

# Assessing changes in the hydrological regime of lacustrine wetlands in the Maputaland Coastal Plain, South Africa

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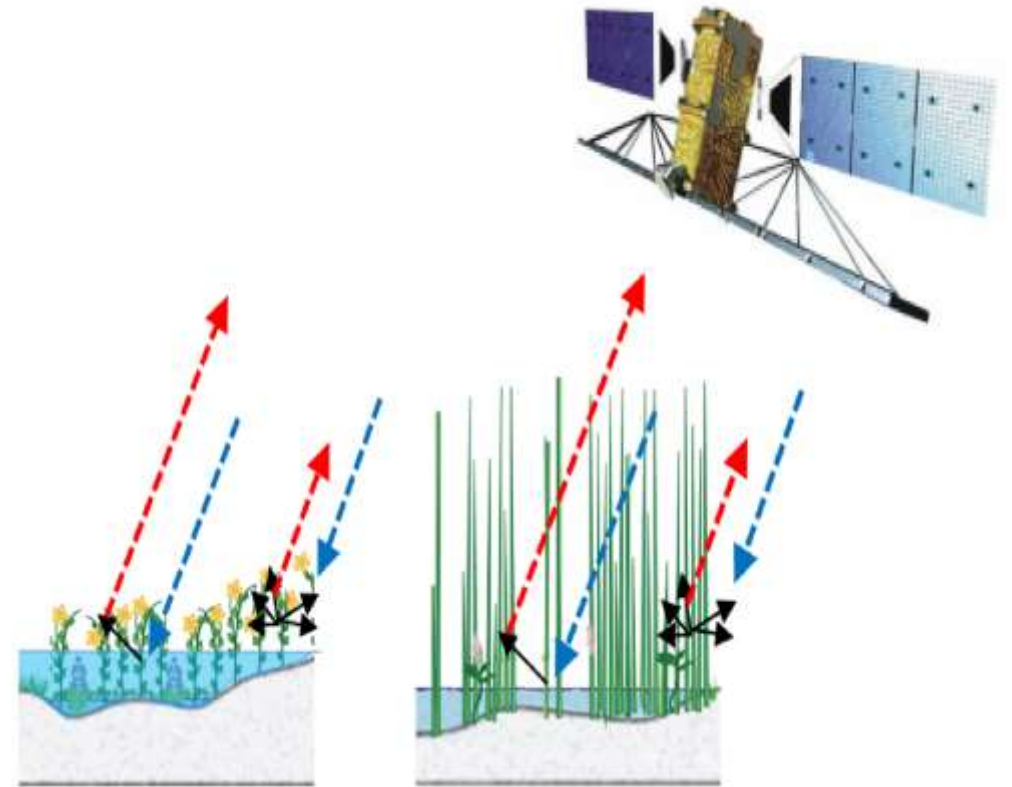


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# Remote Sensing in monitoring wetlands

- Long term dynamics and change detection
- High spatial resolution; surface water monitoring
- Spatial coverage



# Why are Lacustrine systems important?

- Lacustrine Systems refer to open water bodies;
  - IUCN inland water biome
  - Sustainable Development Goal 6 indicator 6.6.1
- Global Biodiversity Framework(GBF) Target 1; by 2030, prevent and significantly reduce the degradation of natural habitats, halt the loss of biodiversity, and protect and prevent the extinction of threatened species.

