Monitoring Water Storage in Reservoirs from Space

José Miguel Delgado

University of Potsdam

March 22, 2018

Outline

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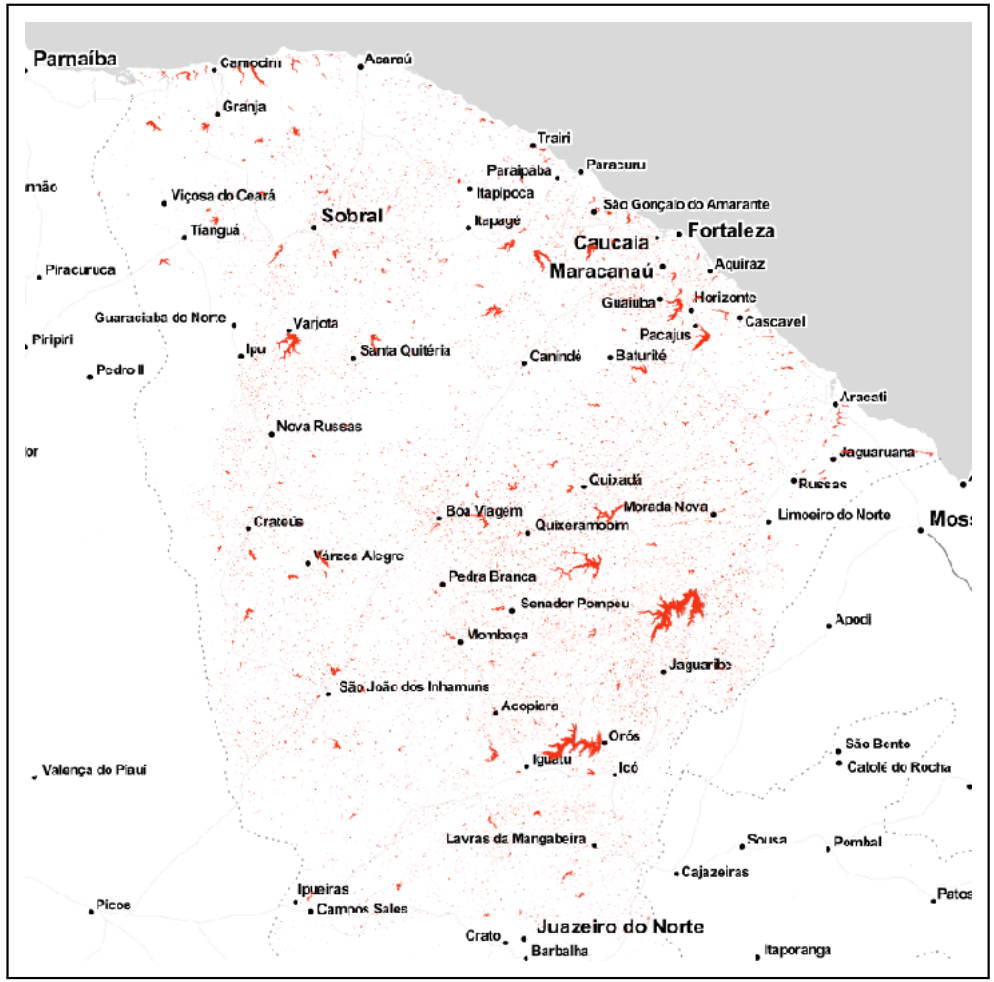
Small dams in Ceará

