

Surface Water Dynamics under Changing Climate: Integrating Multi-Sensor Satellite Observations (1999–2025) across the Falkland Islands

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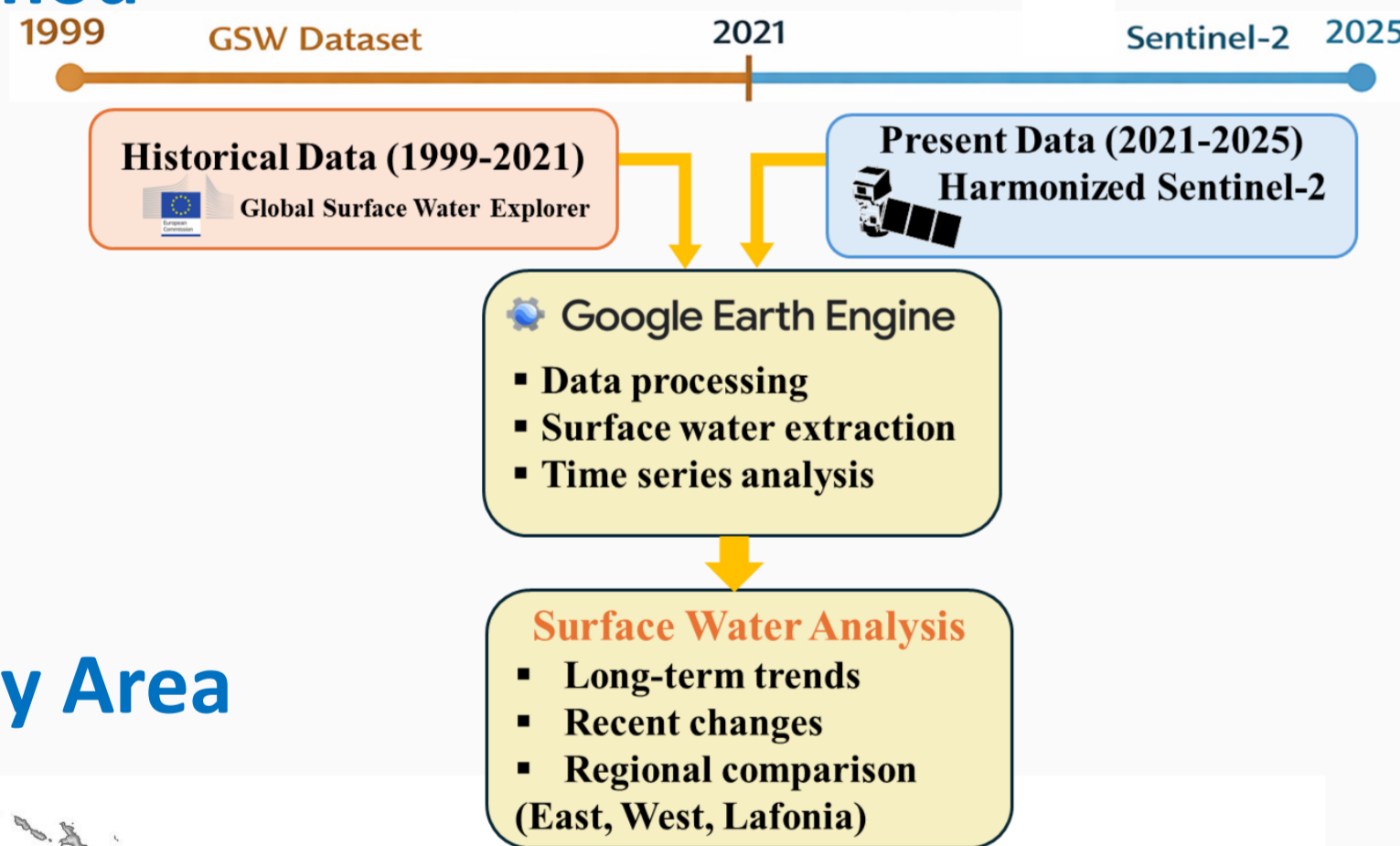
Background

- Falkland Islands facing a drying climate.
- Increasing concerns over water security.
- Limited long-term hydrological data.
- Need for reliable monitoring tools.