# Maputaland Coastal Plain

- 7% of the total area

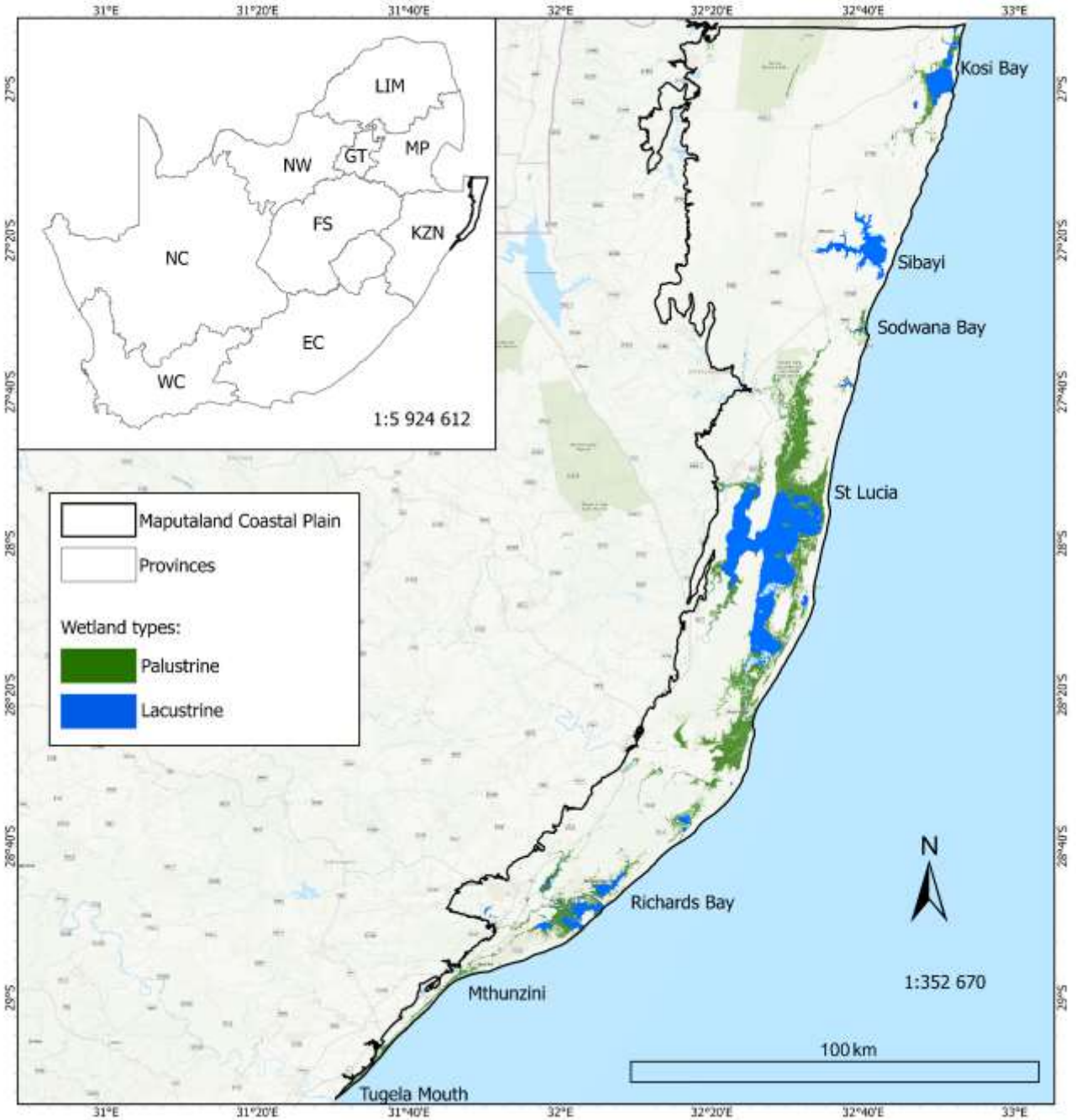


Figure 1: Spatial distribution of open water bodies and palustrine wetlands within the MCP

# Assessing changes in the hydrological regime of lacustrine wetlands in the MCP

- Research Aim : The main aim of this study is to assess the changes in the hydrological regime of lacustrine wetlands in the Maputaland Coastal Plain from 1984 to 2023.
- Research Objectives:
  - i. Correspondence between wetland extent and rainfall trends
  - ii. Changes in hydrological regimes over time
  - iii. Relationship between extreme rainfall events and wetland extremes
  - iv. Extent changes between wettest and driest months