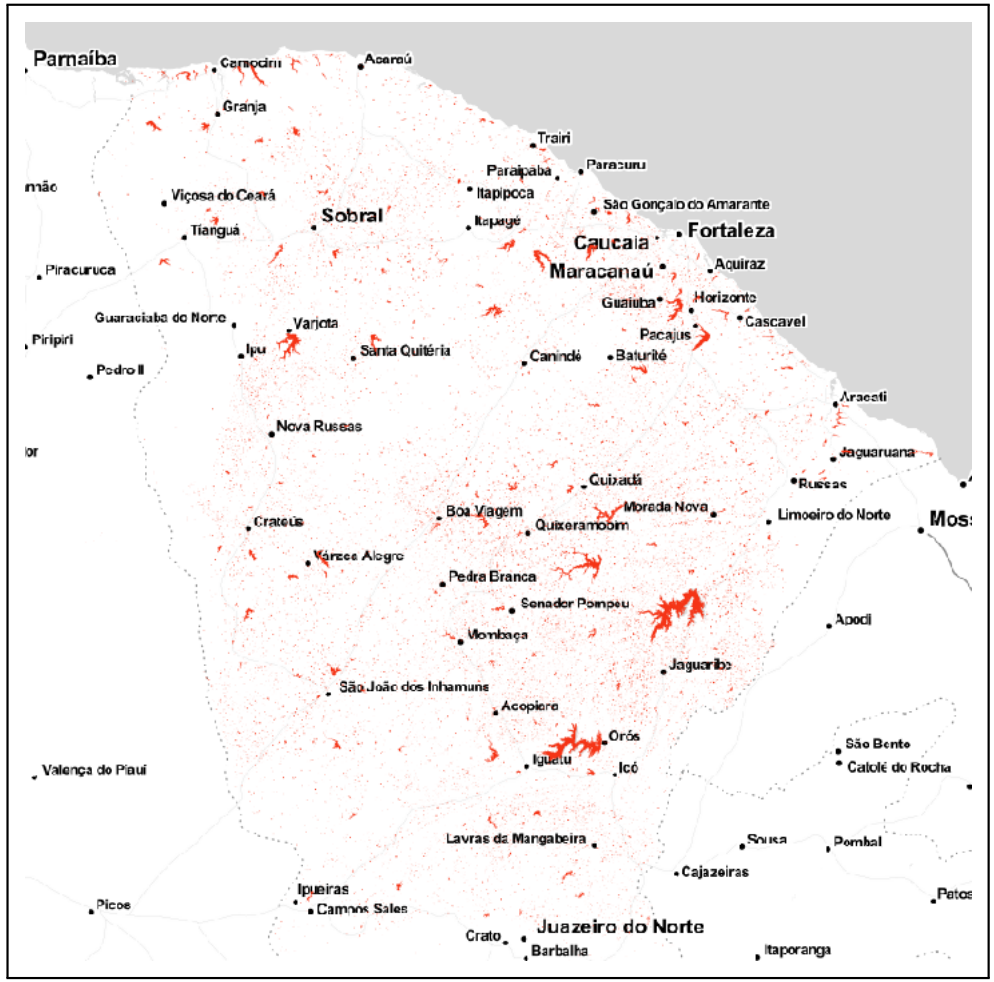
1. water scarcity



Source: *COGERH, 2016*

Small dams in Ceará

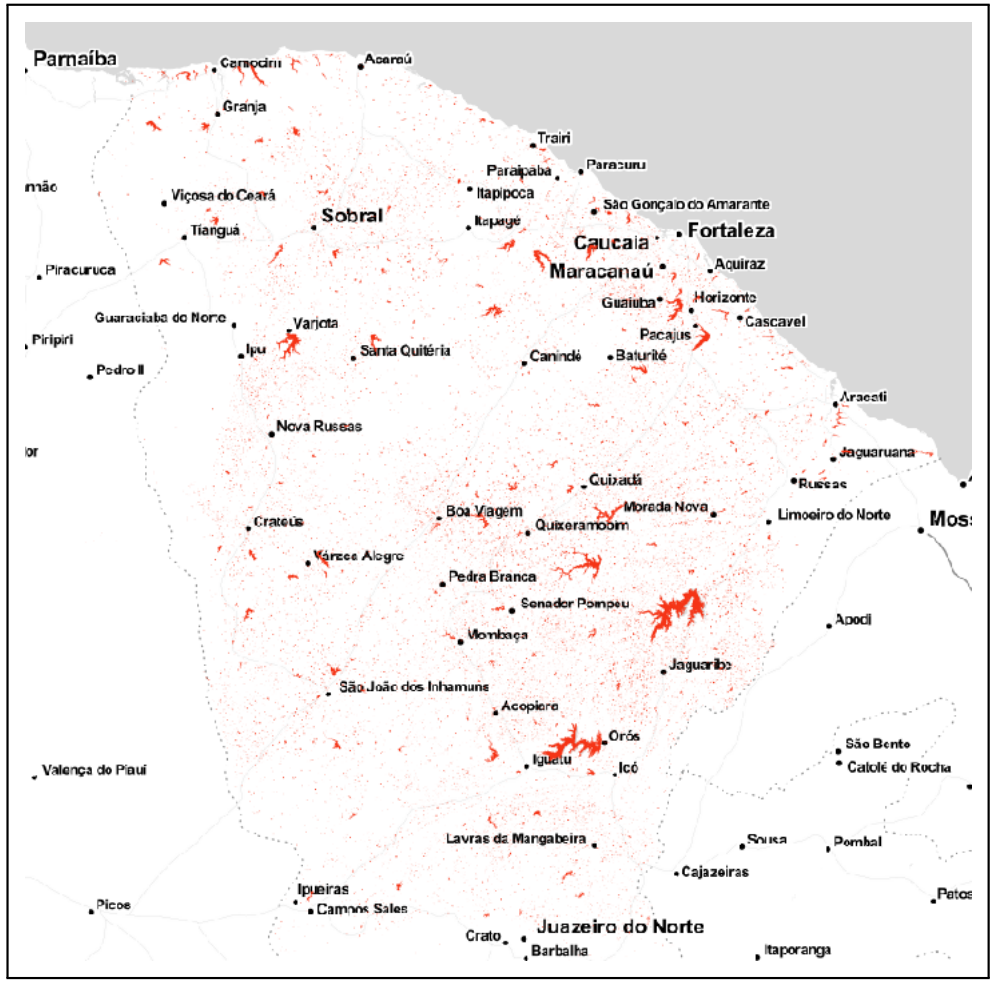
1. water scarcity
2. distributed water infrastructure (tens of thousands of dams)



Source: *COGERH, 2016*

Small dams in Ceará

1. water scarcity
2. distributed water infrastructure (tens of thousands of dams)
3. most small dams used locally (unaccounted for management)



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Small dams in Ceará

First to empty, first to fill

Outline

IWRM – *Cannot manage what we do not measure*

Objectives

1. water management at community level

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2. allocation of emergency resources

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Objectives

1. water management at community level
2. allocation of emergency resources
3. water accounting – *making sense of how much water is available*

OSS, FOSS, FLOSS...

