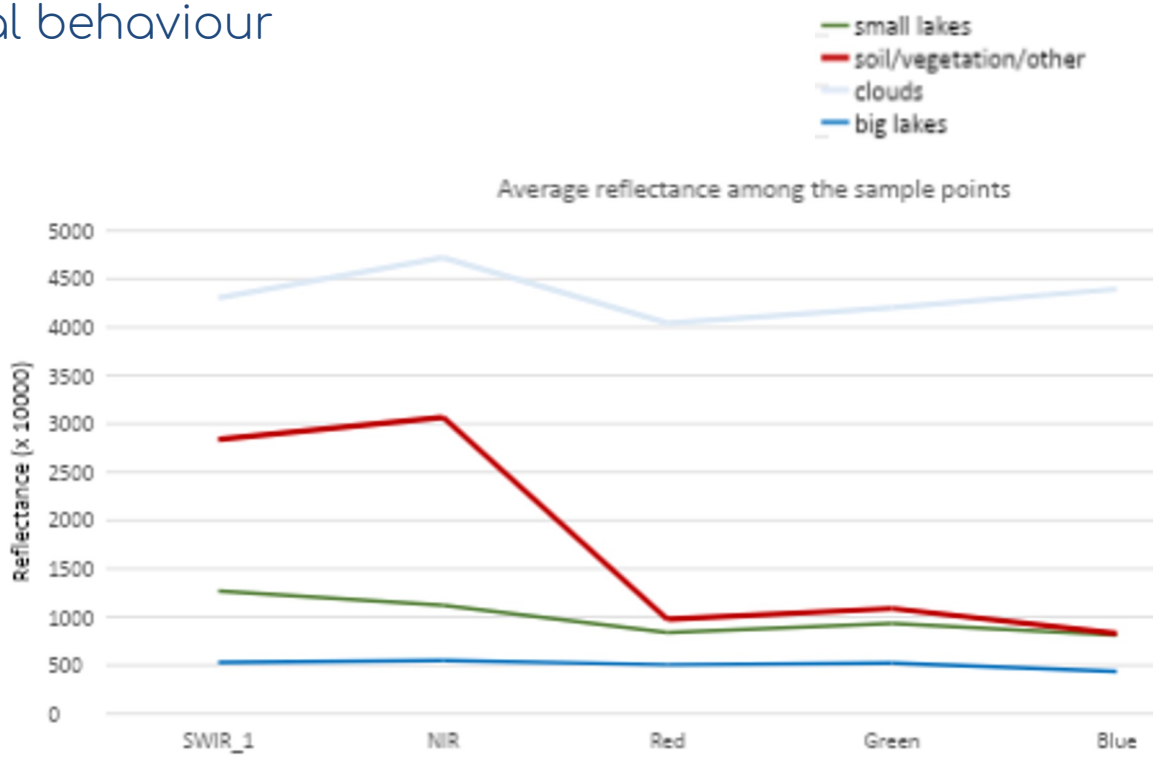


Fonte: Mapagua

Remote Sensing in the Monitoring CHALLENGES

Different patterns of spectral behaviour

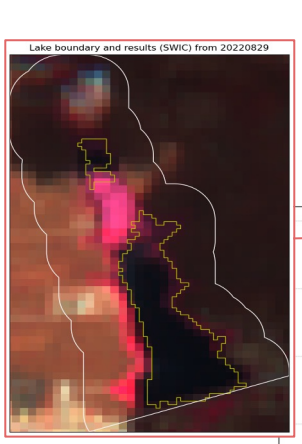




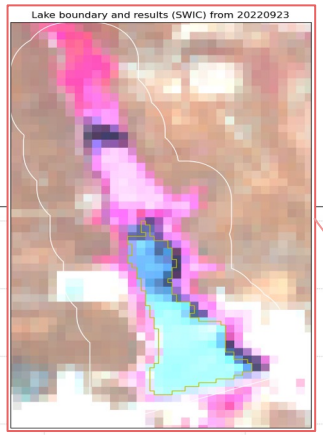
Cloud shadow is similar to the water

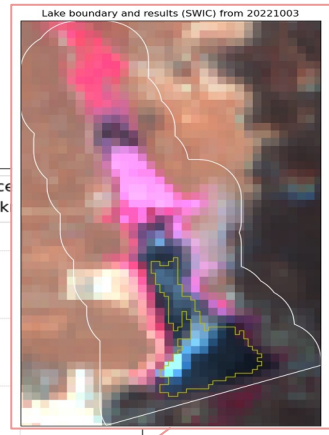
Remote Sensing in the Monitoring CHALLENGES