# Data collection and processing

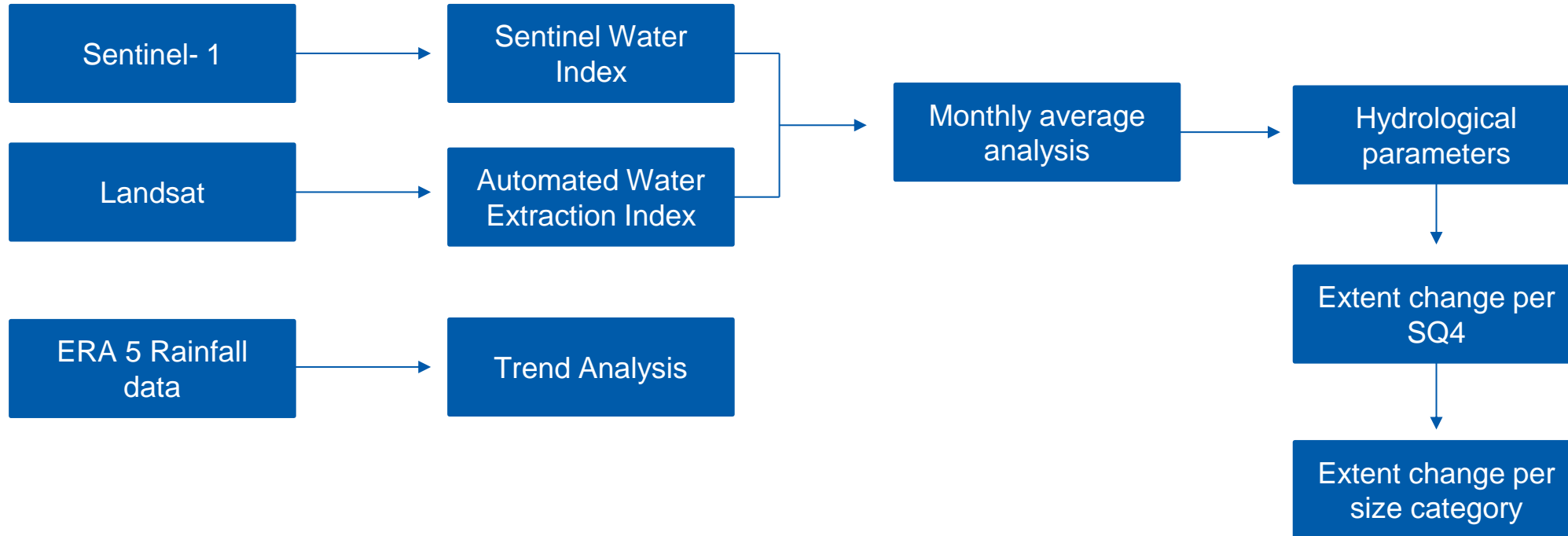


Figure 2: Methodology framework

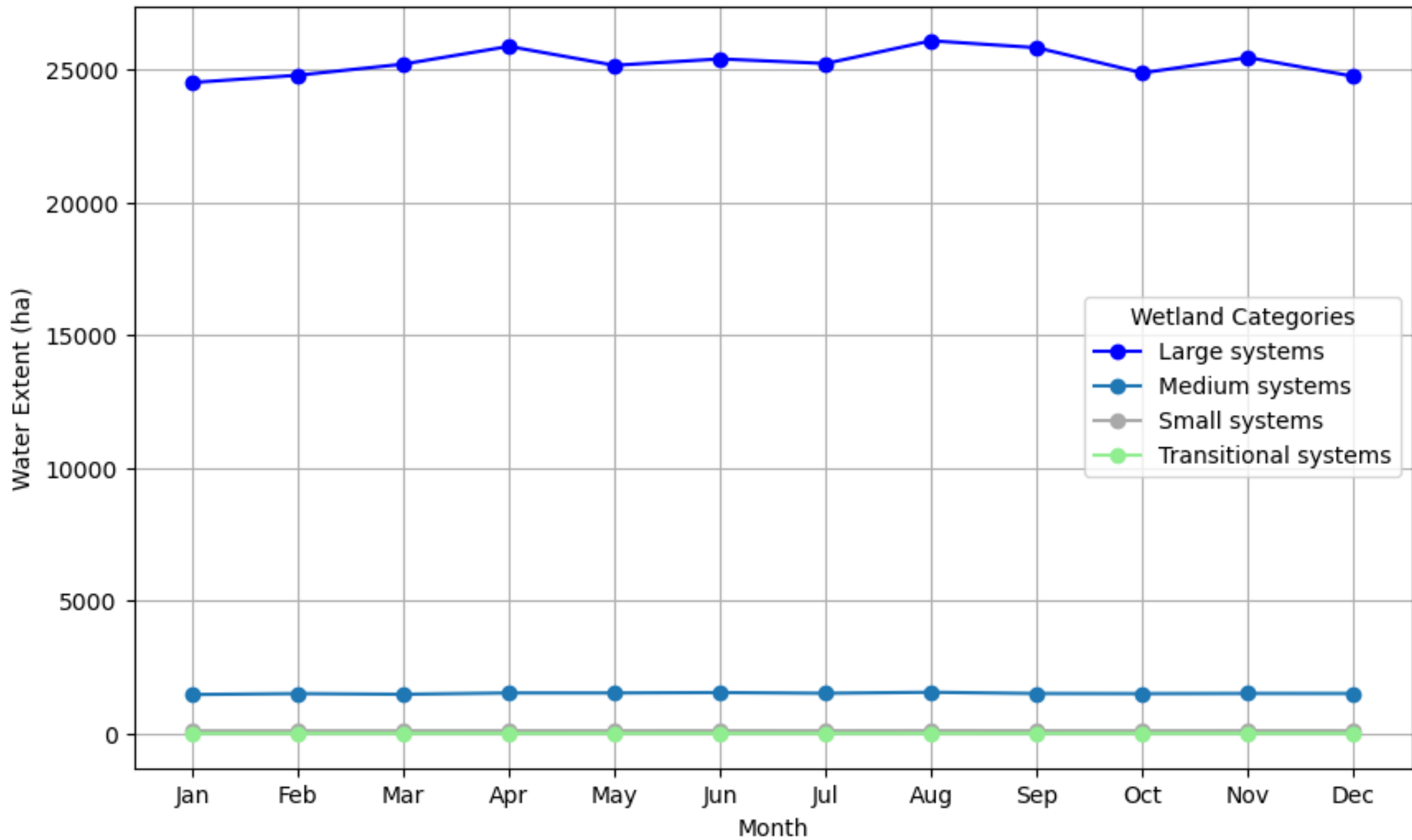