Objective

1. get the system running – improve on the way

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2. use open-source and free of charge data and tools (ESA's Sentinel mission, python, R, PostGIS, mongodb)

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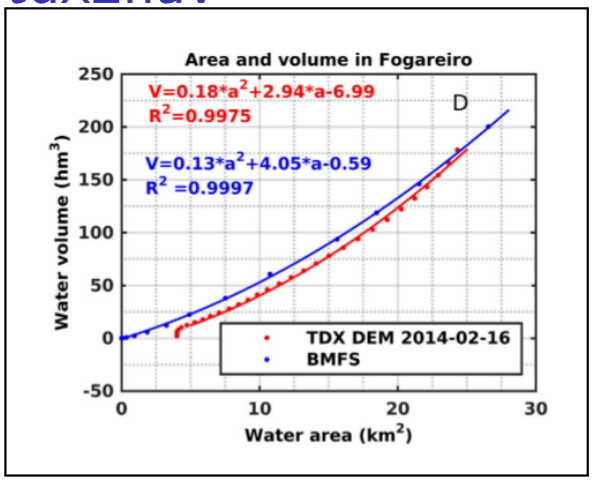
Objective

1. get the system running – improve on the way
2. use open-source and free of charge data and tools (ESA's Sentinel mission, python, R, PostGIS, mongodb)
3. easy replicability (conda environments, git)

