

Hydrological Regime of Sahelian Small Water Bodies from Combined Sentinel-2 MSI and Sentinel-3 SRAL Data

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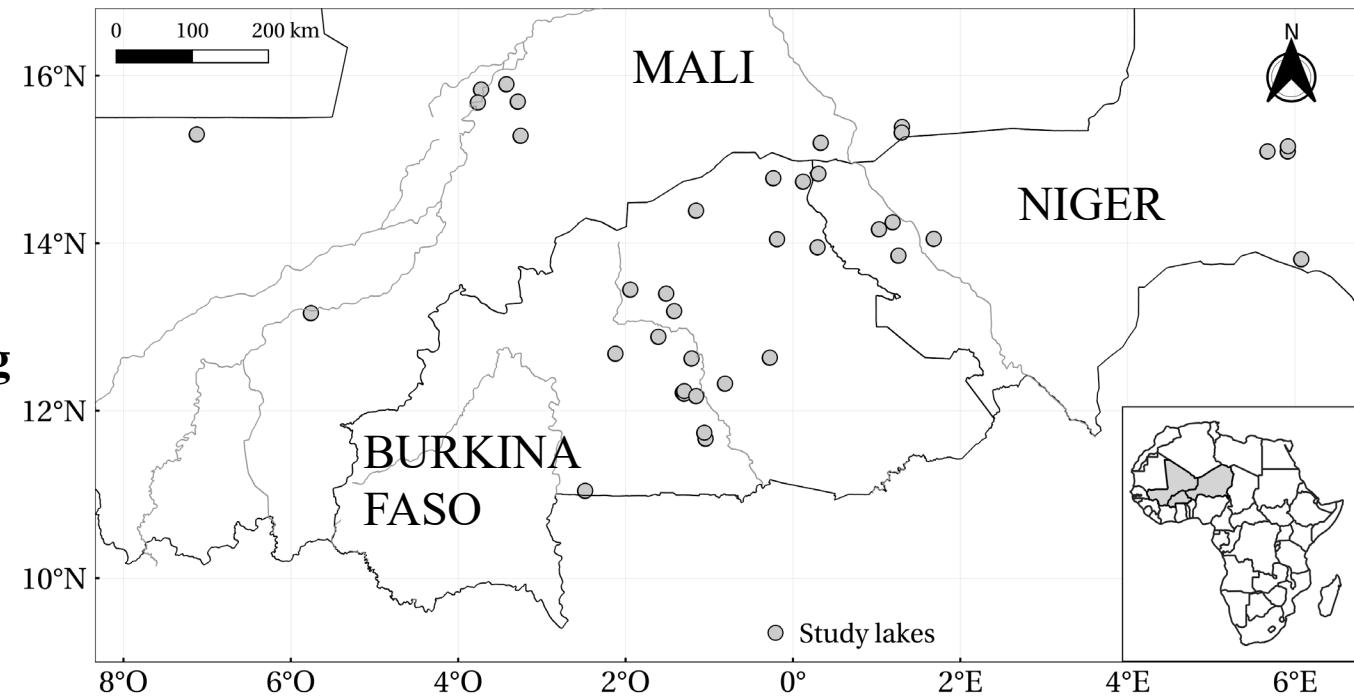
Study sites: 39 **small water bodies** (ponds, reservoir, lakes)

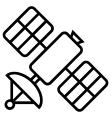
Environmental and human issues: **vital resources, greenhouse gases and biodiversity impact**

Objectives:

- Better understanding of the **hydrological functioning** of small water bodies in a large scale
- Better **management** of water resources (volume and water uses)