Figure 3: Monthly average extent per wetland size category from 1984 to 2023

# Rainfall Trend from 1984 to 2023

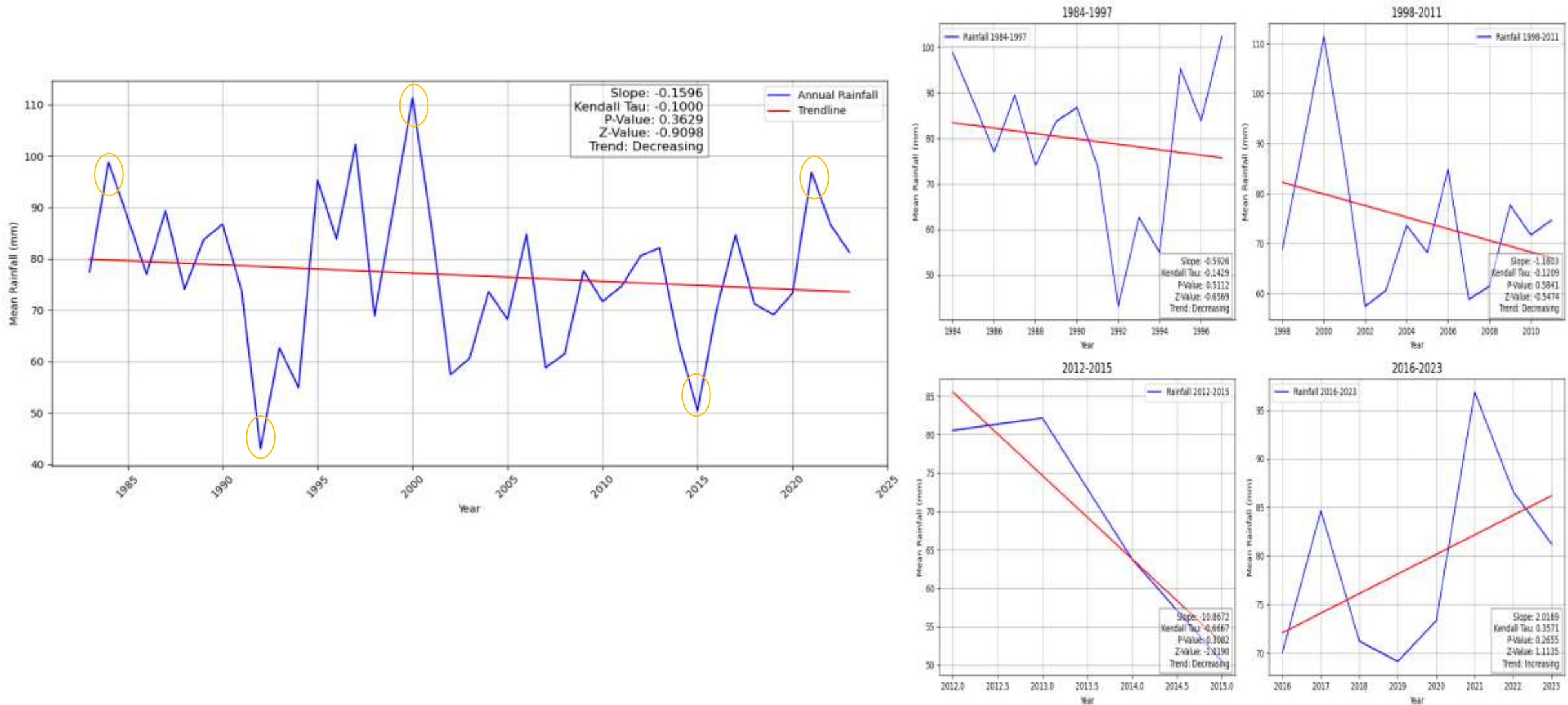