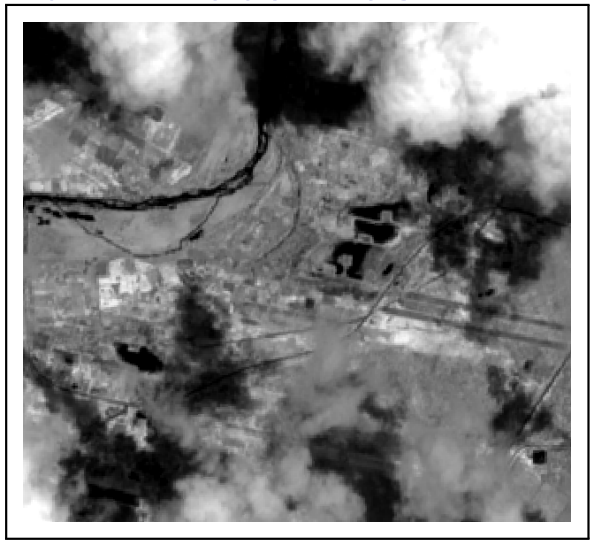
Outline

tdx2hav



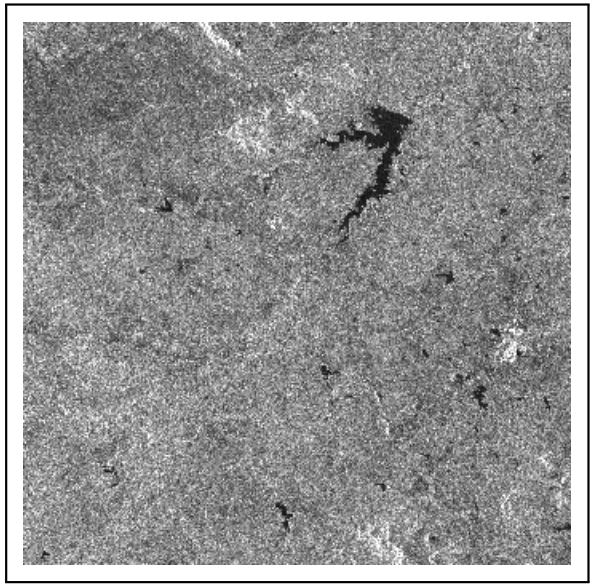
Source: *Zhang et al., 2016*

ndwi2watermask



Source: *ESA, 2018*

sar2watermask



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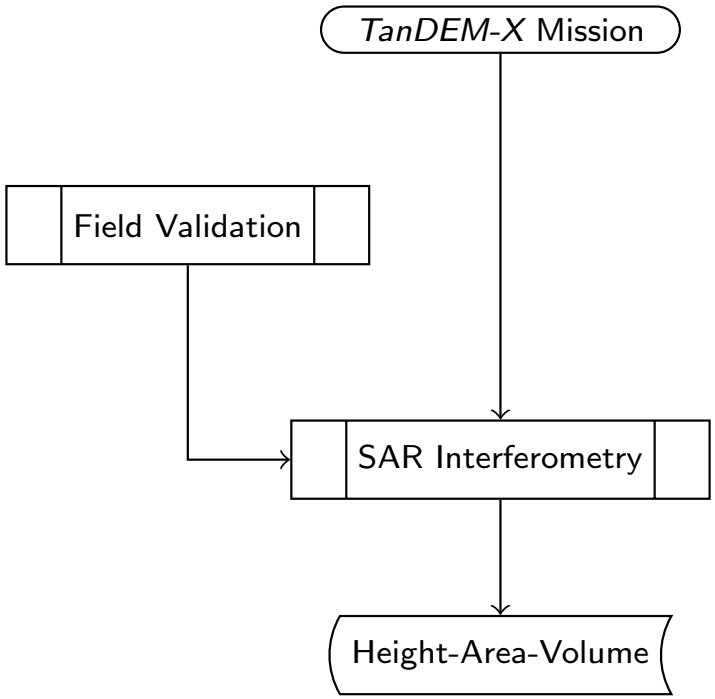

