DPLUS206 Climate impacts on FI past, present and future freshwater dynamics

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2nd July 2025

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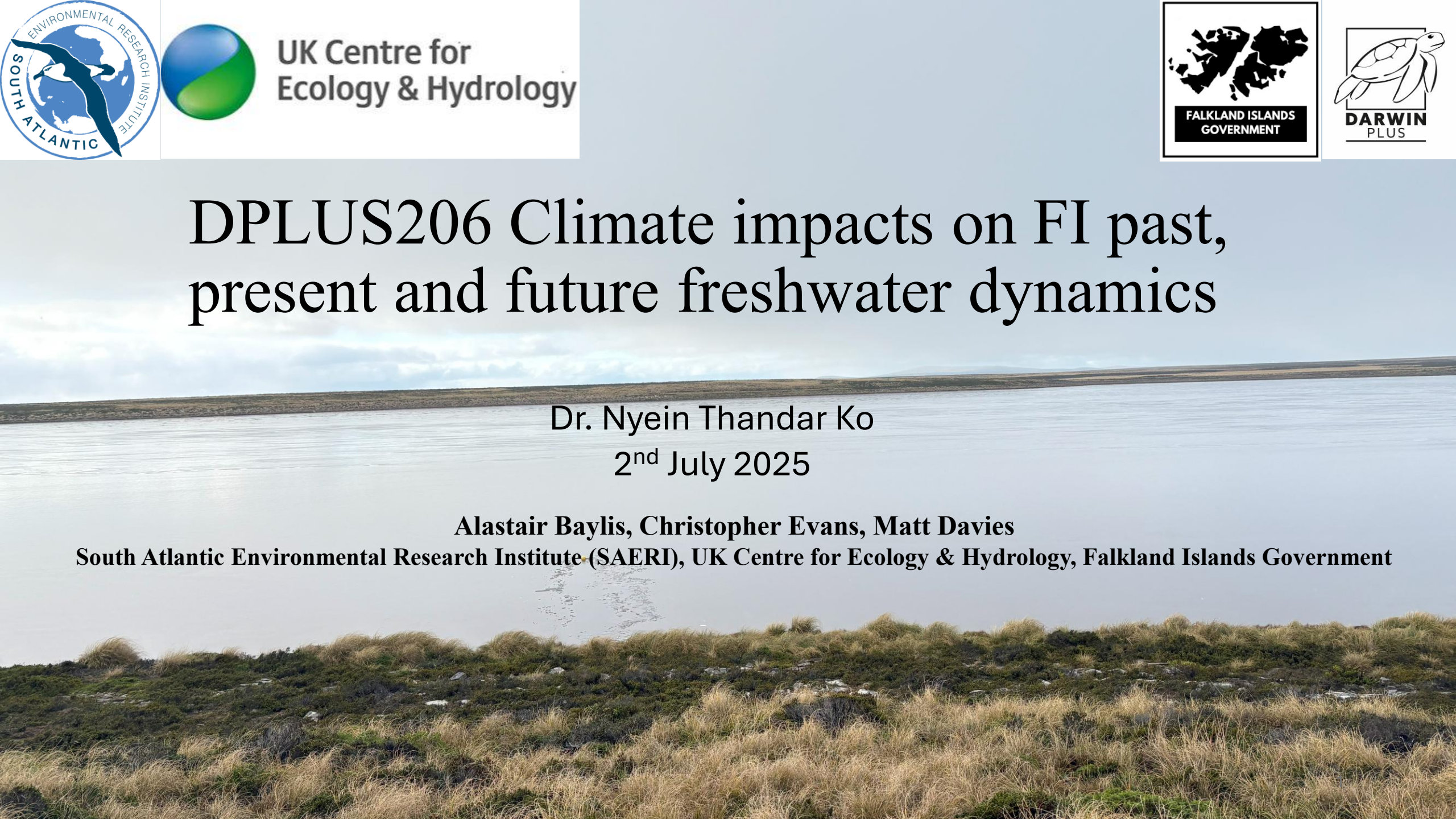
South Atlantic Environmental Research Institute (SAERI), UK Centre for Ecology & Hydrology, Falkland Islands Government



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Who am I?

Myanmar

M.E (Water Engineering and Management)
Asian Institute of Technology
Thailand

PhD (Water Management)
Delft University of Technology
The Netherlands

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Content

FALKLAND ISLANDS GOVERNMENT

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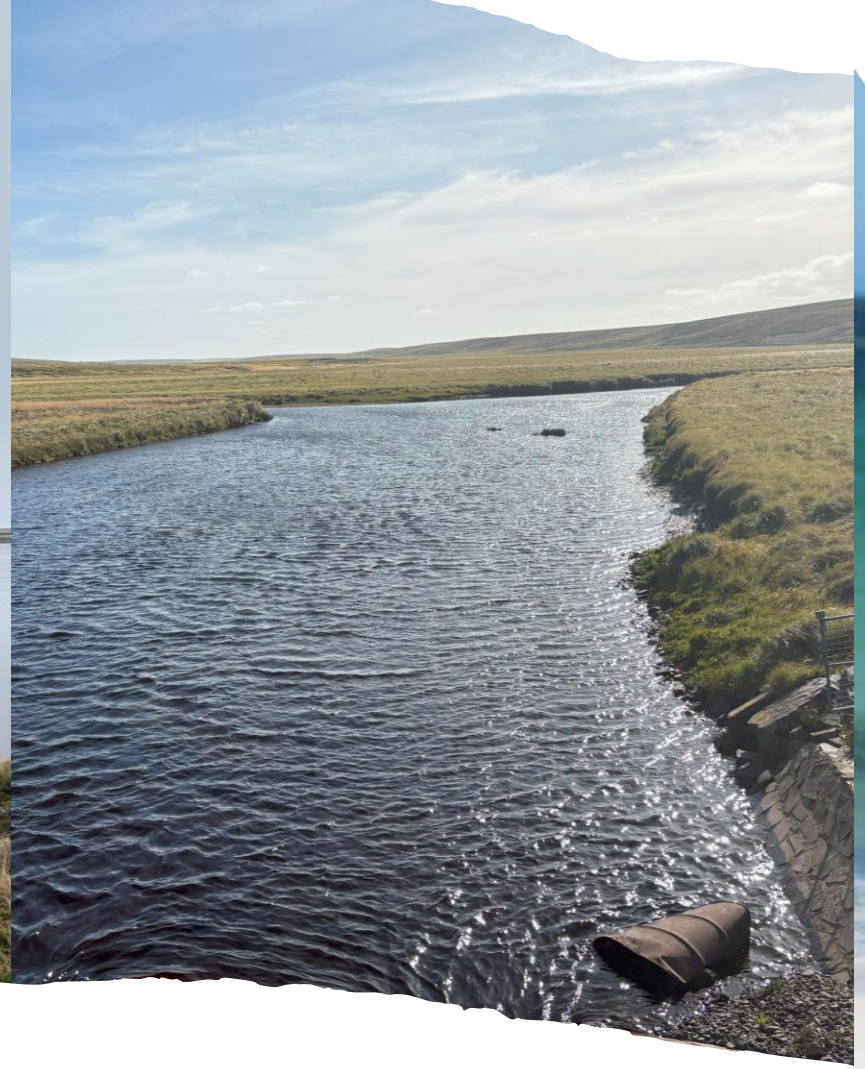

Why Does Freshwater Matter for the Falklands?

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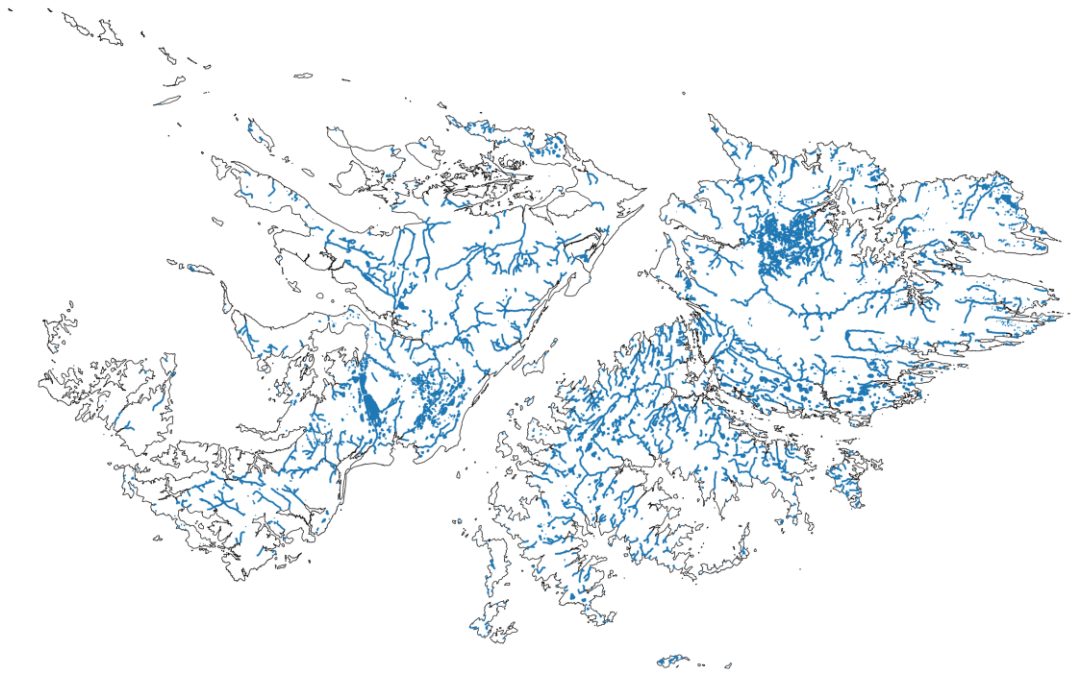