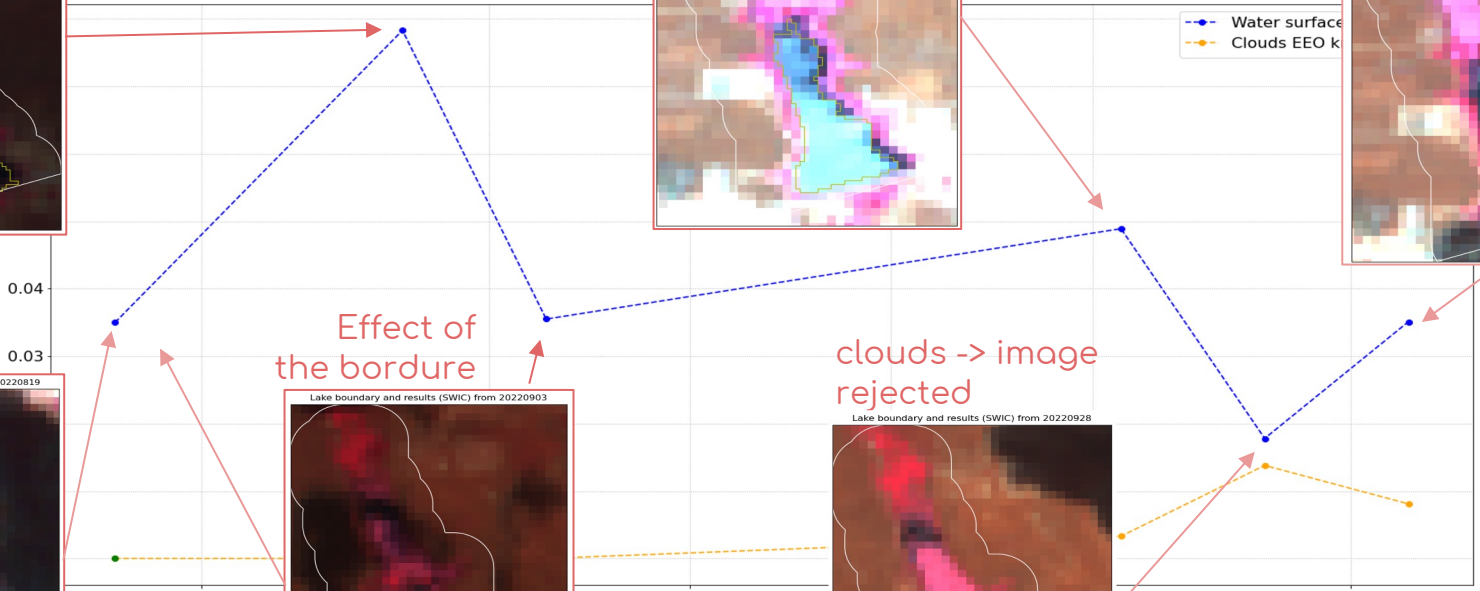
Instability of the extraction methods

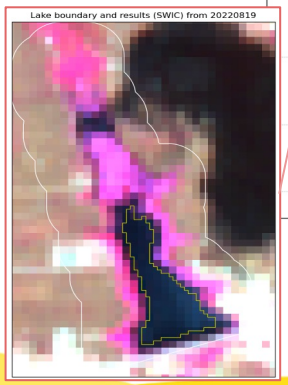


Time series production:
SWIC = Violete reservoir

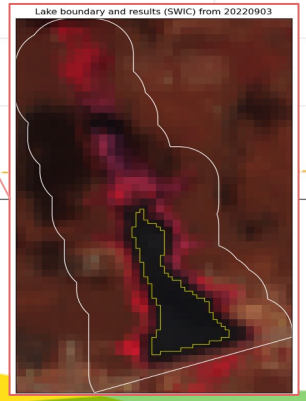








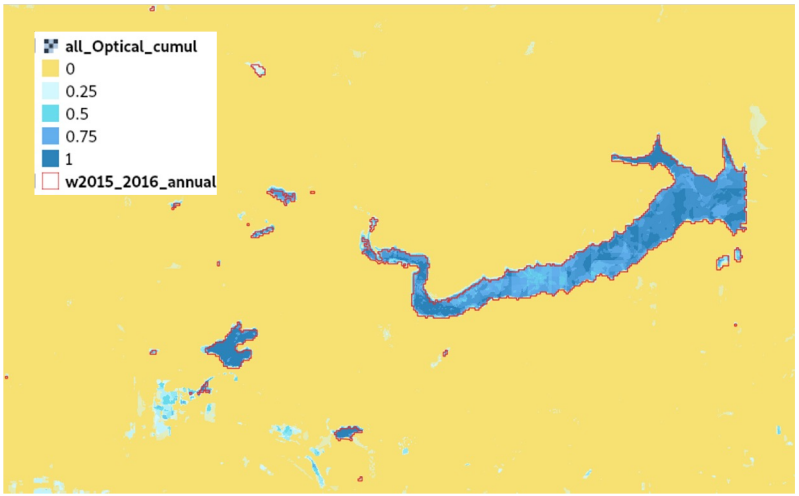
Effect of the bordure



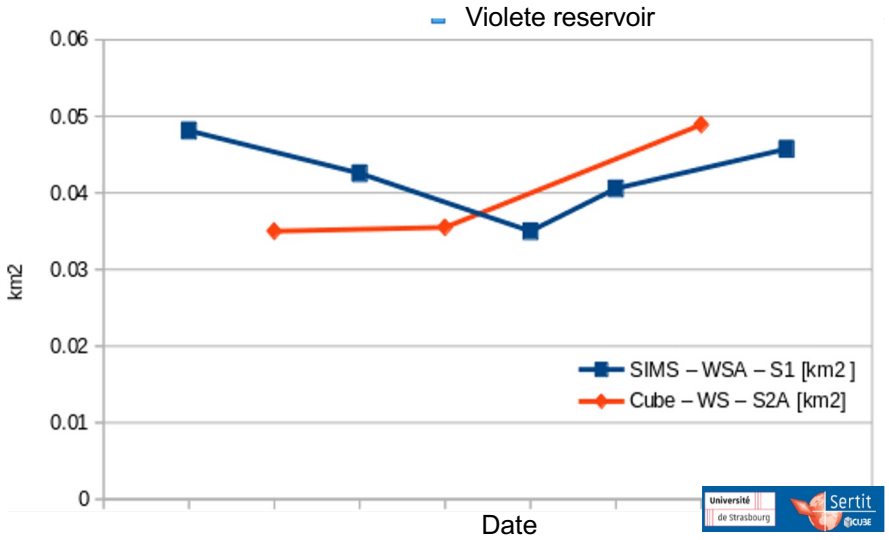
clouds -> image rejected

Remote Sensing in the Monitoring CHALLENGES

Commission and Omission of pixels in different methods and sensors



Surfwater (CNES) x Mapagua (Funceme)



VALIDATION OF THE METHODS

CEARÁ
GOVERNO DO ESTADO

ANALYSIS AND MONITORING OF SMALL WATER OBJECTS IN THE BRAZILIAN NORTH EAST SEMI-ARID USING REMOTE SENSING

FUNCEME · IRD Institut de Recherche pour le Développement FRANCE · cnes · DEHA Departamento de Engenharia Hidráulica e Ambiental · UFPE · Labomar · CPRM Serviço Geológico do Brasil · NASA · SWOT · GET · LEGOS