Study area: **Central Sahel**

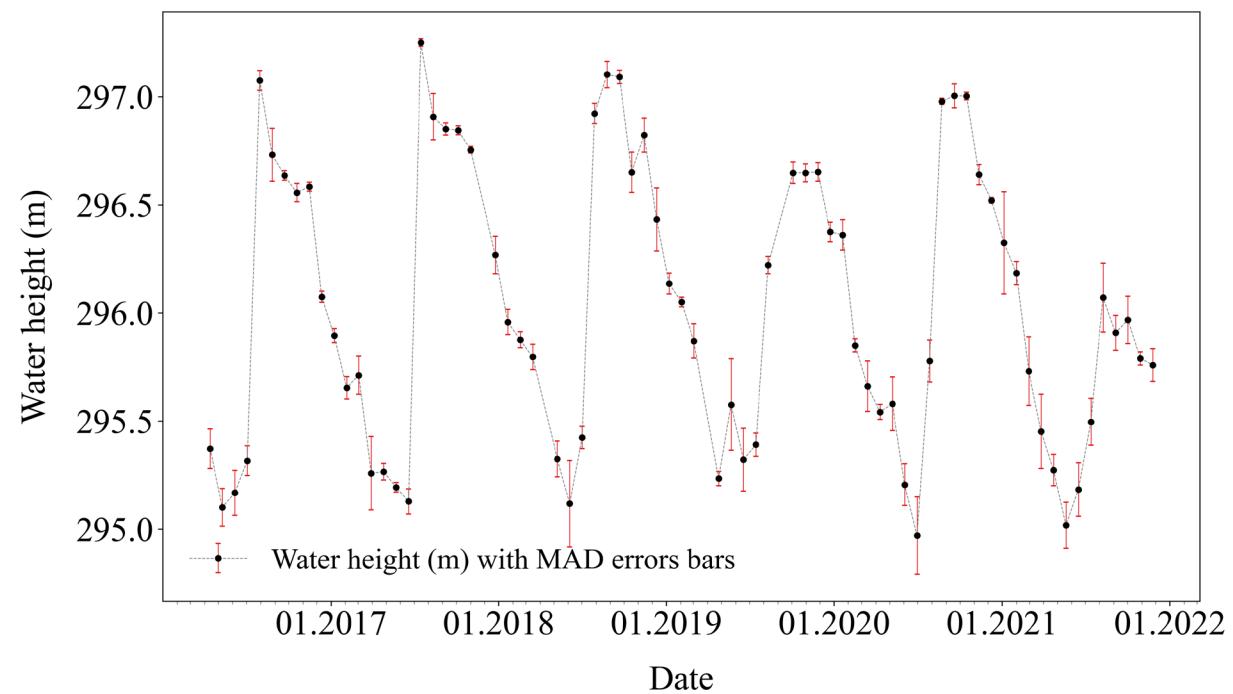




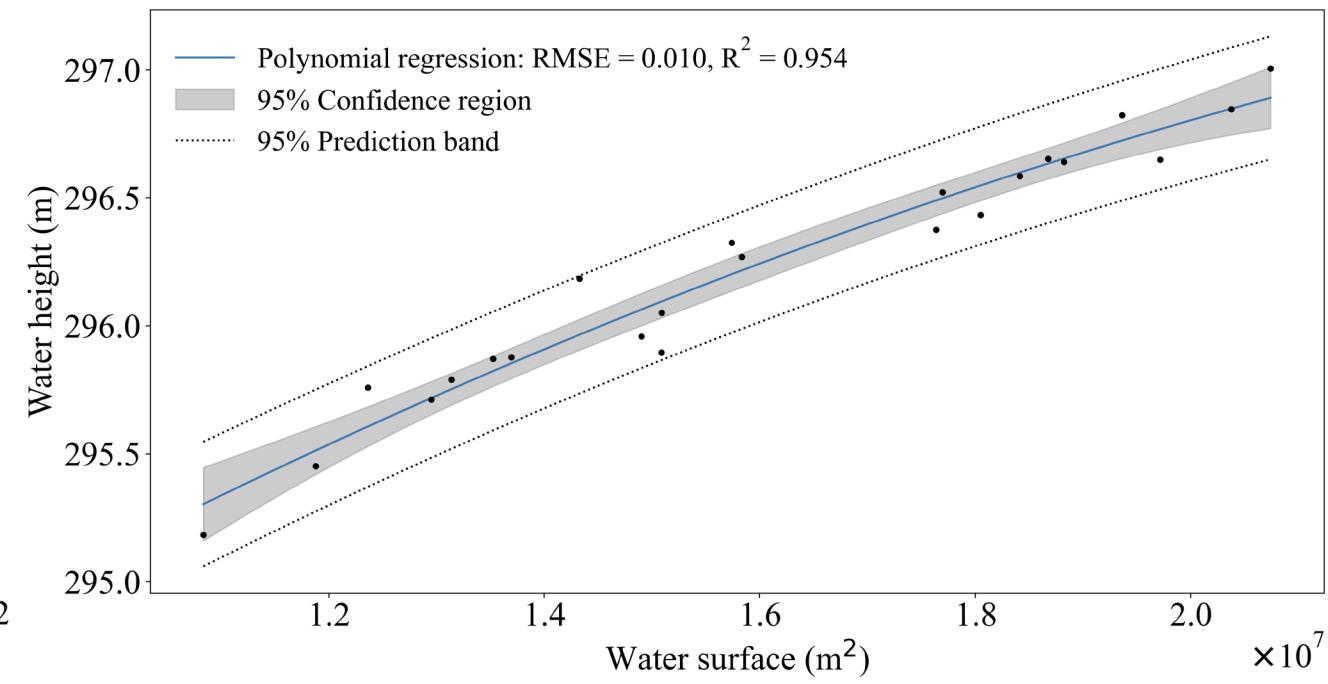
METHOD

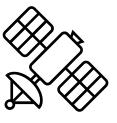
Densification of the water heights time series