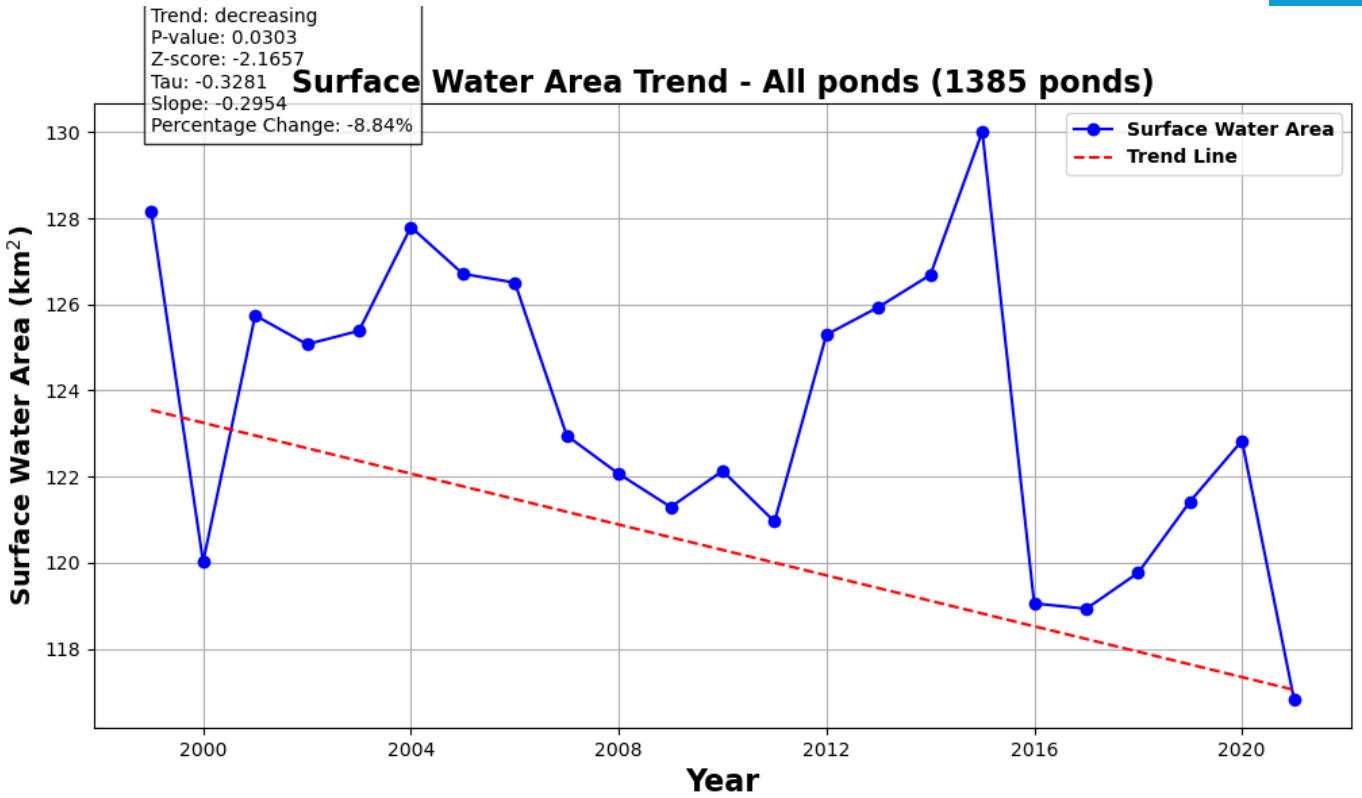

What Is This Project About?

- ✓ Studying how climate change affects **freshwater in the Falklands**
- ✓ Looking at the **past, present, and future**
- ✓ Collecting data on **soil moisture and surface water**
- ✓ Understanding how **climate changes** affects water
- ✓ Creating models to show **future risks**
- ✓ Goal: Help the Falklands manage water **more sustainably**

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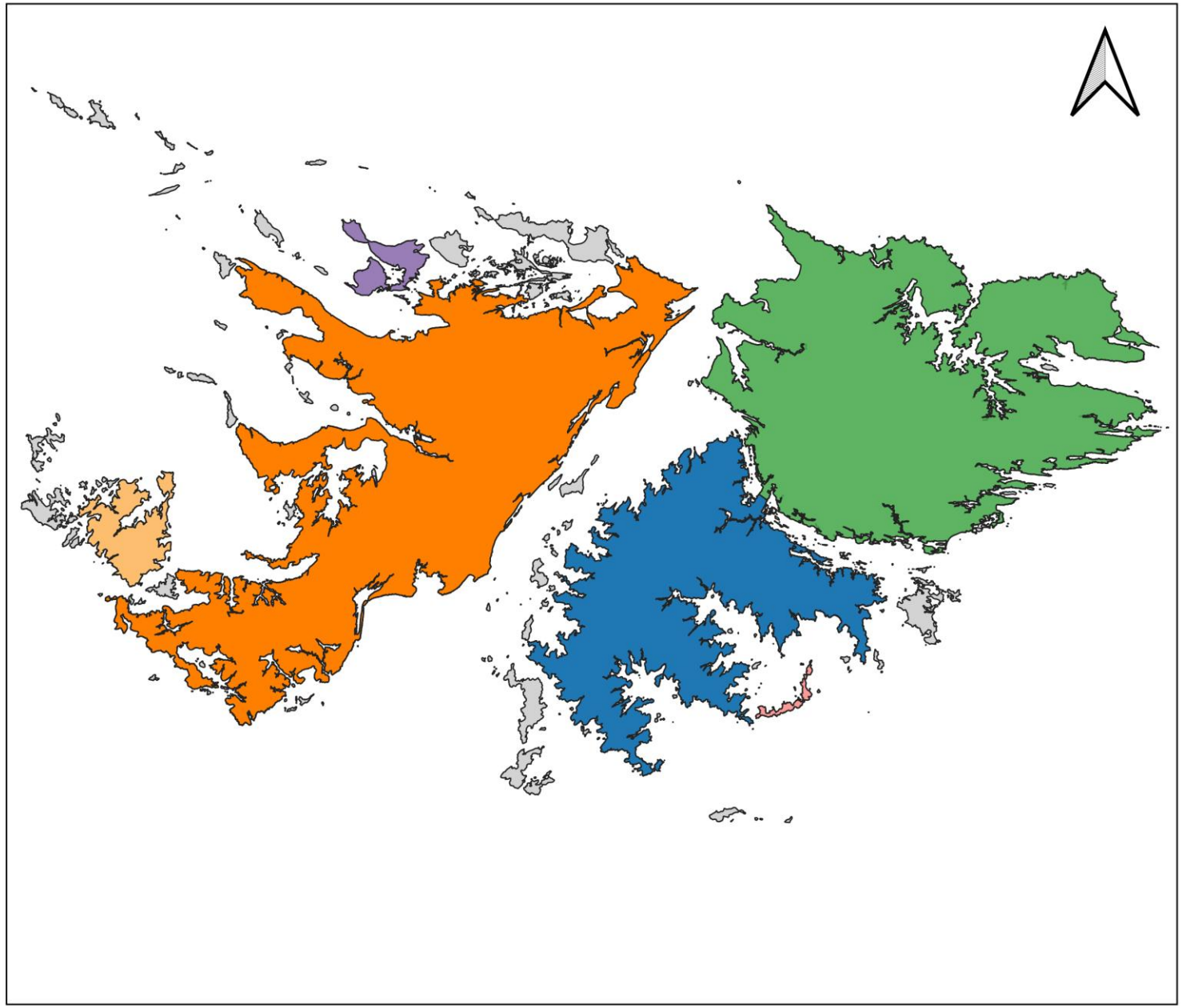
Where Is the Research Happening?



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Please note! This map is created for Project DPLUS206 Climate Change on Falkland Islands past, present and future Freshwater Dynamics, funded by the UK Government through Darwin Plus Local funding and Falkland Islands Government.

Map CRS: WGS 84 / Pseudo-Mercator EPSG:3857

Scale: 1: @ A4

Drawn by: Nyein Ko @ SAERI (26/06/2025)

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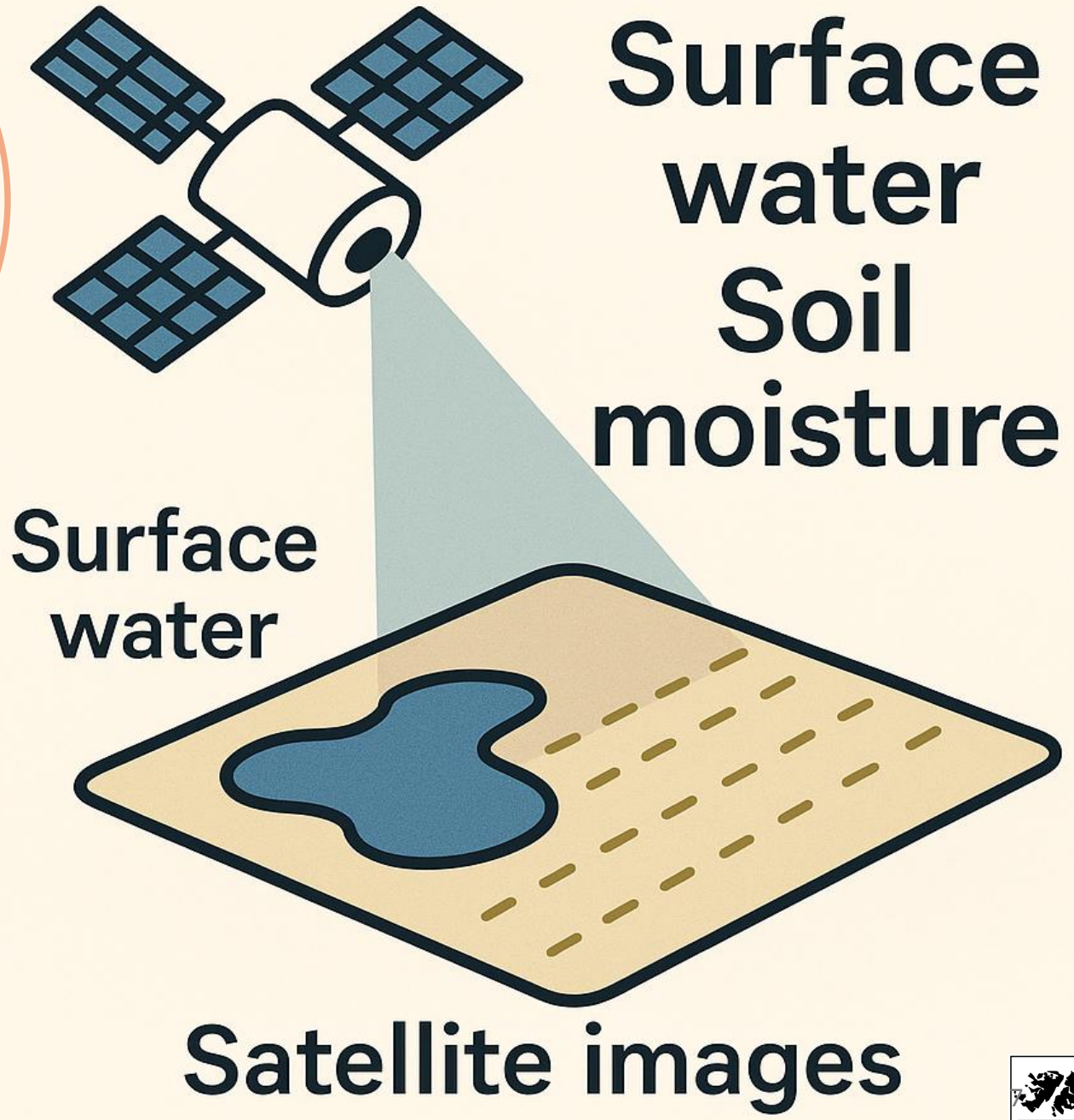
What Do We Monitor and How?