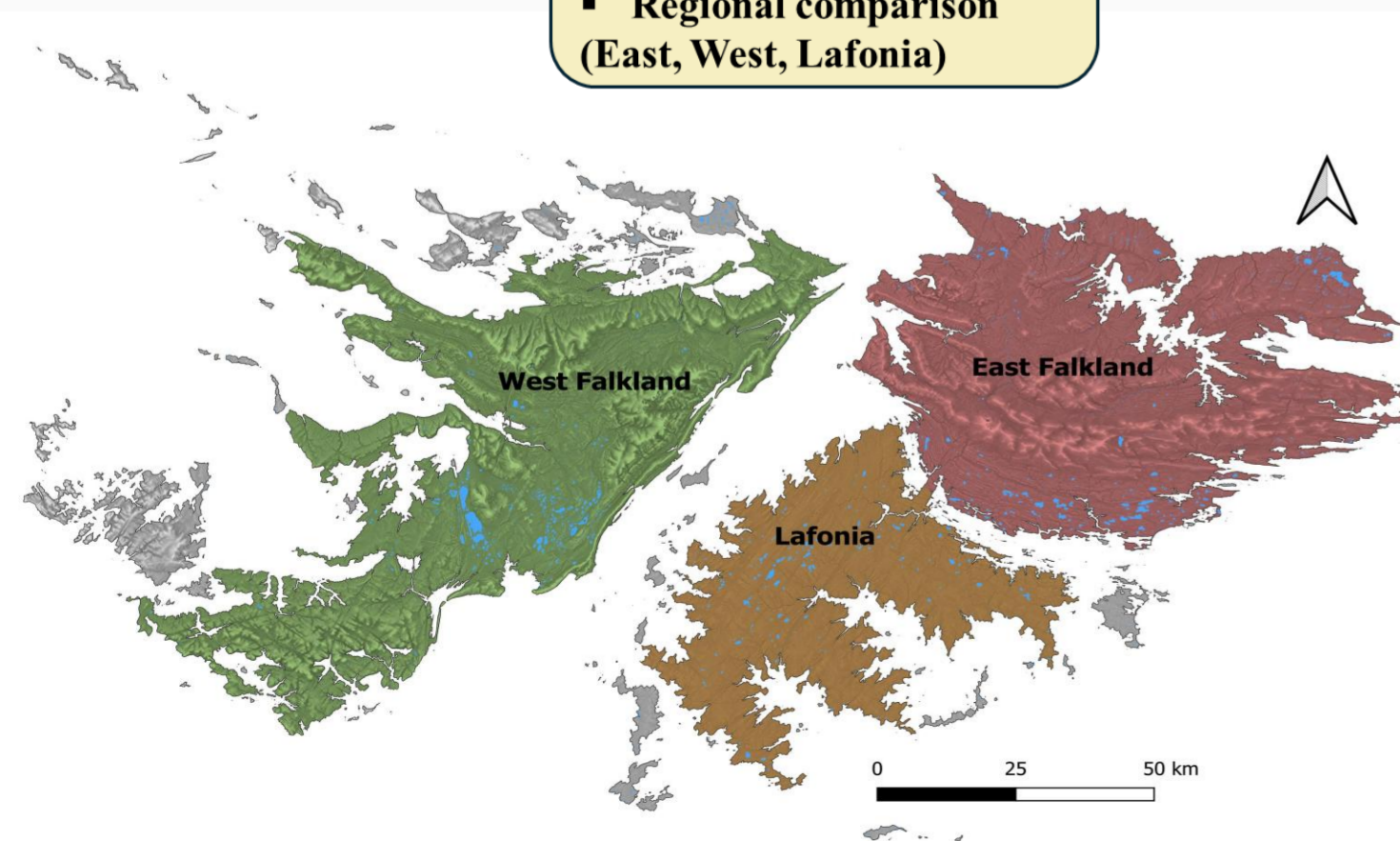
Aim

Quantify long-term and recent changes in surface water area across the Falkland Islands to support climate-resilient water management in a data-scarce region.