Water heights
Sentinel-3 SRAL
AlTiS 2.0 (Frappart et al., 2021)
27 days and 300 m x 1.64 km



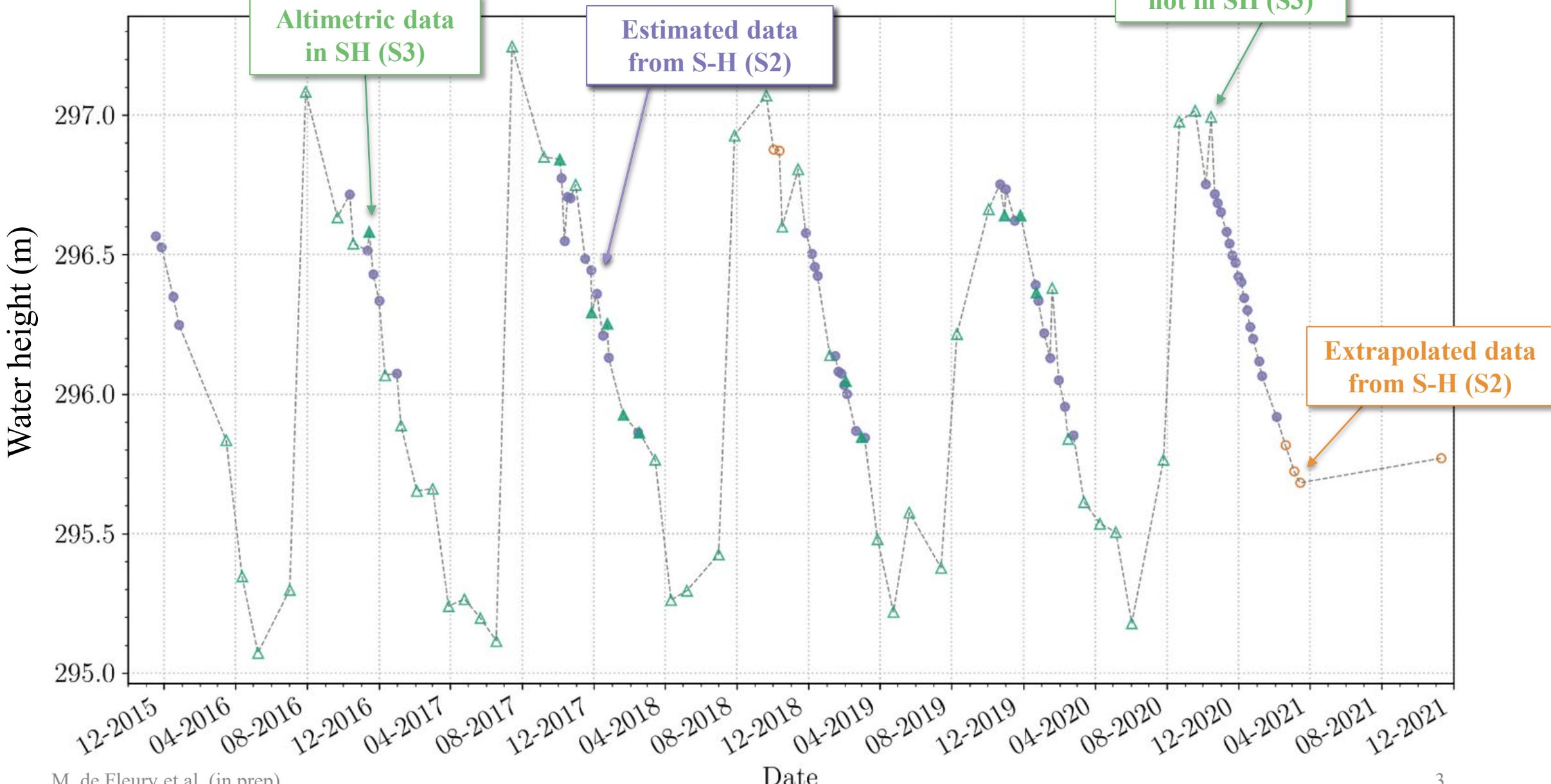
Water surfaces
Sentinel-2 MSI
Google Earth Engine Collection, MNDWI
5 days and 20 m