Disappearing lake (Lake Milh-Iraq)
Global Surface Water Explorer



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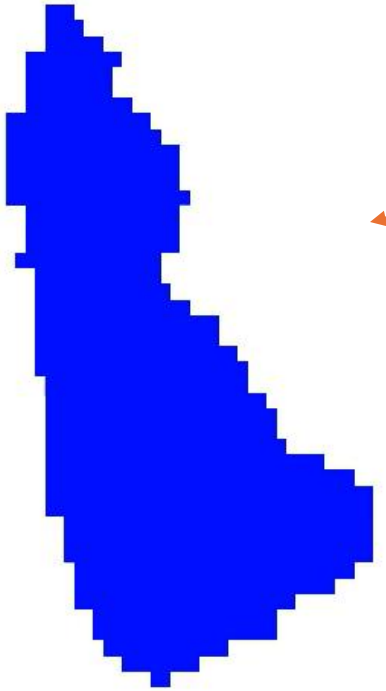
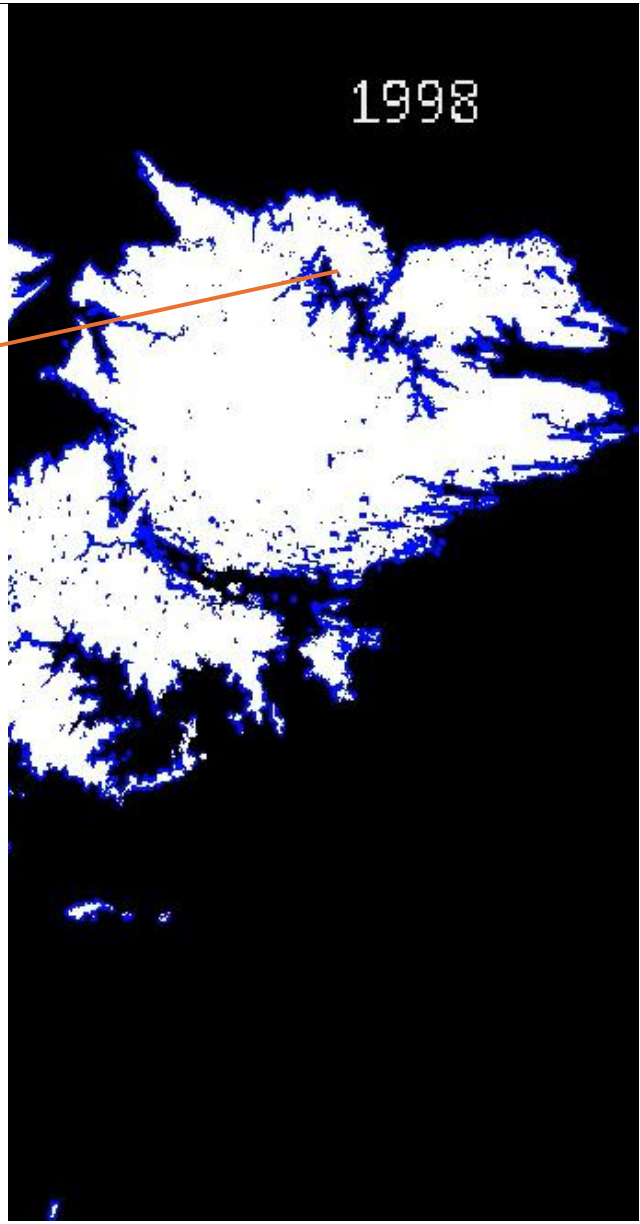
Surface water area (GSW Global Surface Water dataset via Google Earth Engine)

8 months progress

What Have We Found So Far?





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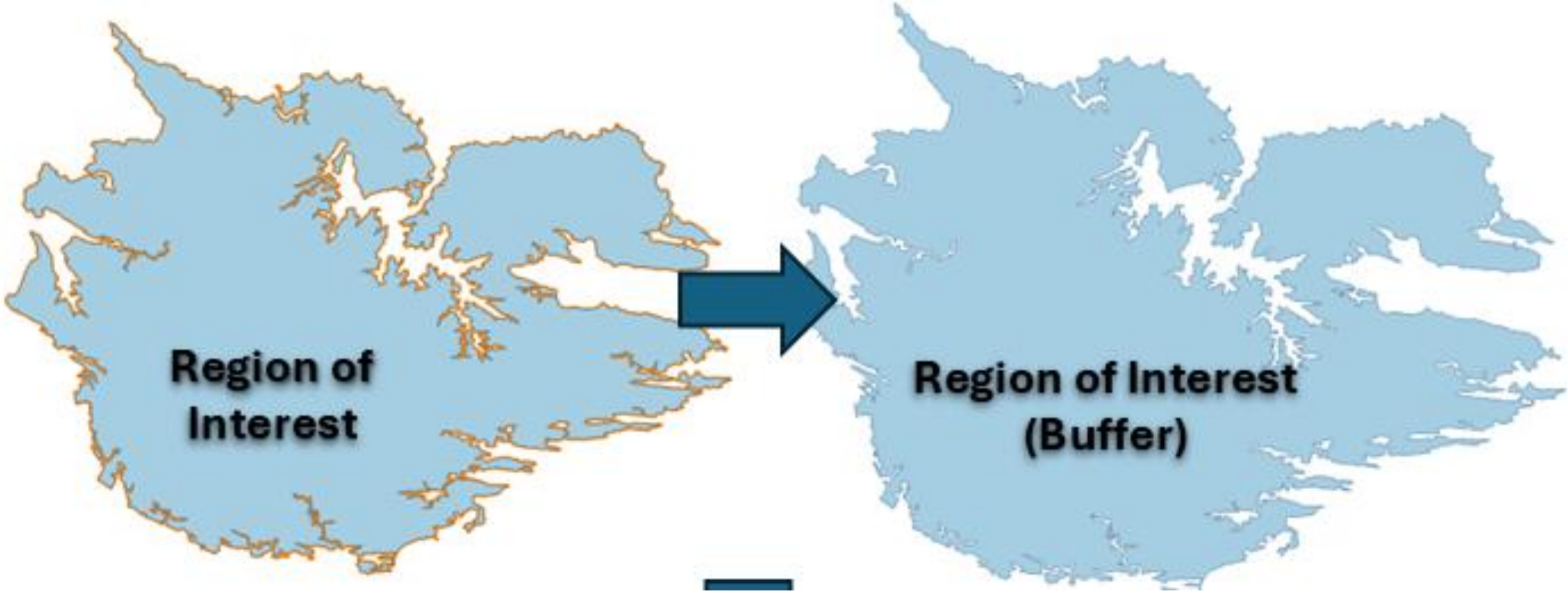
Surface water area (only freshwater)



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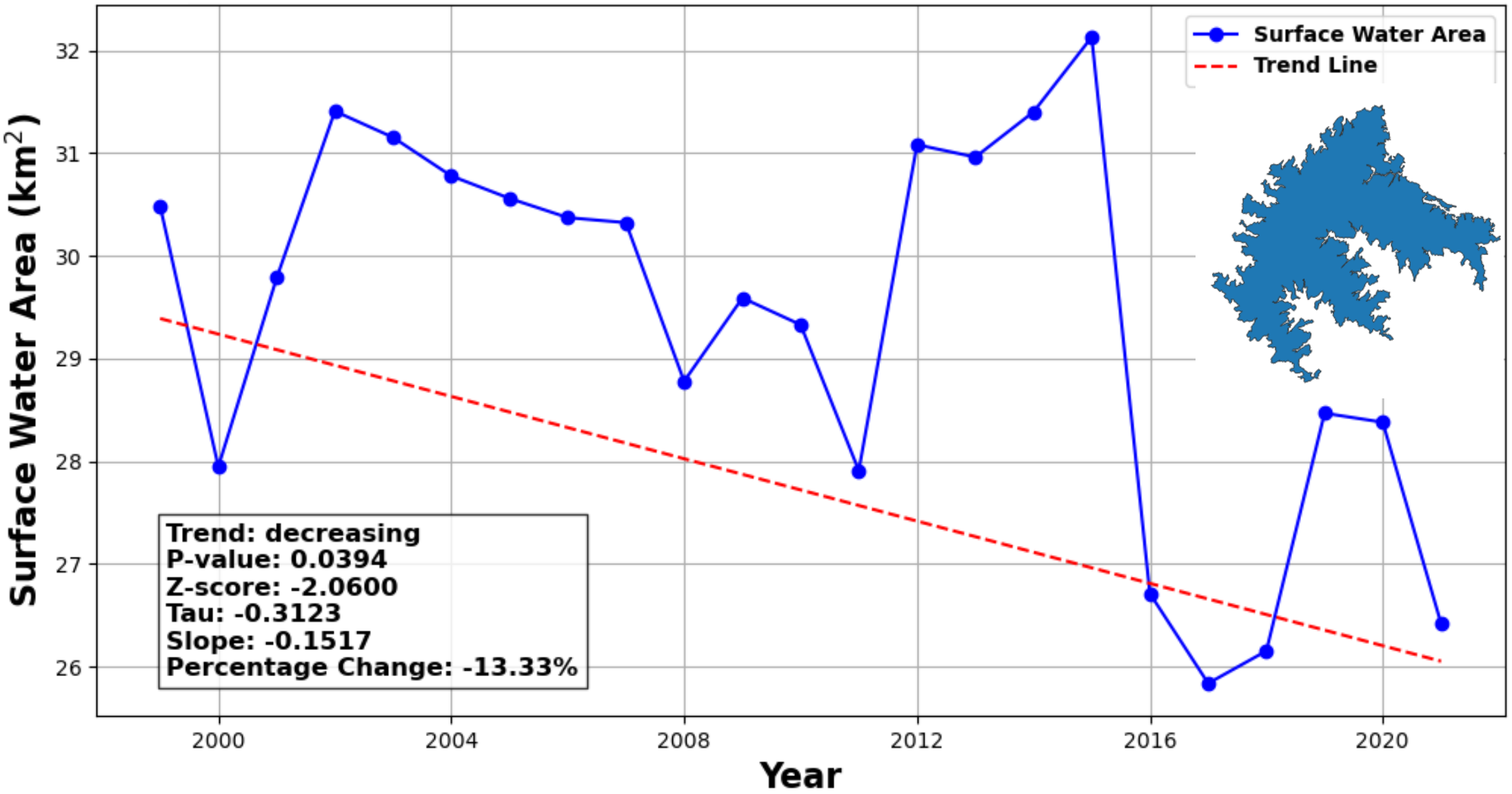
Surface Water Area Trend - Lafonia