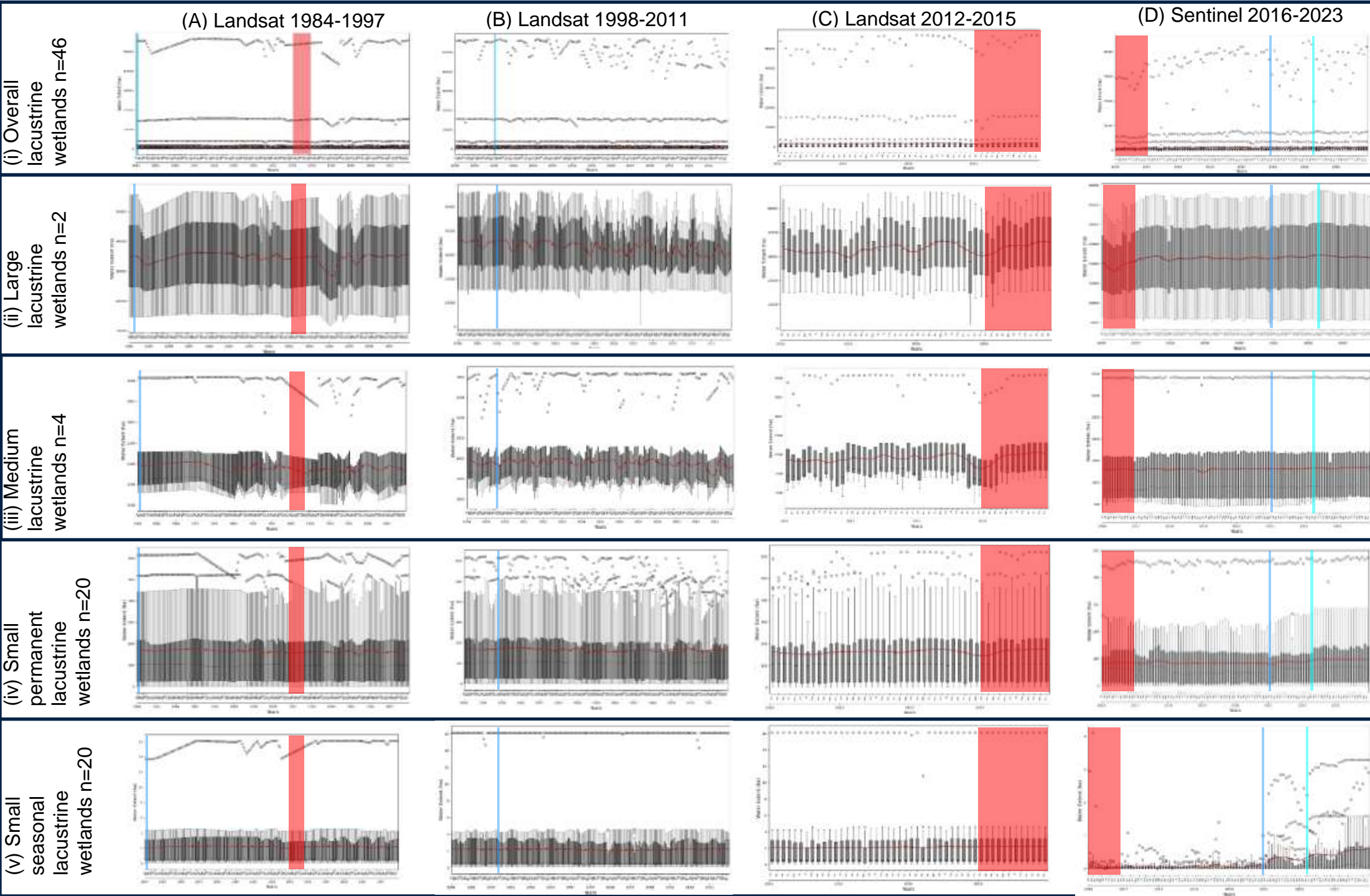


Figure 5: Rainfall trends over time. (a) overall trend from 1984 to 2023, (b) trends for the four time periods