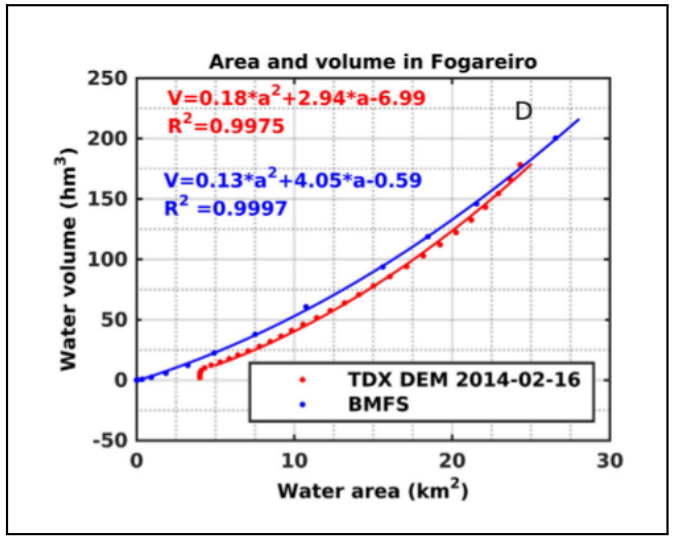

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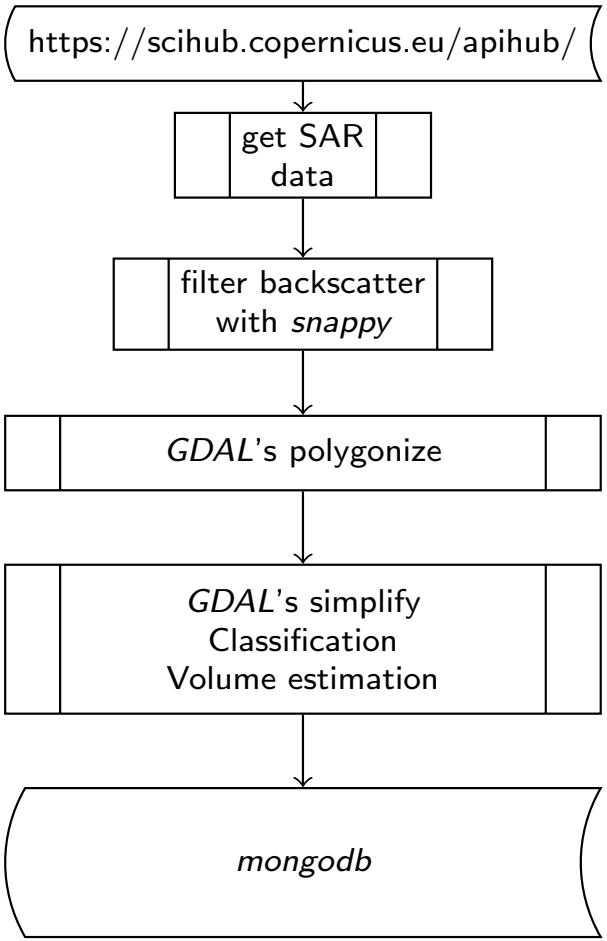
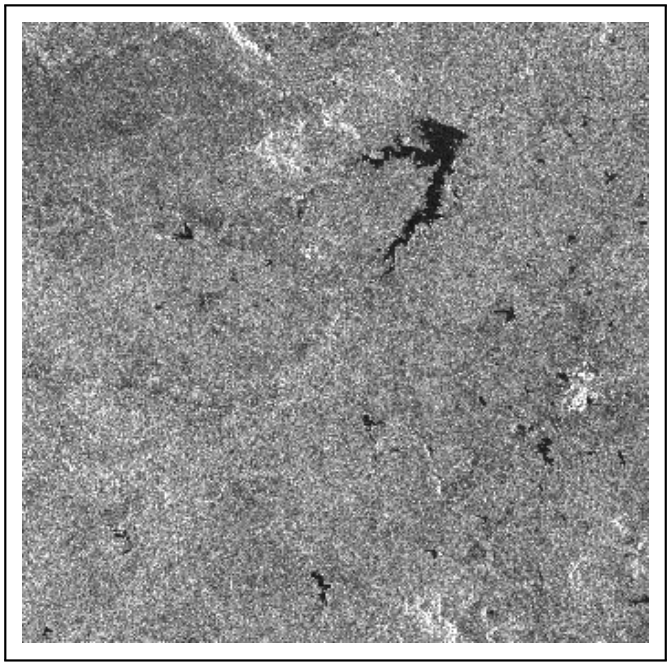
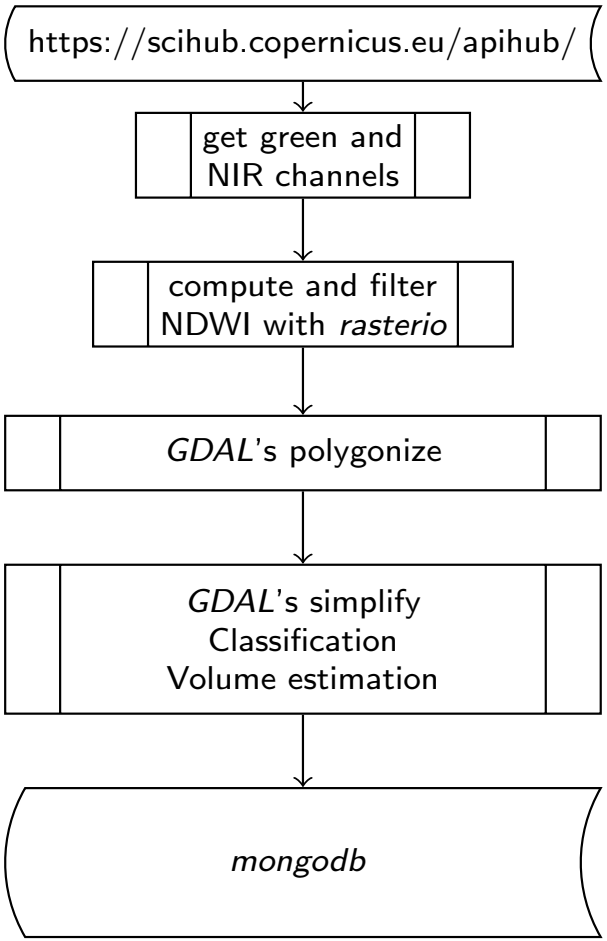
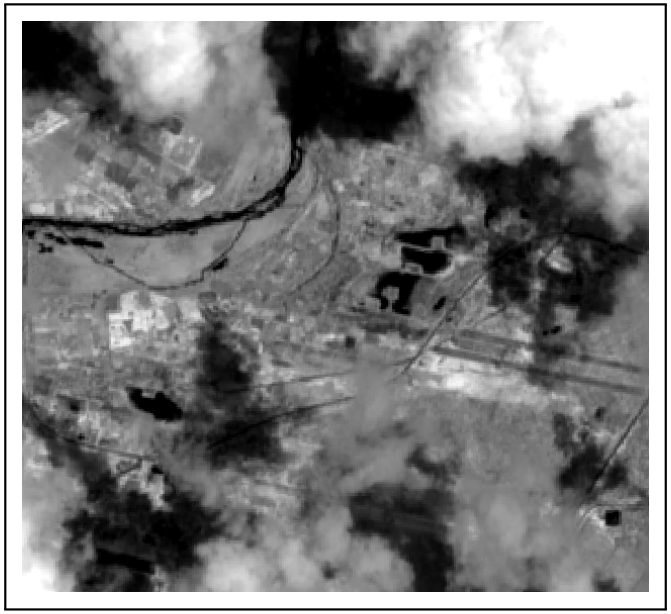