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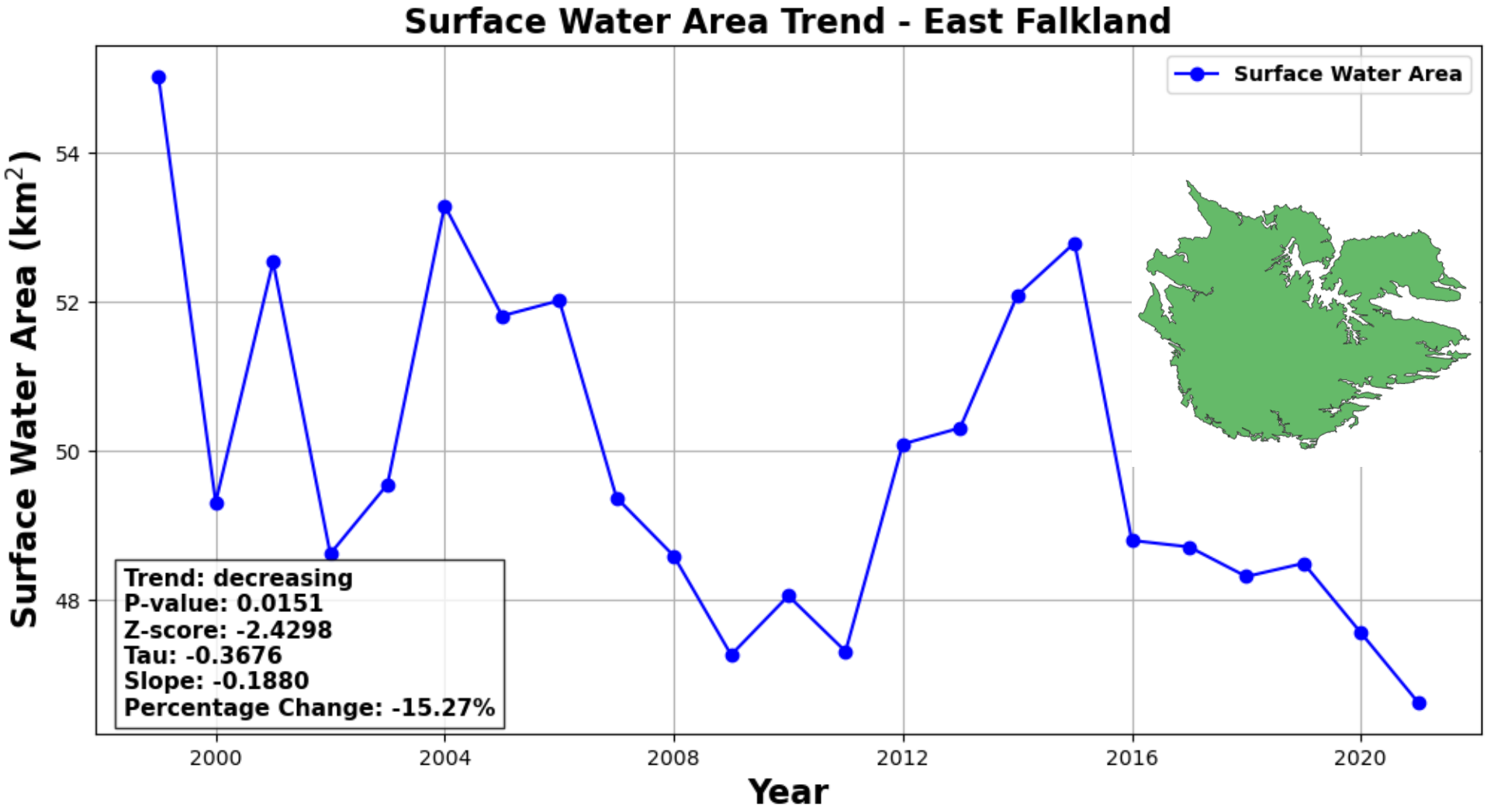
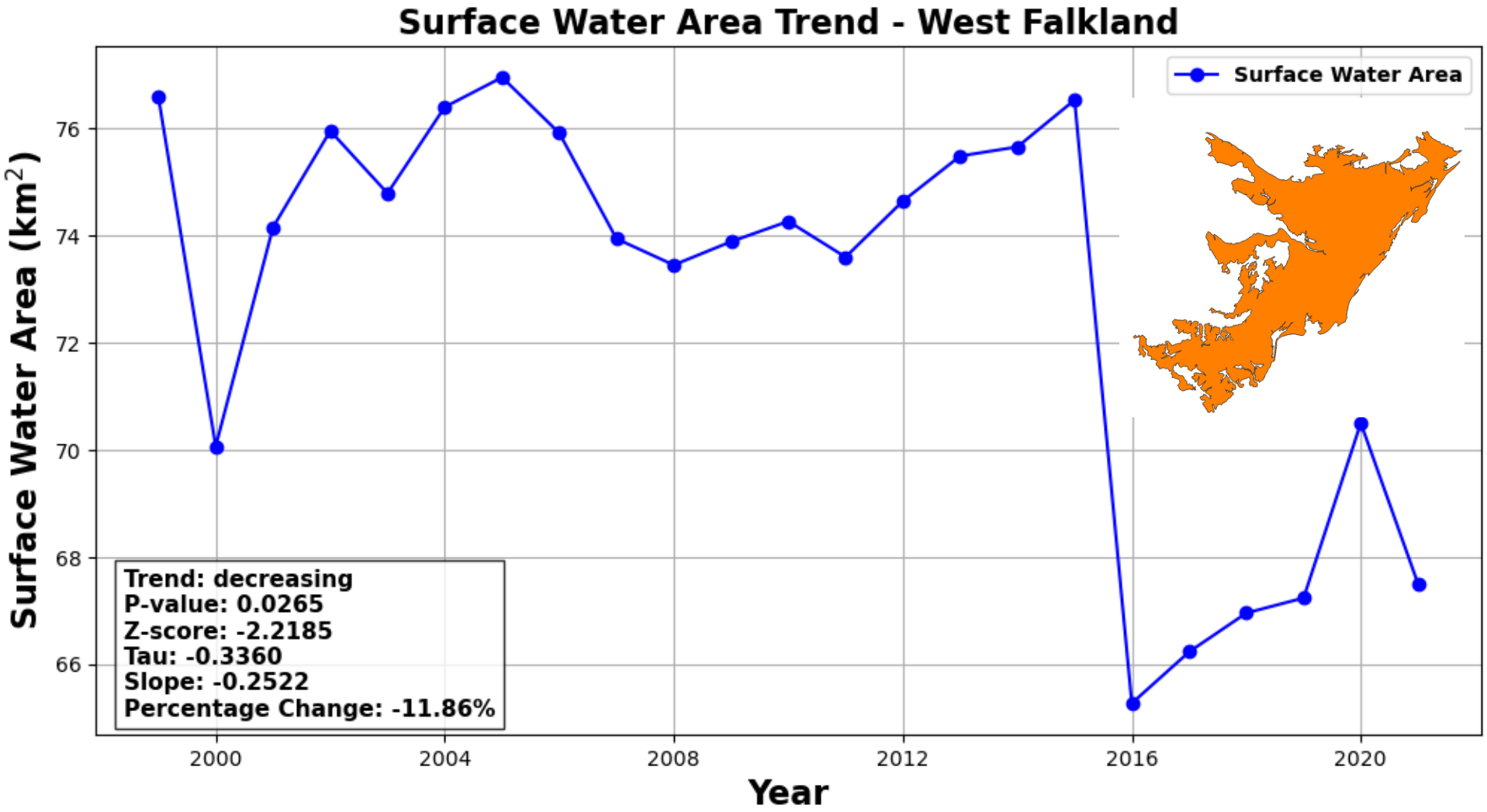
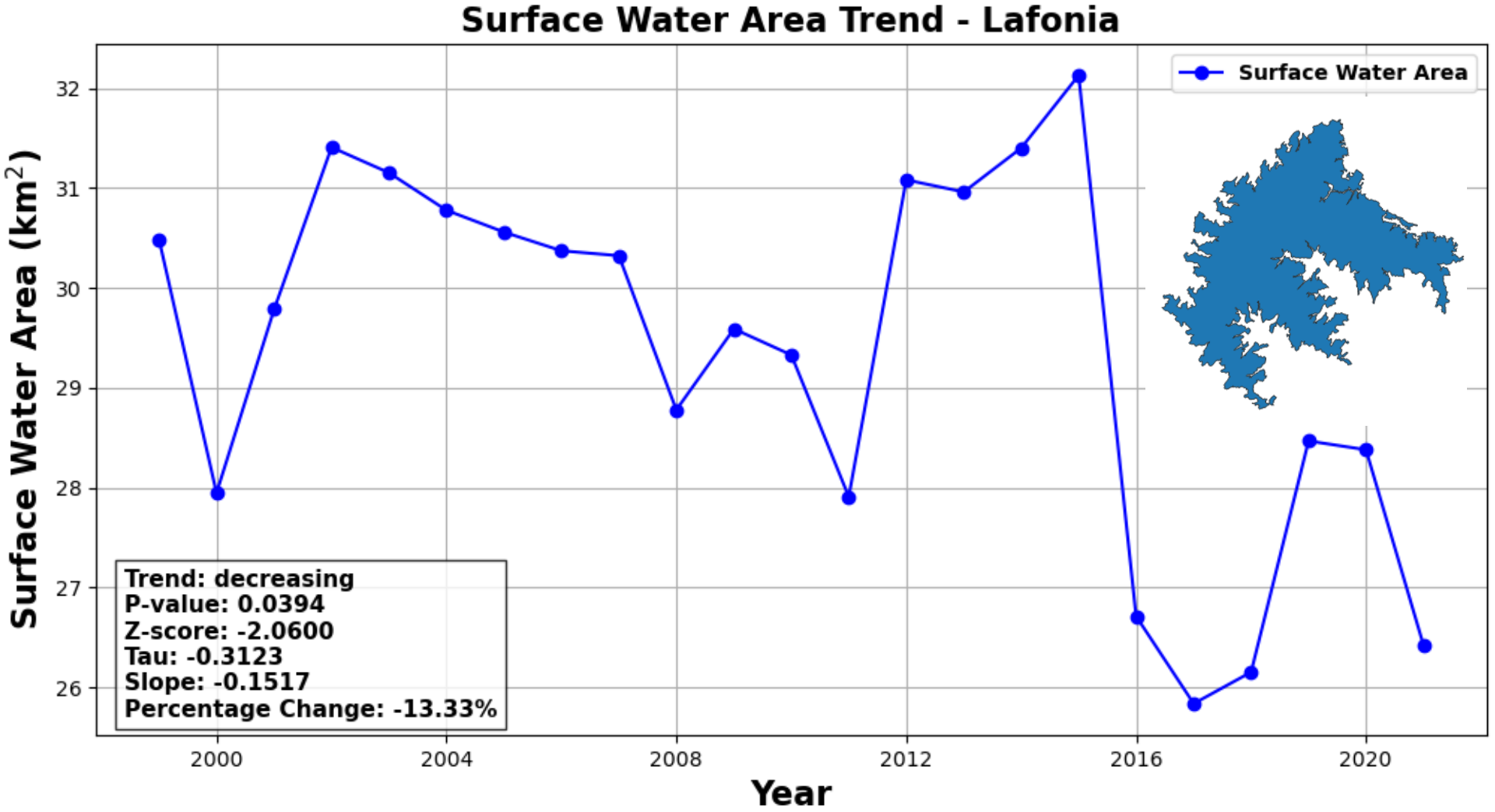
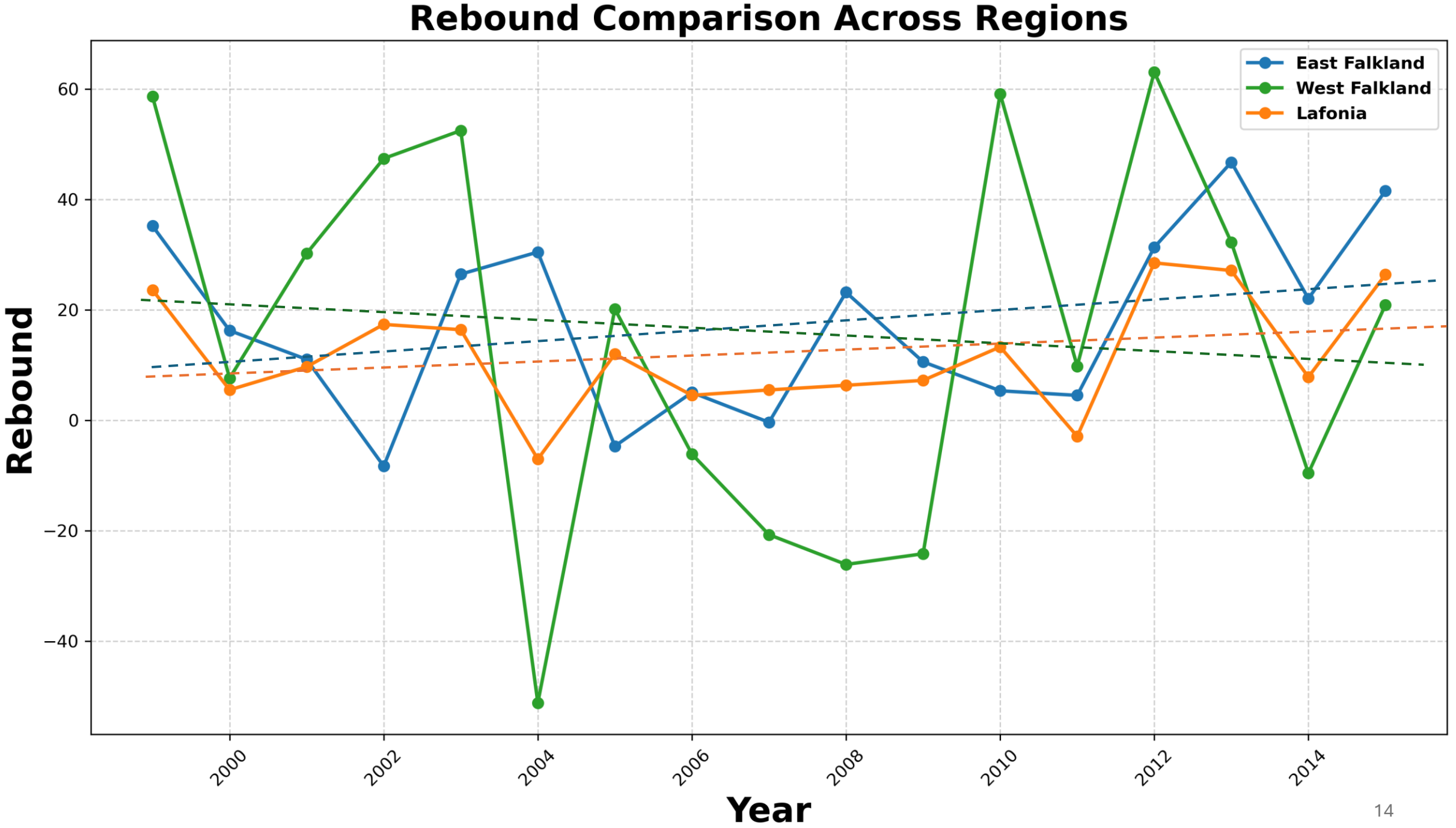