Method



Study Area



Results

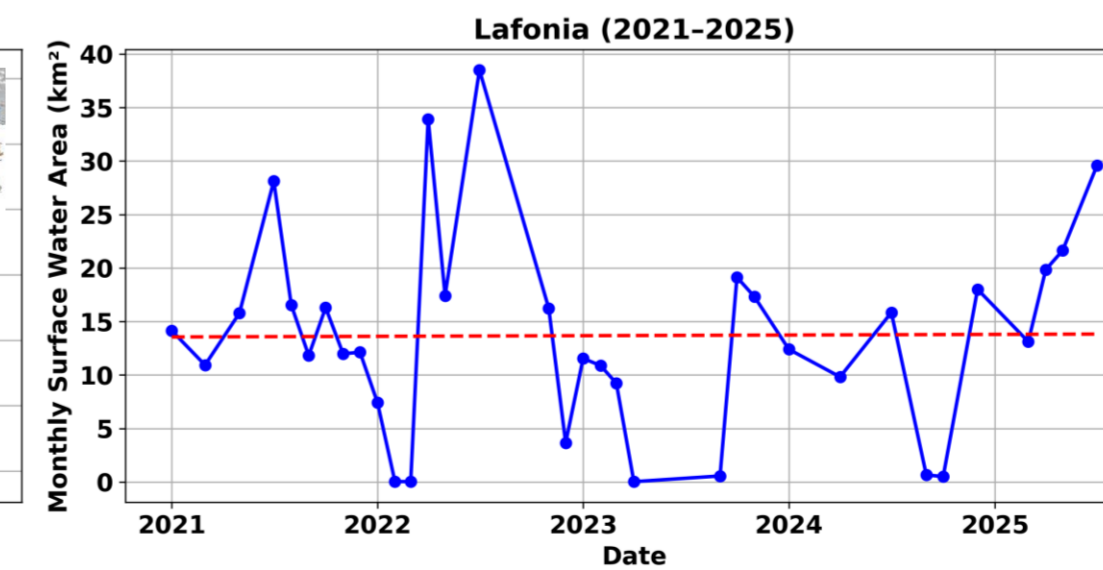
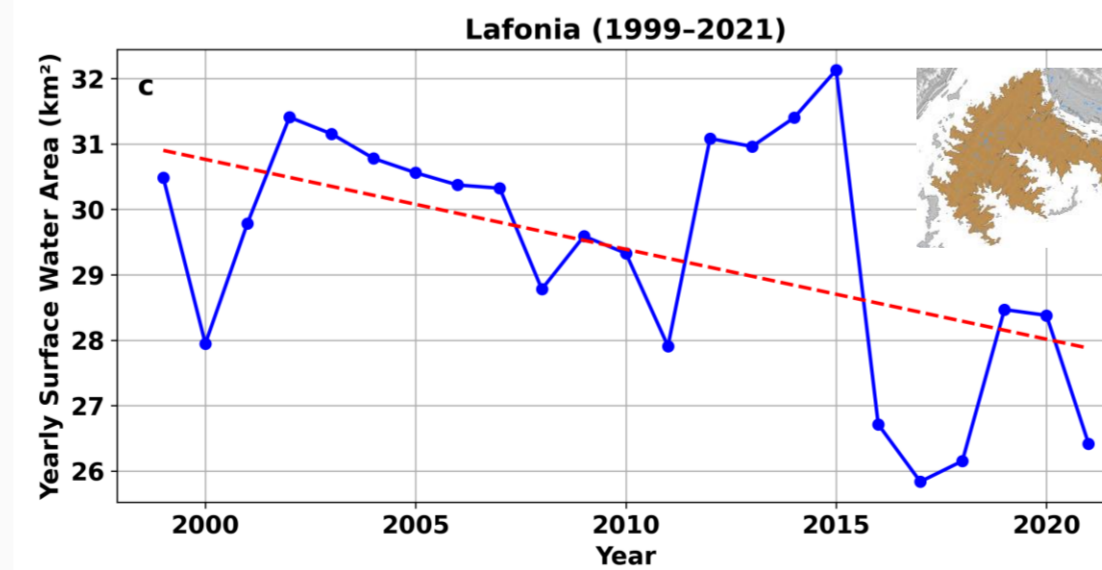