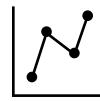




METHOD

Densification of the water heights time series





METHOD

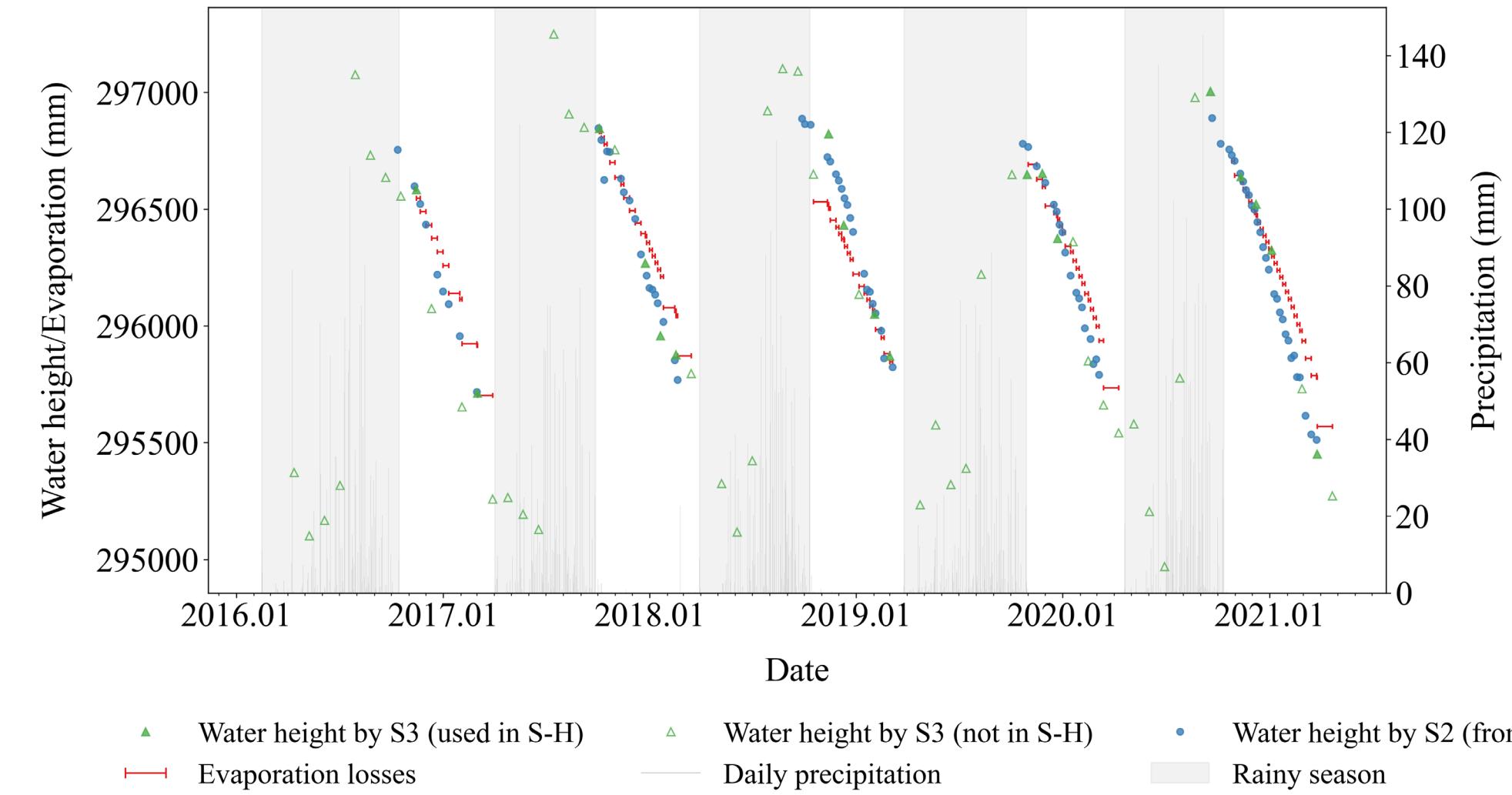
Water balance estimation

$$\Delta H = R + \sum_i (P_i + E_i)$$

precipitation (IMERG)

evaporation (ERA5)

Penman (Mc Mahon et al., 2013 and Gal et al., 2016)



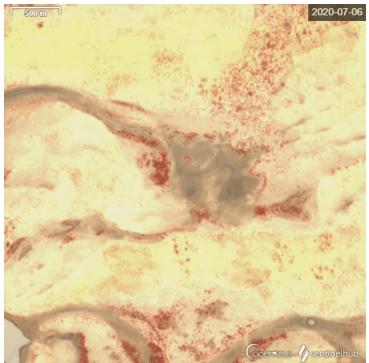
(Fowe et al., 2015)