Surface Water Area Trend - East Falkland
Surface Water Area
Surface Water Area (km²)
54
52
50
48
2000
2004
2008
2012
2016
2020
Year
Trend: decreasing
P-value: 0.0151
Z-score: -2.4298
Tau: -0.3676
Slope: -0.1880
Percentage Change: -15.27%

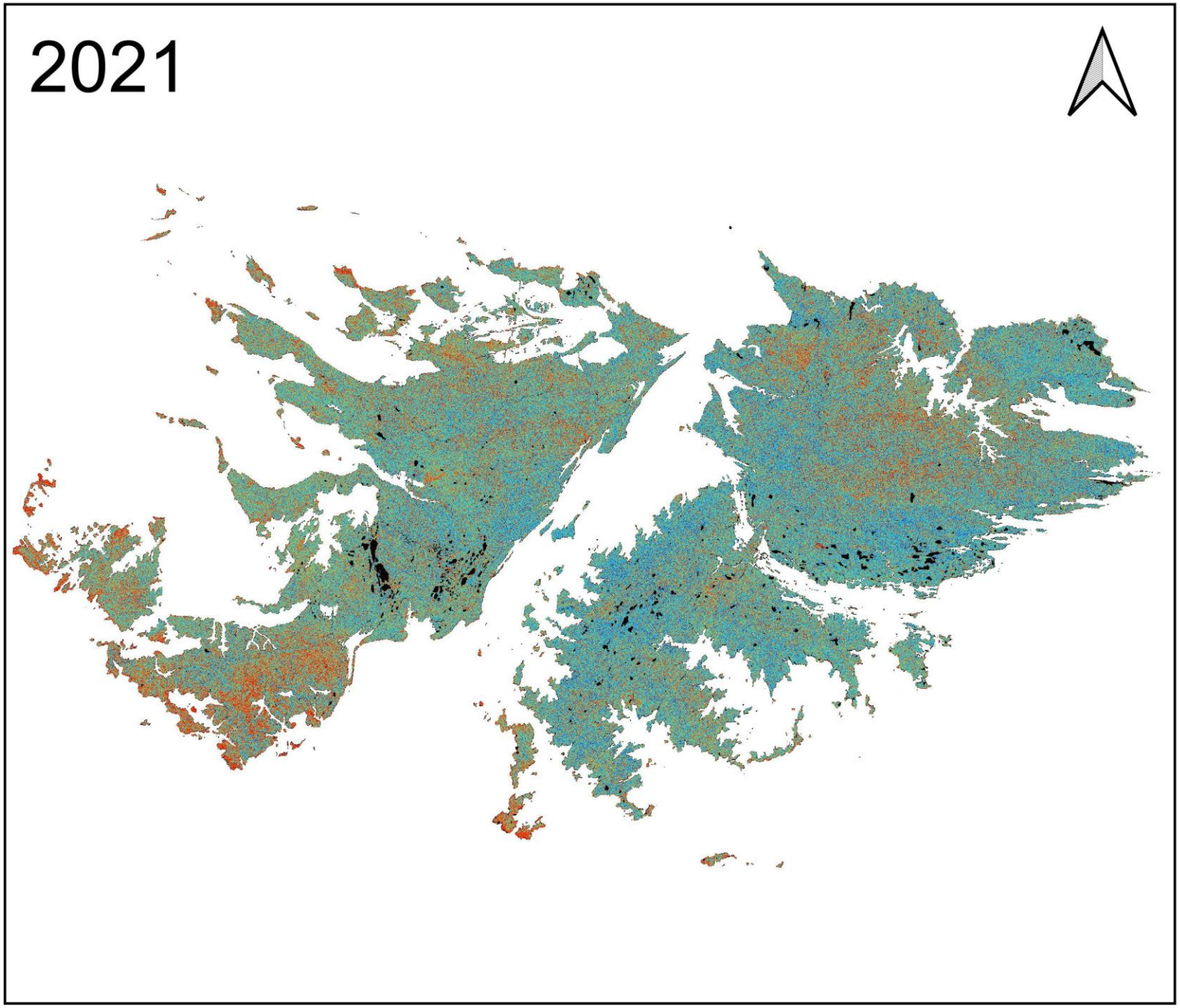

Surface Water Area Trend - West Falkland
Surface Water Area
Surface Water Area (km²)
76
74
72
70
68
66
Trend: decreasing
P-value: 0.0265
Z-score: -2.2185
Tau: -0.3360
Slope: -0.2522
Percentage Change: -11.86%
2000
2004
2008
2012
2016
2020
Year