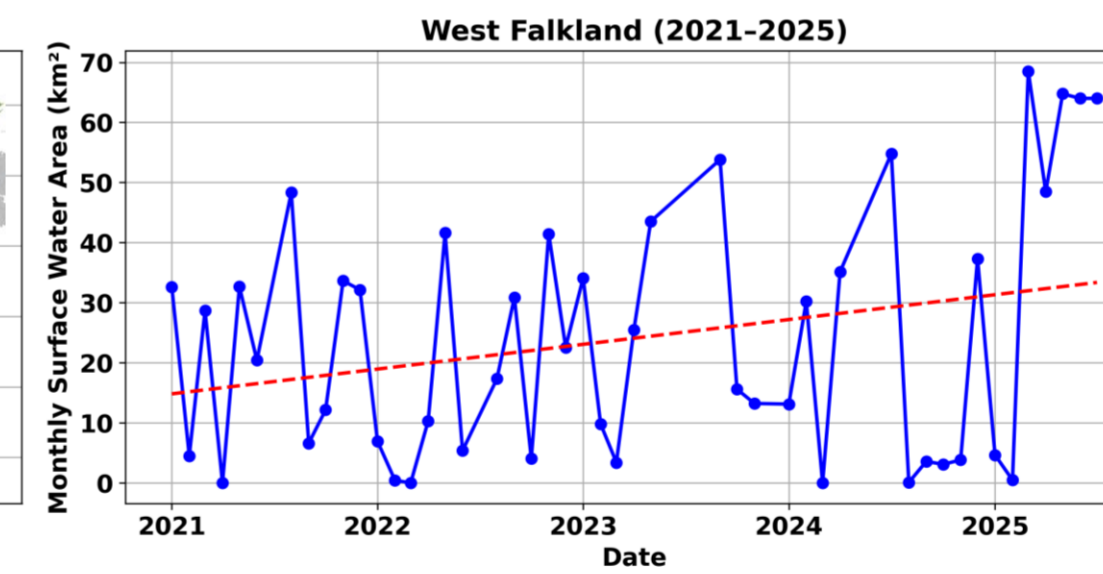
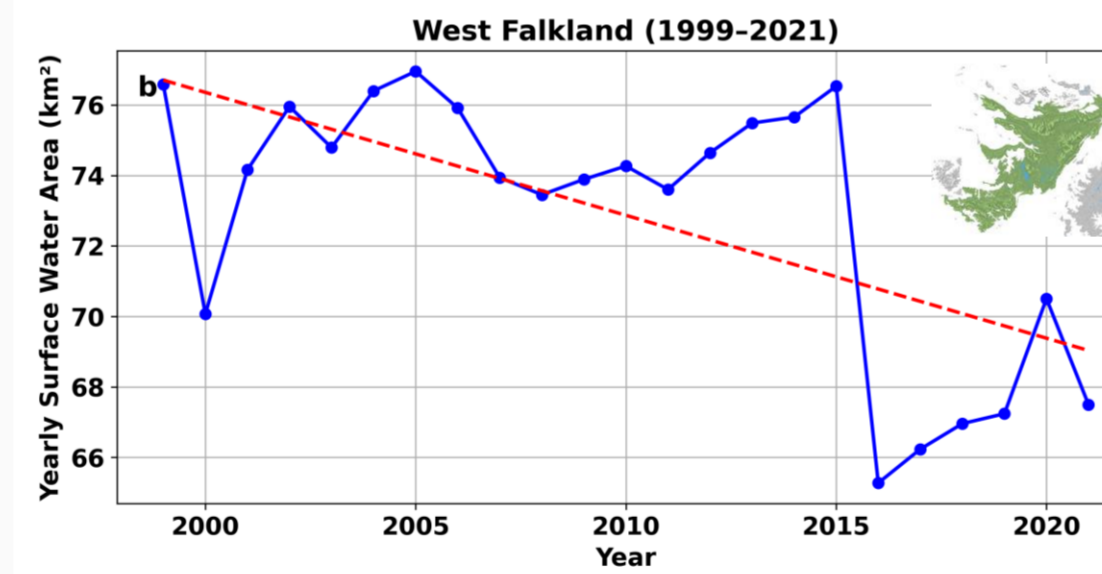