https://github.com/jmigueldelgado/sar2watermask

ndwi2watermask





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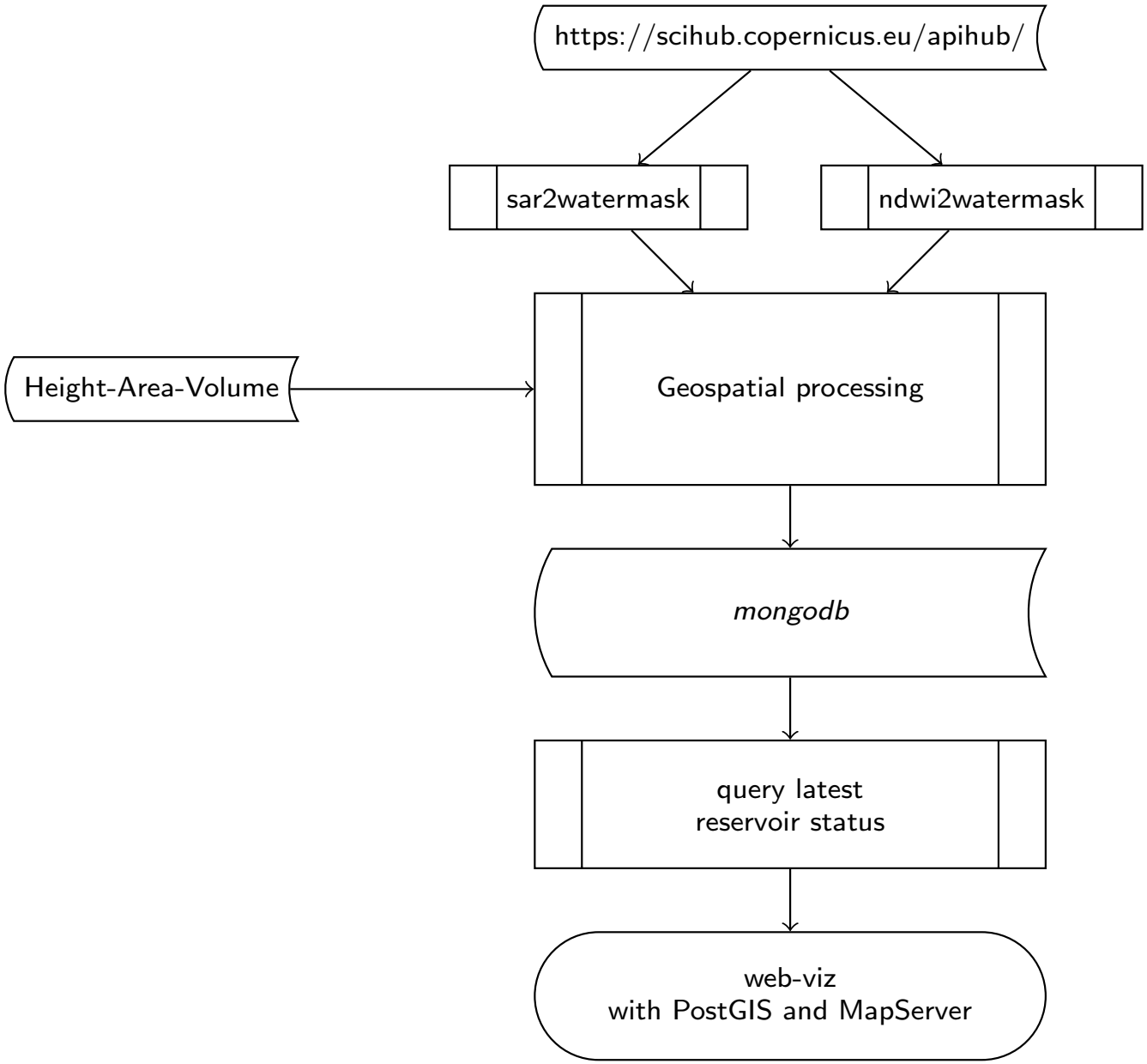
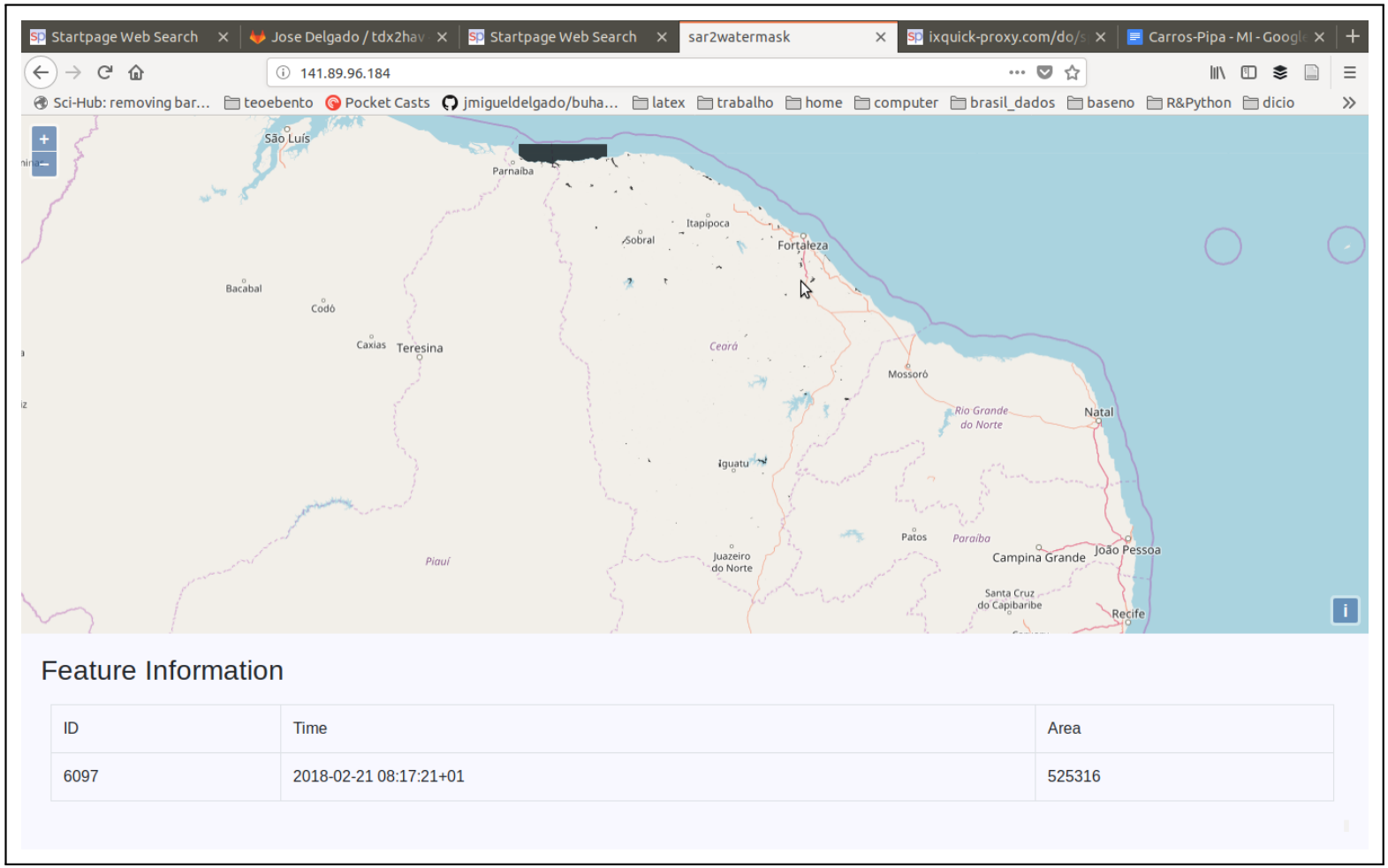
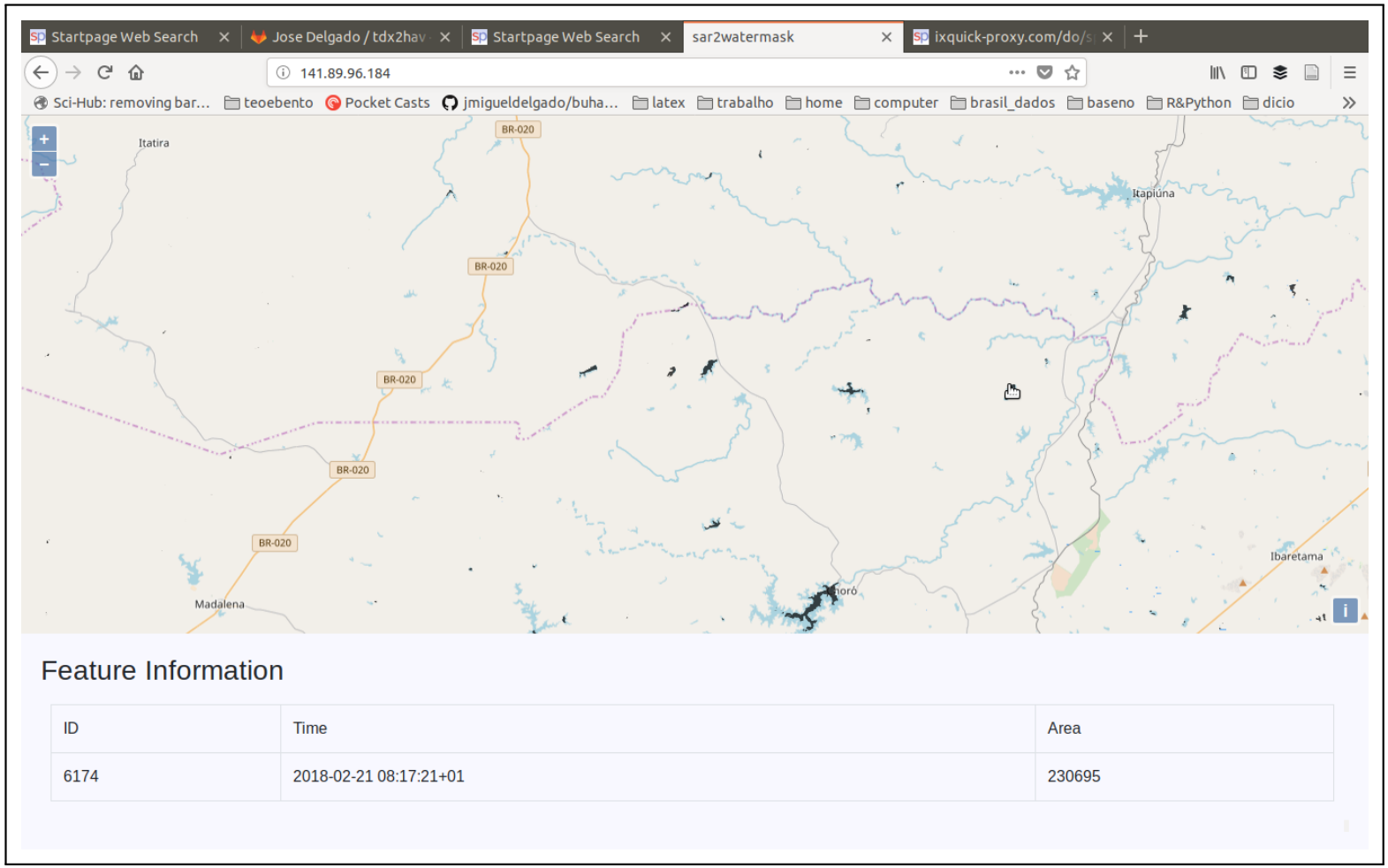