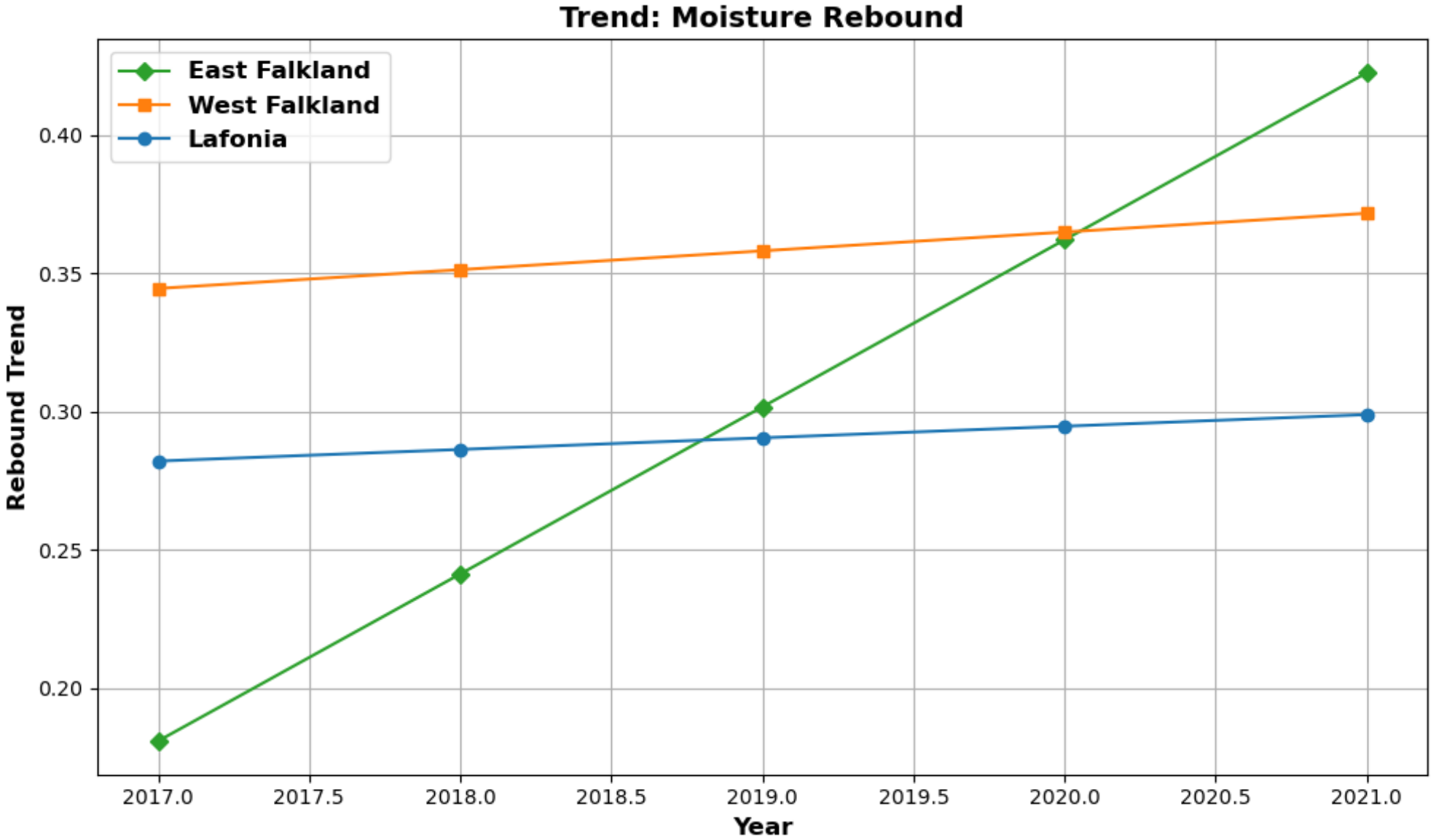

Surface Water Area Trend - Lafonia
Surface Water Area
Surface Water Area (km²)
Year
Trend: decreasing
P-value: 0.0394
Z-score: -2.0600
Tau: -0.3123
Slope: -0.1517
Percentage Change: -13.33%
32
31
30
29
28
27
26
2000
2004
2008
2012
2016
2020

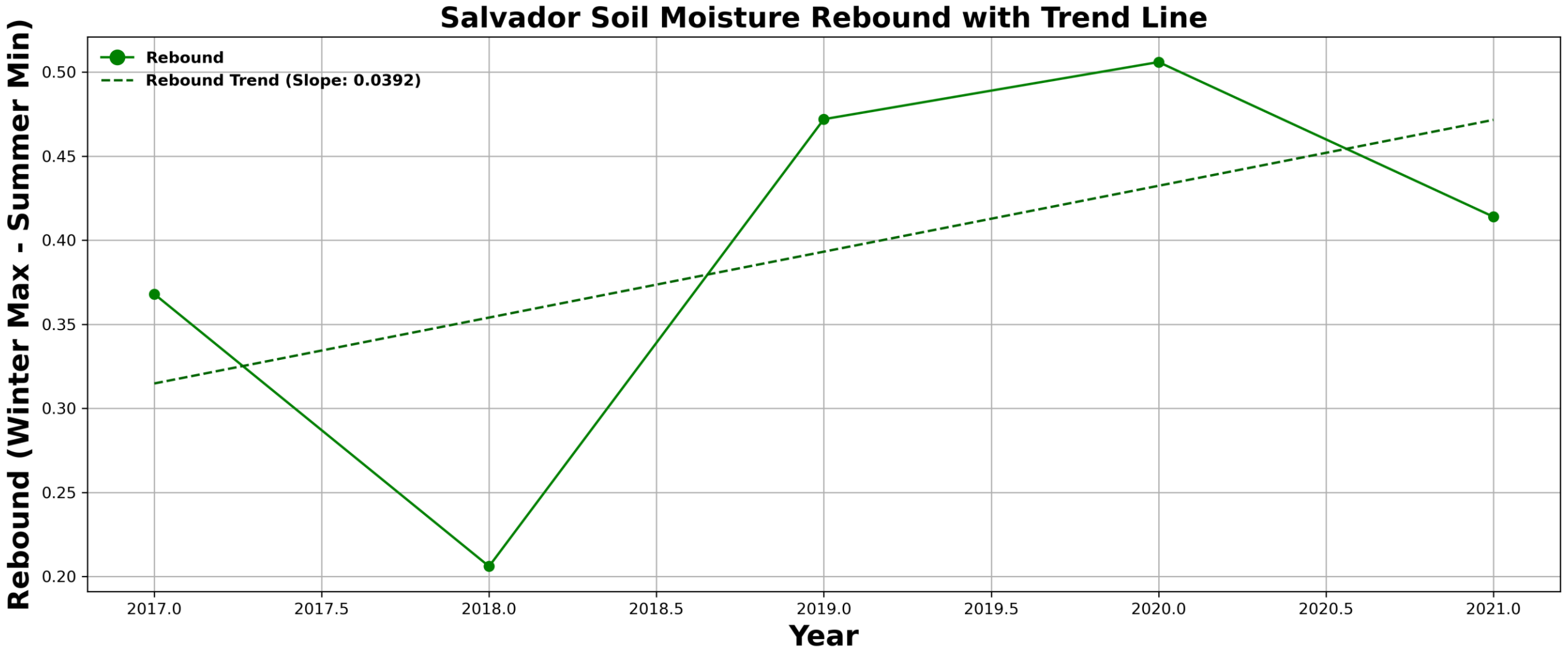

Rebound Comparison Across Regions
East Falkland
West Falkland
Lafonia
Rebound
Year
60
40
20
0
−20
−40
2000
2002
2004
2006
2008
2010
2012
2014

Soil Moisture (Sentinel-1)

What Have We Found So Far?