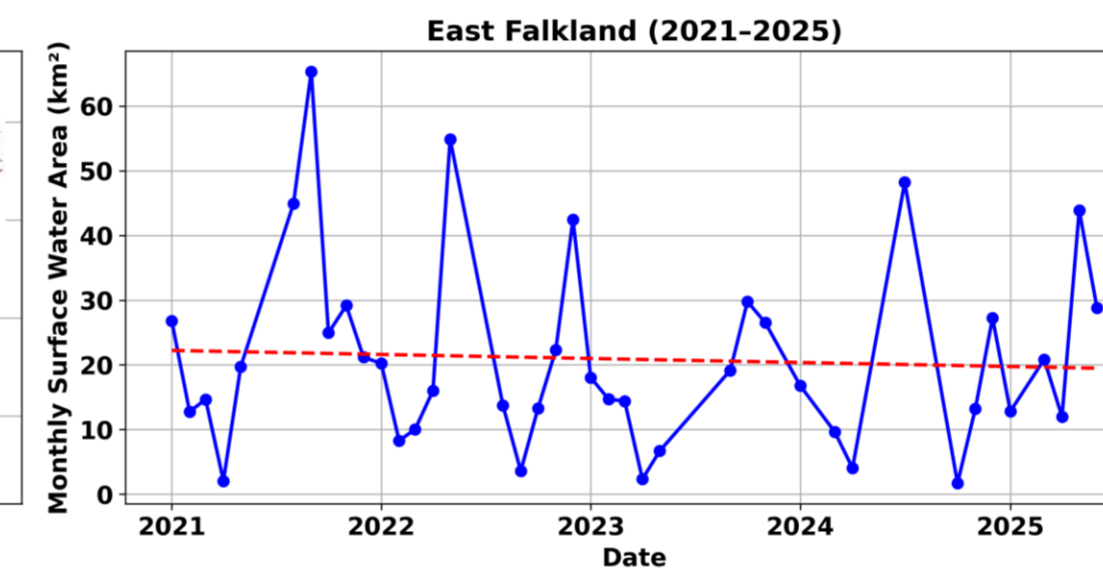
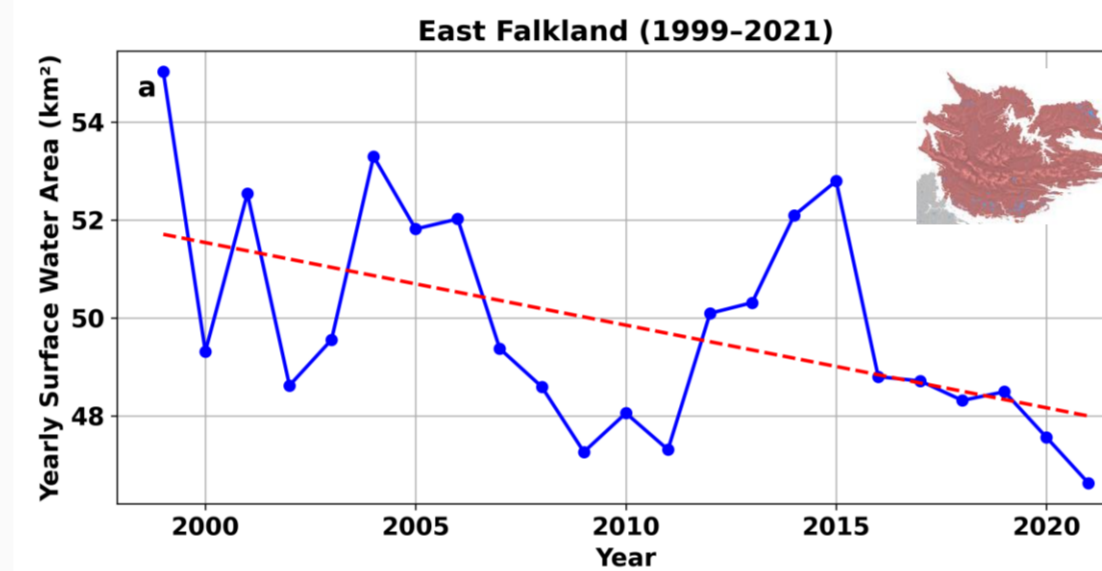
1999 GSW Dataset 2021 Sentinel-2 2025