https://scihub.copernicus.eu/apihub/
sar2watermask
ndwi2watermask
Height-Area-Volume
Geospatial processing
mongodb
query latest
reservoir status
web-viz
with PostGIS and MapServer

Outline

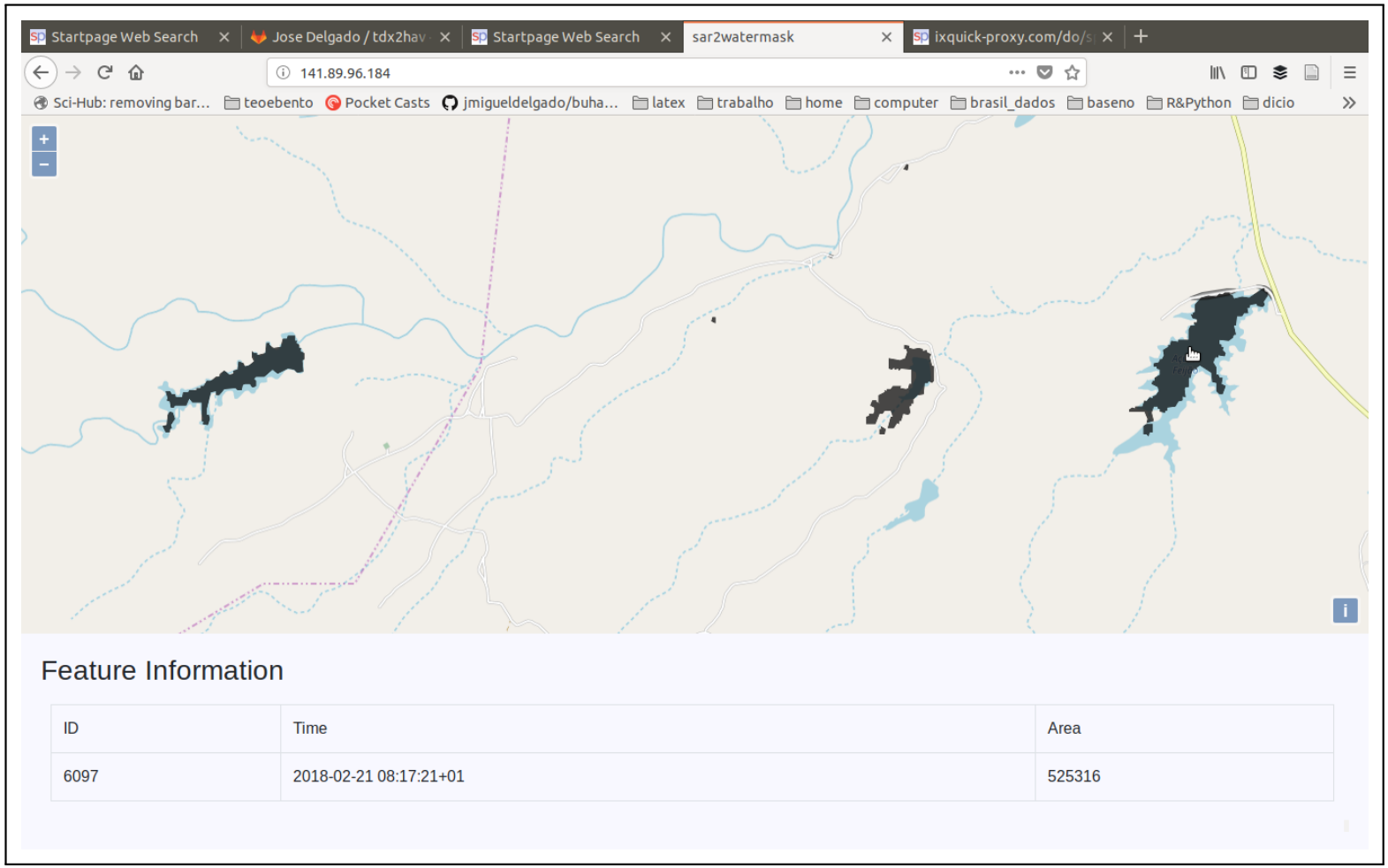
First Results (1)



First Results (2)



First Results (3)



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1. validation with monitored small/medium dams

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2. combining with community level water usage (watering animals, irrigation, human consumption)

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2. combining with community level water usage (watering animals, irrigation, human consumption)
3. assimilation of small dam volumes into hydrological model

Our repositories and websites:

- http://seca-vista.geo.uni-potsdam.de
- http://github.com/jmigueldelgado/buhayra
- http://gitlab.com/jmigueldelgado/tdx2hav (still not open to the general public)

Thank you!

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