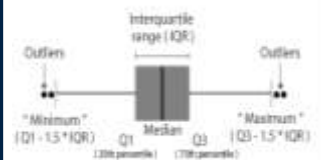


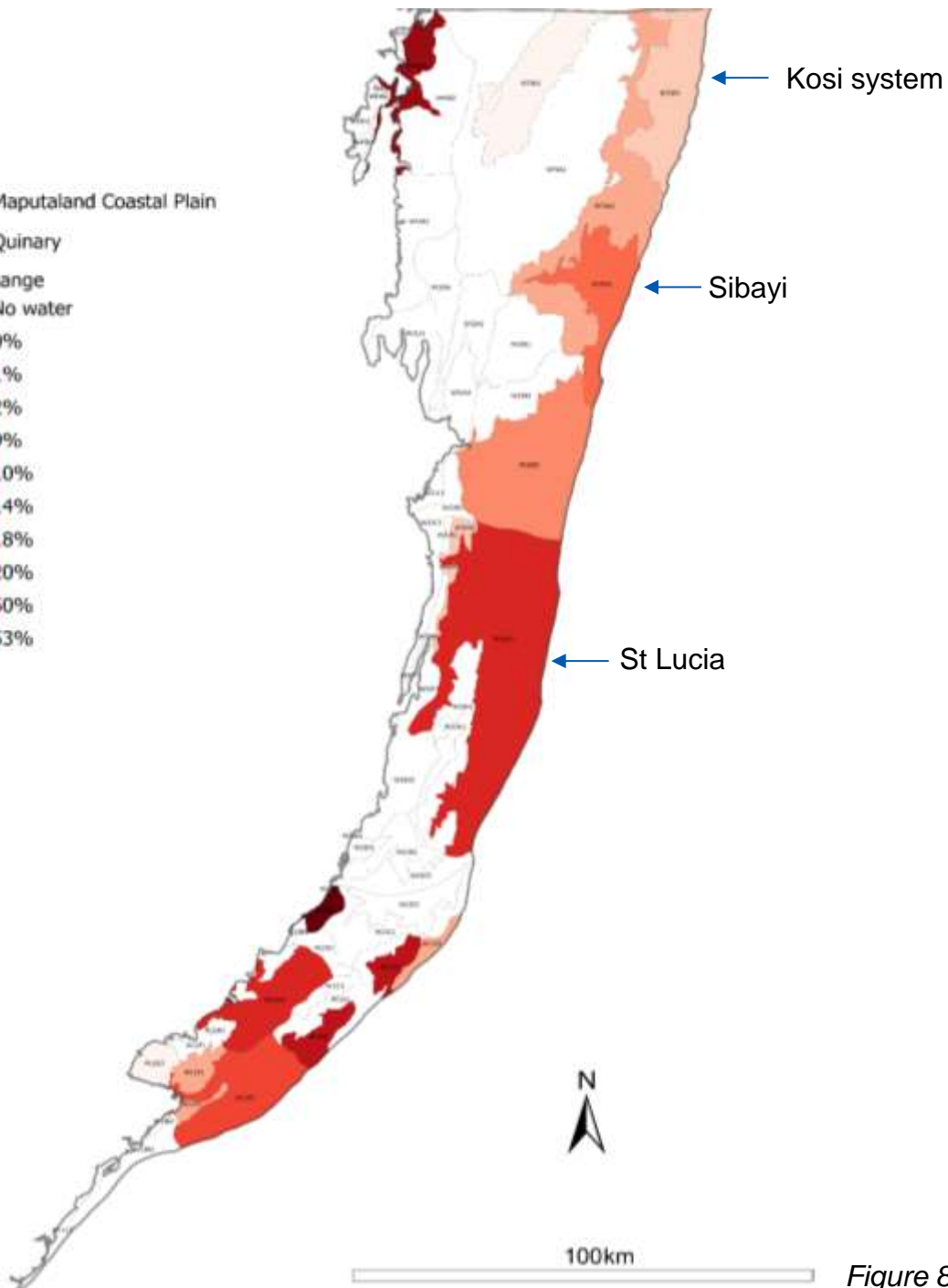
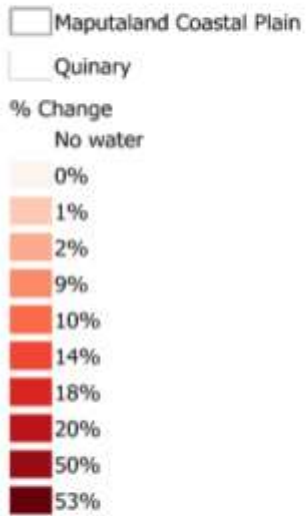
**Seasonality**