✓ = RESULTS: 5-year averaged residual

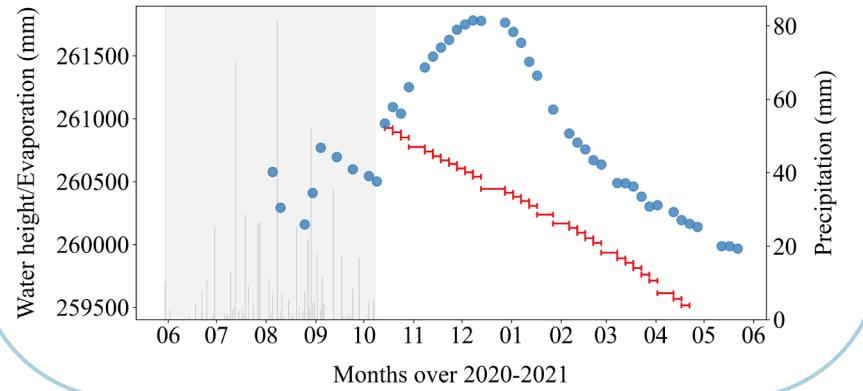


SWOT contribution: more study sites

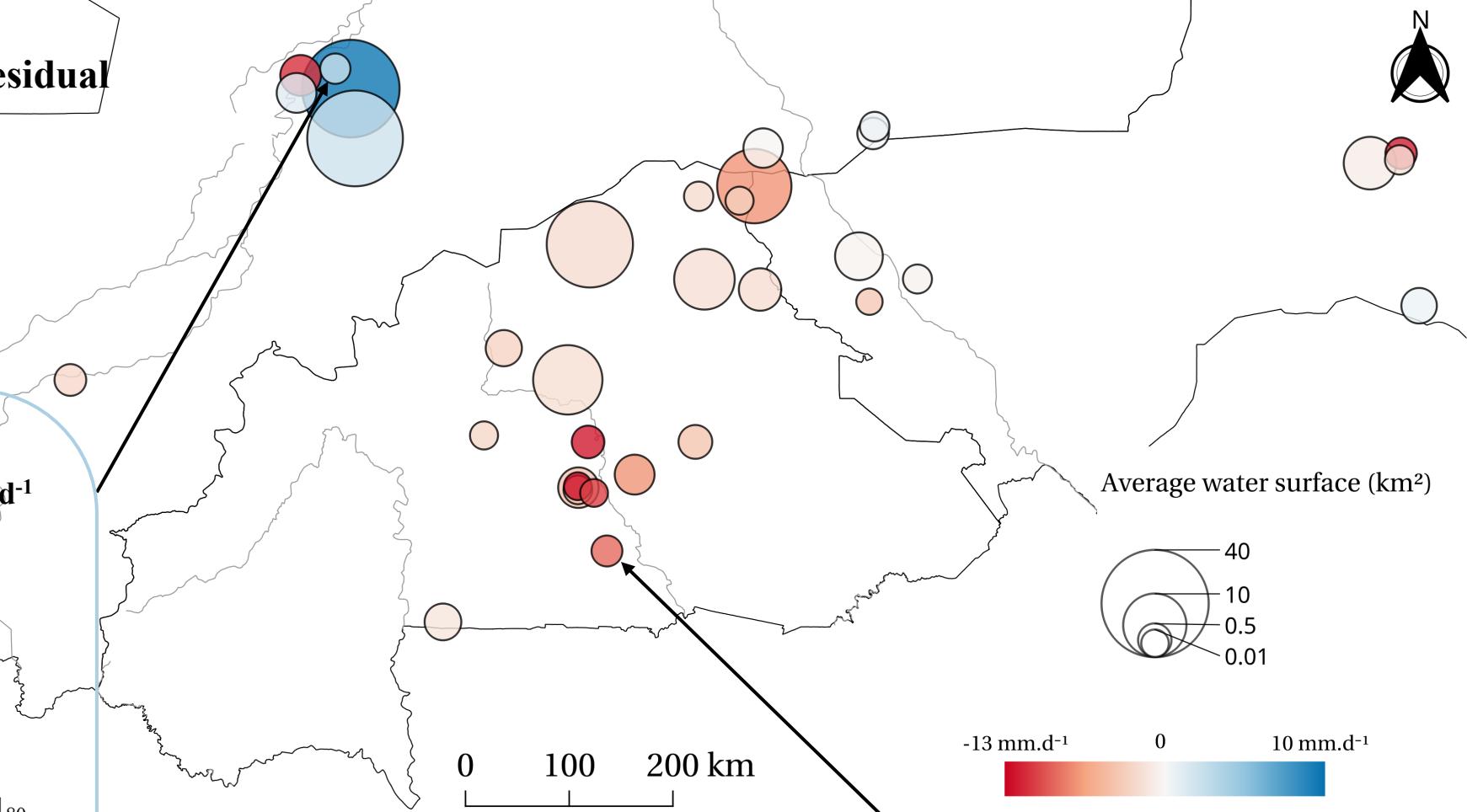
Bokoko lake, Sentinel-2 False Color



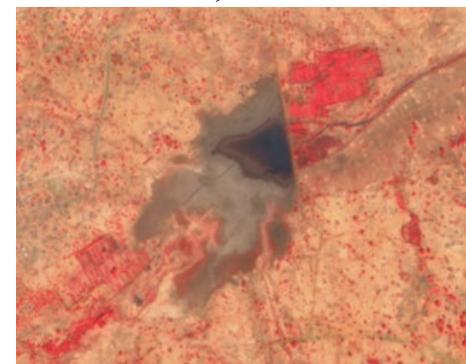
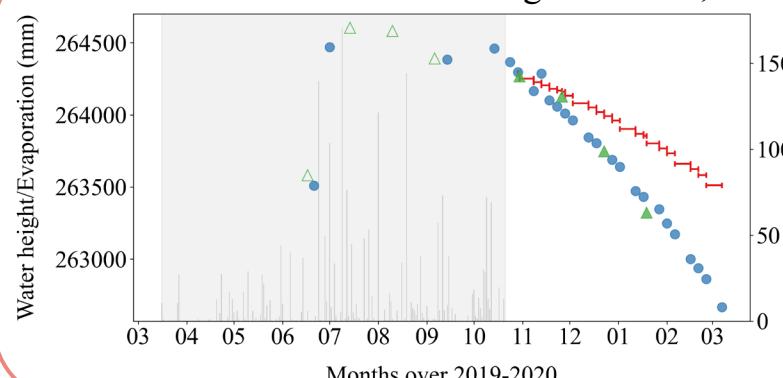
$$R = 2.79 \text{ mm.d}^{-1}$$



M. de Fleury et al. (in prep)

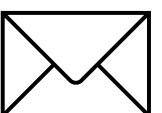


$R = -8.28 \text{ mm.d}^{-1}$ Manga reservoir, Sentinel-2 False Color, 2021-01-21





THANK YOU



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