✓ Overall decline in surface water

✓ East Falkland → stable

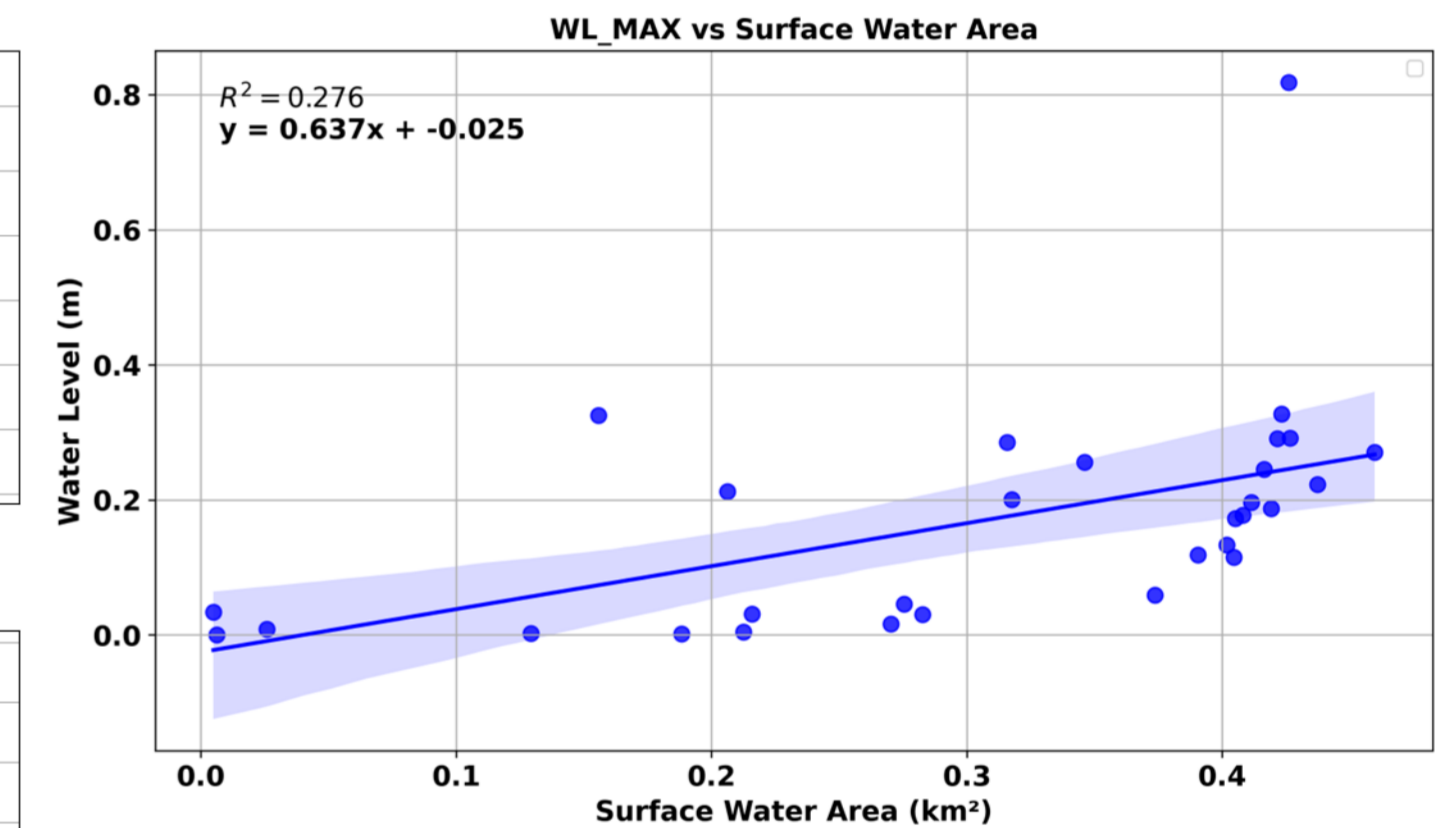
✓ West Falkland → slight increase

✓ Lafonia → strong increase + seasonal variability



Validation with ground data

- Comparison with in-situ water level data (2021-2025)
- Positive correlation between satellite-derived surface water area and measured water levels
- Supports reliability of remote sensing approach



Conclusion

- Surface water is declining, but trends are regionally complex.
- Multi-sensor satellite data captures these dynamics reliably
- Approach enables monitoring in data-scarce environments

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