Trend: Moisture Rebound
East Falkland
West Falkland
Lafonia
Rebound Trend
0.40
0.35
0.30
0.25
0.20
2017.0
2017.5
2018.0
2018.5
2019.0
2019.5
2020.0
2020.5
2021.0
Year


Salvador Soil Moisture Rebound with Trend Line
Rebound
Rebound Trend (Slope: 0.0392)
Rebound (Winter Max - Summer Min)
0.50
0.45
0.40
0.35
0.30
0.25
0.20
2017.0
2017.5
2018.0
2018.5
2019.0
2019.5
2020.0
2020.5
2021.0
Year

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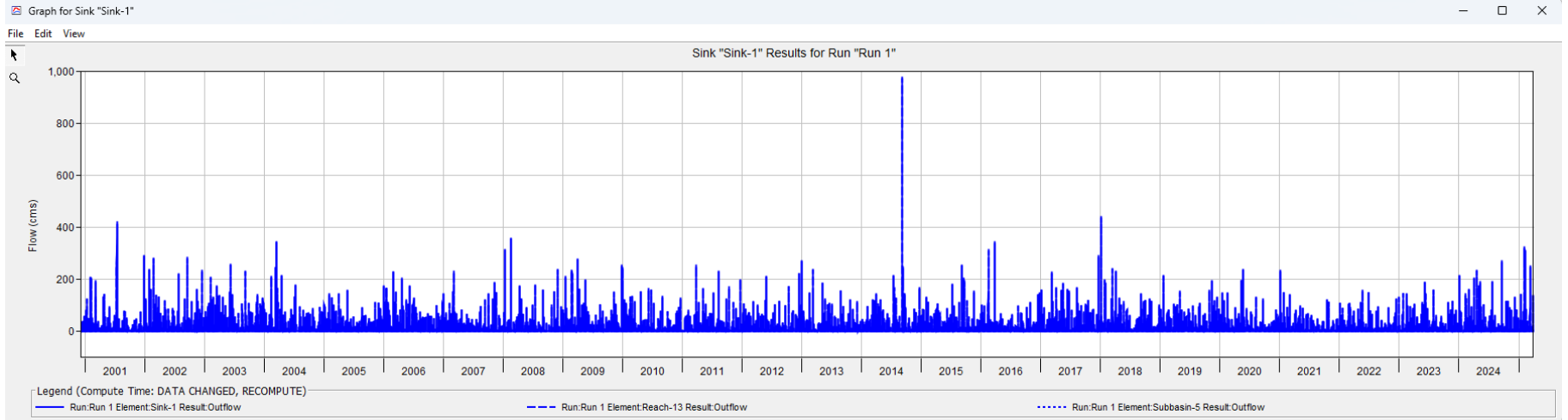
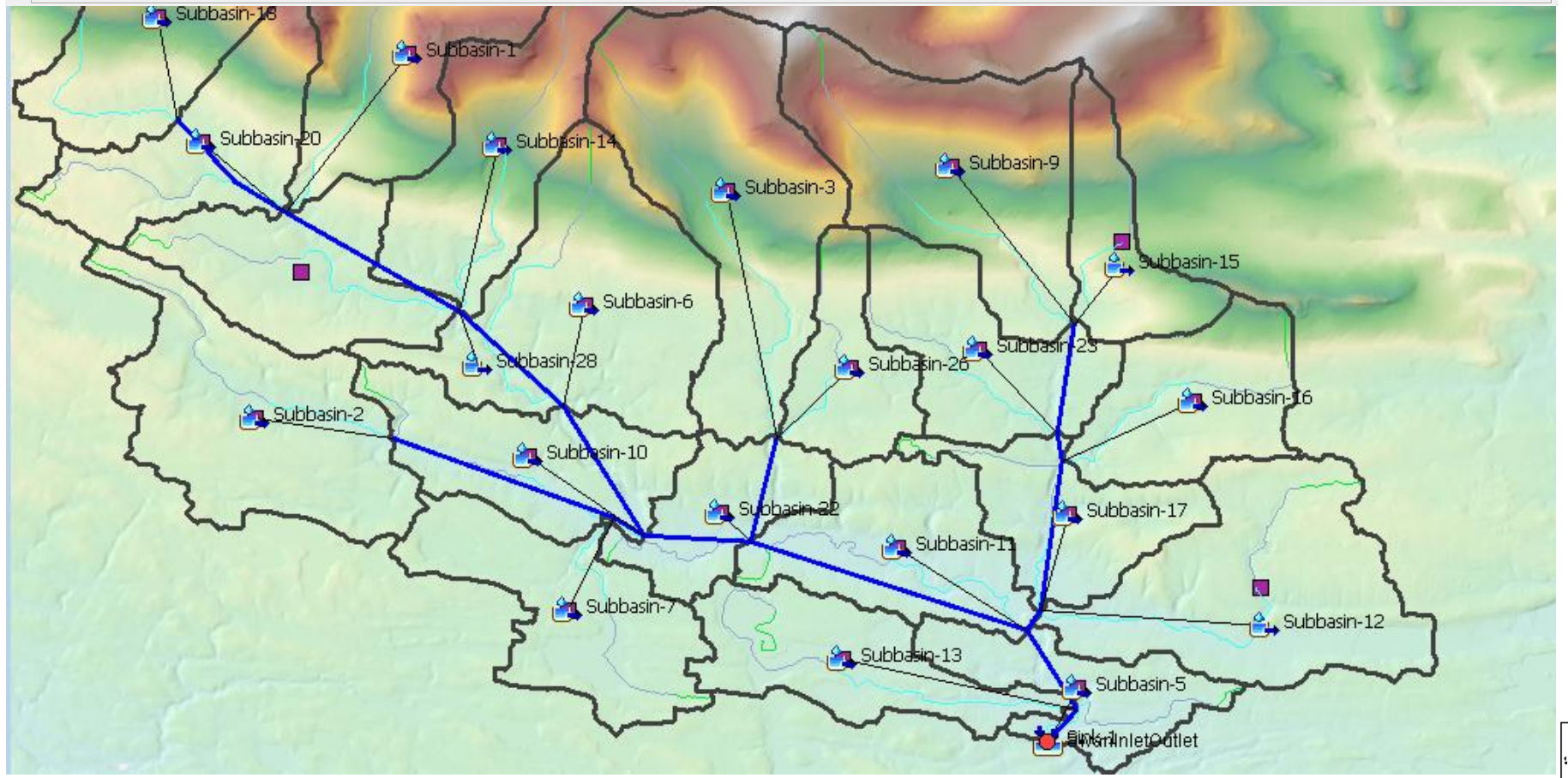
What Challenges Are We Facing?





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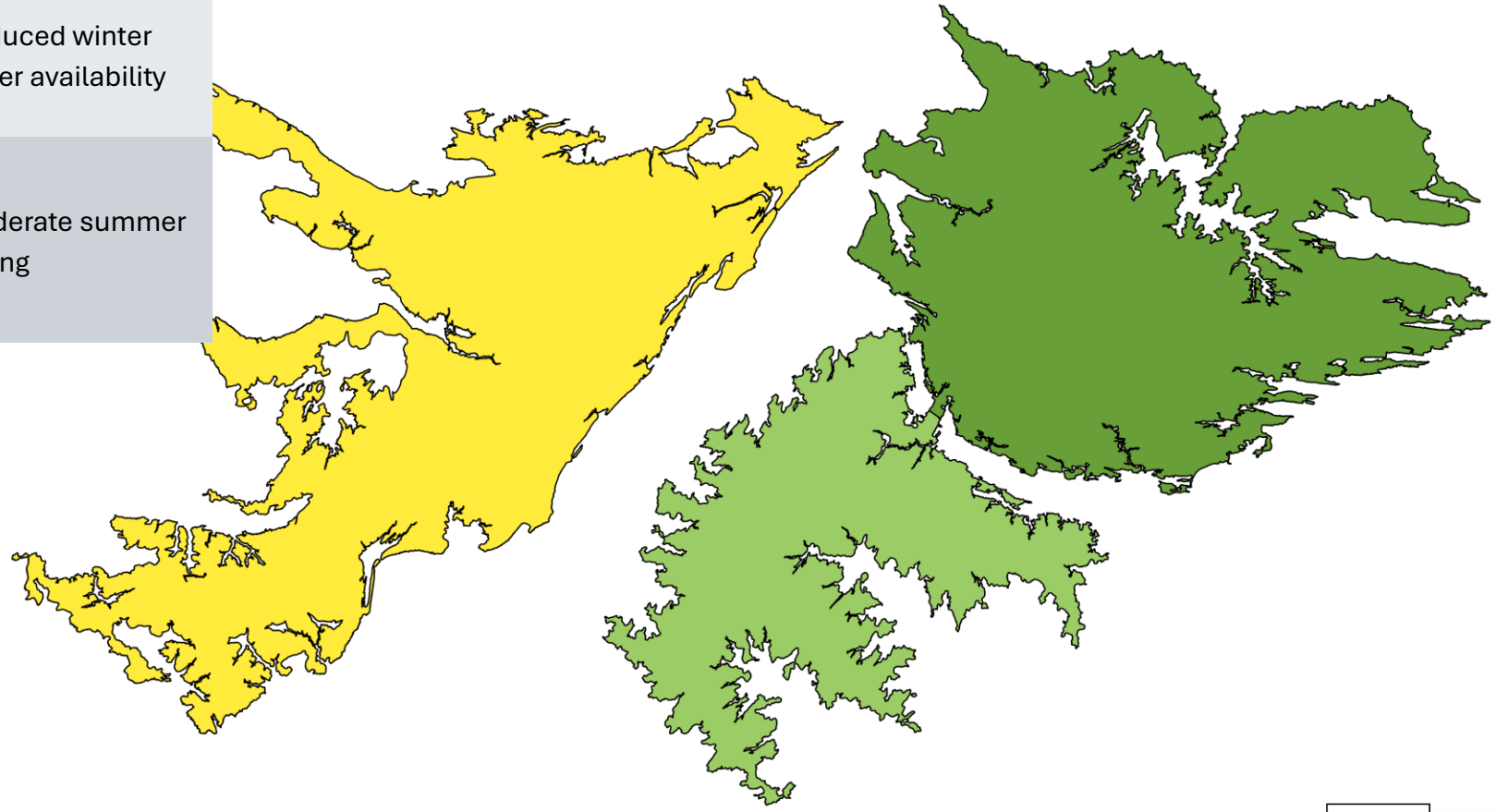
Region	Summer Min Trend	Winter Max Trend	Rebound Trend	Overall Grade	Key Concerns
East Falkland	▼ Declining (−0.79 km²/yr)	▲ Slight Increase (+0.16 km²/yr)	▲ Significant Increase (+0.95 km²/yr)	**B+**	Summer drying, increased seasonality
West Falkland	— Stable	▼ Declining (−0.69 km²/yr)	▼ Declining (−0.69 km²/yr)	**C**	Reduced winter water availability
Lafonia	▼ Declining (−0.26 km²/yr)	▲ Slight Increase (+0.17 km²/yr)	▲ Moderate Increase (+0.43 km²/yr)	**B**	Moderate summer drying

Grade	Meaning
A	**Excellent condition; resilient**
A–	**Very good; minor issues**
B+	**Good with improvements**
B	**Mostly stable**
B–	**Moderate; emerging imbalance**
C	**Vulnerable to stress**
D/F	**Urgent attention needed**

✓ Surface water area (GSW Global Surface Water dataset via Google Earth Engine)