- Savitzsky
- Golay function

**Extreme climatic events**

- Drought
- Tropical cyclone
- Cut-off low





# SQ4 extent change % between wettest and driest months



100km

Figure 8: Distribution of lacustrine wetland extent changes between wettest and driest month

# Wettest vs driest months extent changes maps

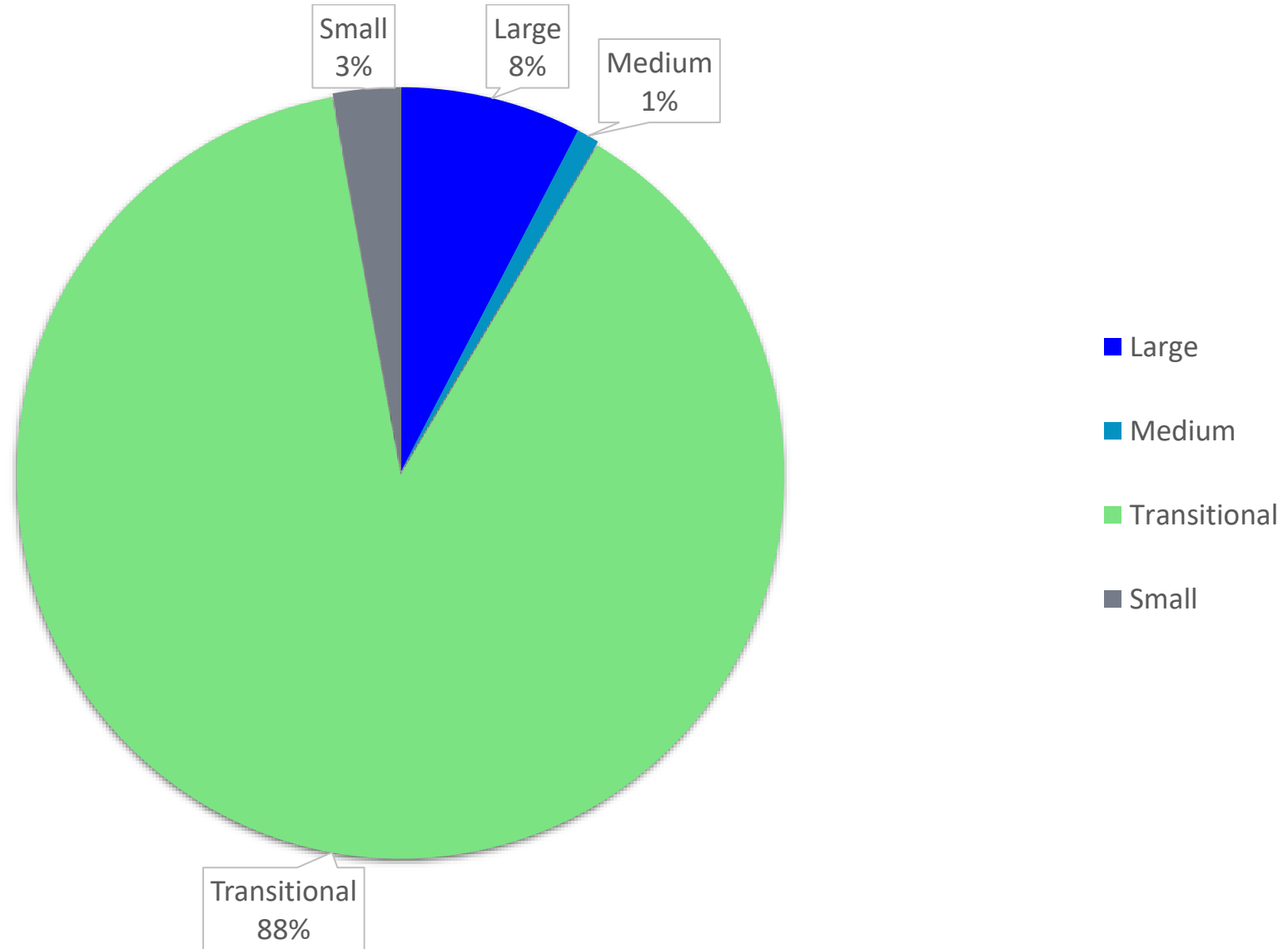


Figure 9: percentage of extent change per size category systems

# Key message

- Sentinel is optimal for long-term response monitoring
  - All weather capability
  - Day and night monitoring
- Complexity of the region
  - Dynamic hydrological regime
  - Frequent cloud cover
- Reporting to GBF
  - Meeting commitments to biodiversity conservation
  - Ecosystem protection