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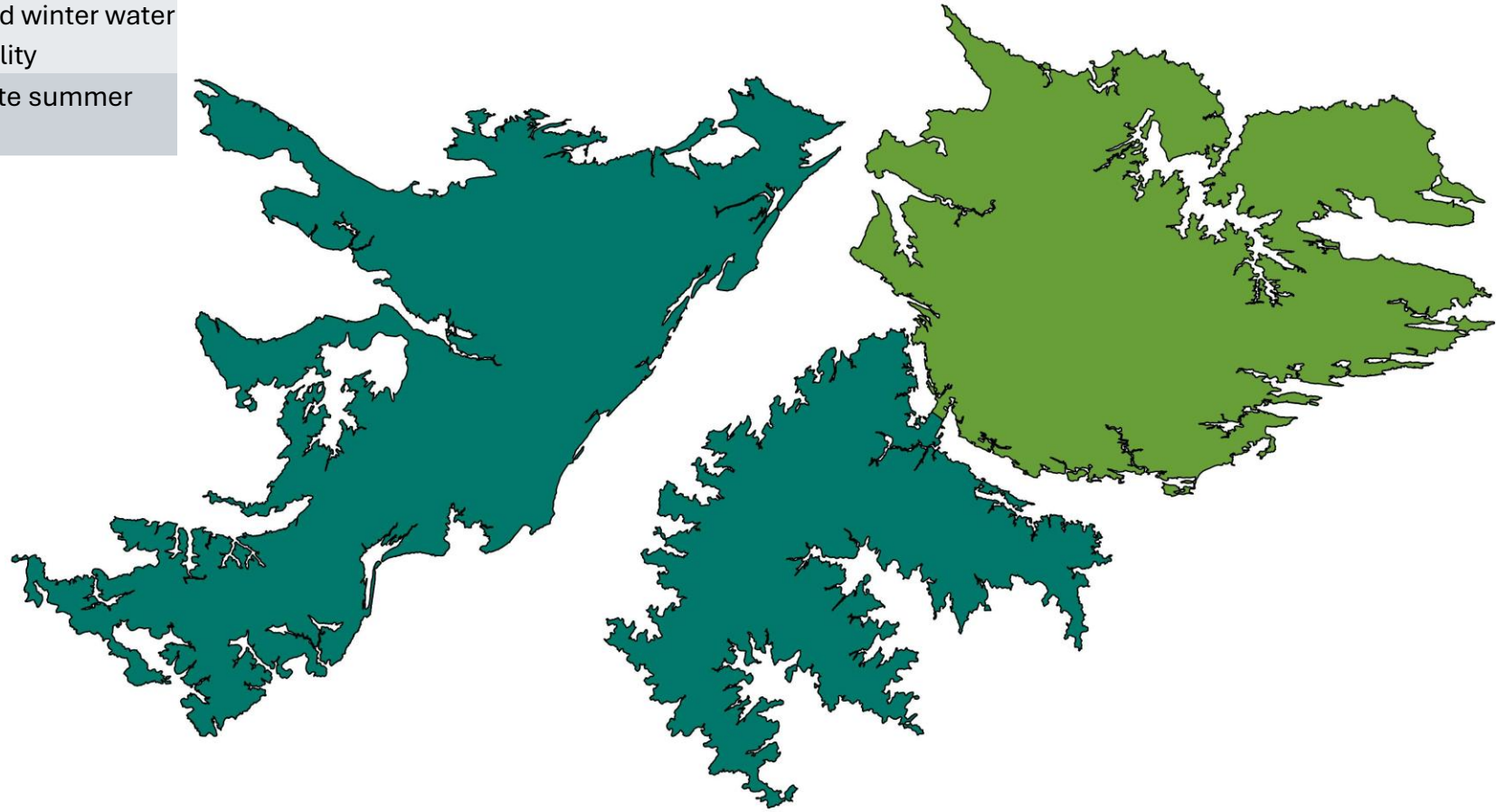
✓ Soil Moisture (Sentinel -1)

Region	Summer Min Trend	Winter Max Trend	Rebound Trend	Overall Grade	Key Concerns
East Falkland	0.29 (Moderate)	0.59 (High)	0.30 (Medium)	**B+**	Summer drying, increased seasonality
West Falkland	0.28 (Moderate)	0.57 (High)	0.29 (Medium)	**A-**	Reduced winter water availability
Lafonia	0.23 (Lower)	0.59 (High)	0.36 (High)	**A-**	Moderate summer drying



Grade	Meaning
A	Excellent condition; resilient
A–	Very good; minor issues
B+	Good with improvements
B	Mostly stable
B–	Moderate; emerging imbalance
C	Vulnerable to stress
D/F	Urgent attention needed

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Freshwater Report Card – Falkland Islands

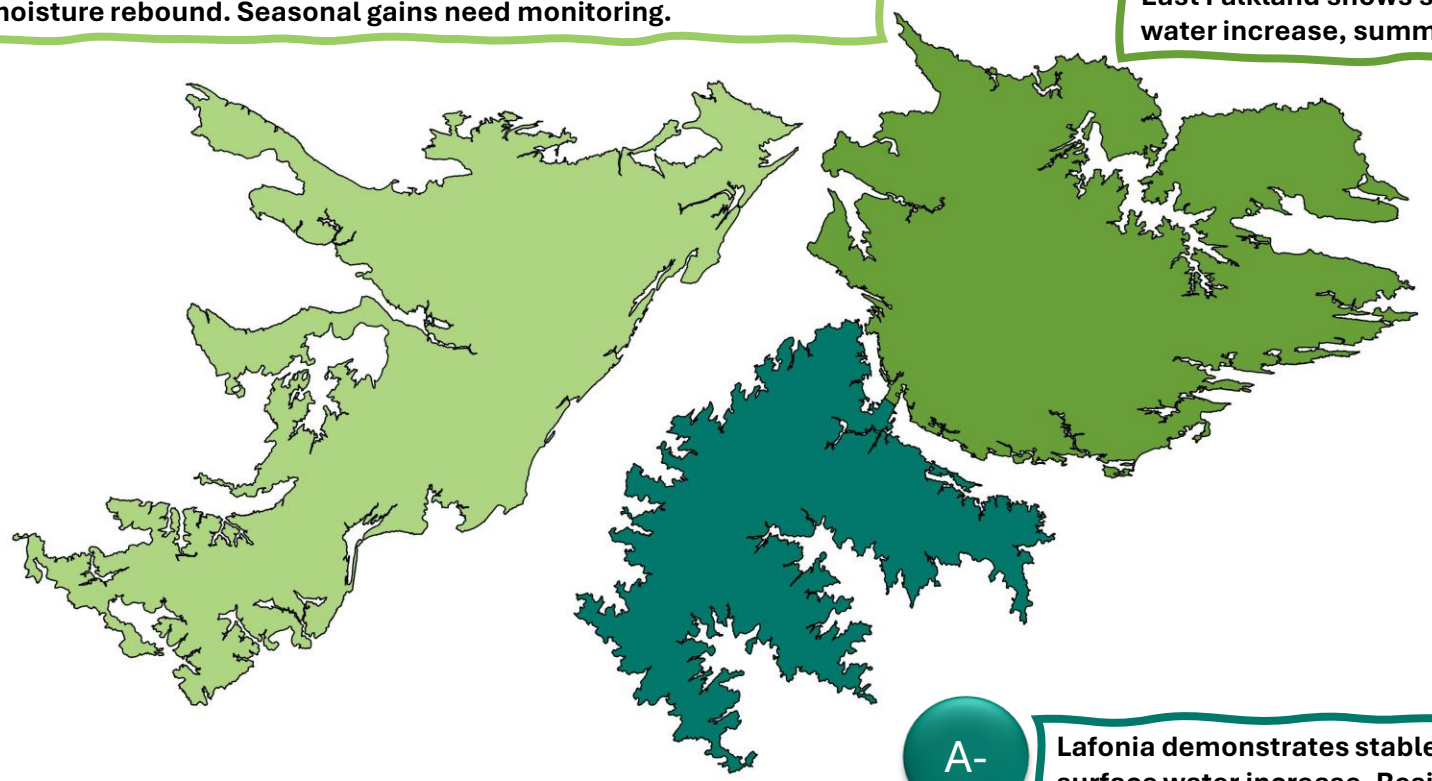
Region	Surface Water	Soil Moisture	Integrated Grade	Notes
East FL	B+	B+	B+	Balanced, improving but not stellar
Lafonia	B	A–	A–	Strong resilience
West FL	C	A–	B–	Good recovery, surface water a concern

B-

West Falkland shows declining surface water offset by strong soil moisture rebound. Seasonal gains need monitoring.

East Falkland shows strong rebound in soil moisture, slight surface water increase, summer drying remains a concern.

B+



A-

Lafonia demonstrates stable and improving moisture, moderate surface water increase. Resilient zone.

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Citizen Science Freshwater Monitoring Falkland Islands

#	Question	Yes =	No =	Explanation
1	Does the pond/wetland hold water during both summer and winter?	✅ +1	❌ 0	**Presence of water = good**
2	Is the water visibly clear (low cloudiness/turbidity)?	✅ +1	❌ 0	**Clarity suggests better quality**
3	Is there no bad or unusual smell from the water?	✅ +1	❌ 0	**Smell can indicate pollution**
4	Are surrounding plants green and healthy?	✅ +1	❌ 0	**Vegetation reflects good moisture and nutrients**
5	Are upland or waterfowl (or other native birds) present nearby?	✅ +1	❌ 0	**Bird presence indicates ecological health**
6	Have cattle or sheep been drinking from or standing in the water?	❌ 0	✅ +1	**Livestock can cause erosion or contaminate the water with waste.**
7	Is the water flowing normally (streams/springs), not reduced or stagnant?	✅ +1	❌ 0	**Normal flow supports oxygenation & life**
8	Is there visible algae, scum, or surface sheen?	❌ 0	✅ +1	**Algal blooms/scum may indicate eutrophication**
9	Are there signs of pollution (e.g. trash, oil spots)?	❌ 0	✅ +1	**No pollution = better condition**
10	Is the water level similar to previous years, not receding faster?	✅ +1	❌ 0	**Stable levels suggest good hydrology**

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We extend our sincere thanks to our project partners and local landowners for supporting this important monitoring work and enabling continued site access.

✓Creating models to show **future risks**

Field Monitoring-Water Level

What's next?

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References

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