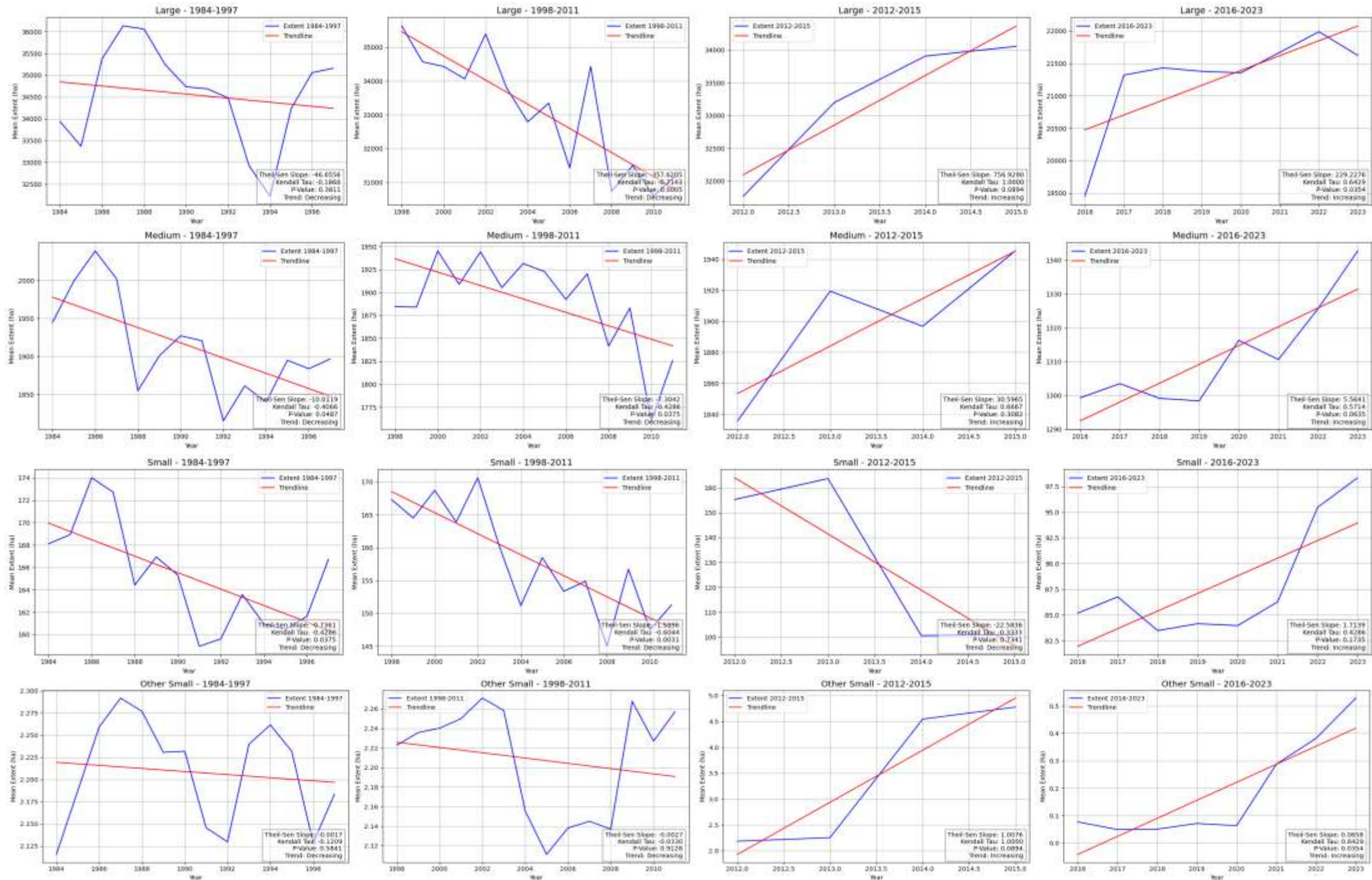
# Acknowledgements

- South African National Space Agency (SANSA)
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- Council for Scientific and Industrial Research (CSIR)



# Thank you





# Definitions

- SDG 6 aims to protect and restore water-related ecosystems
- Indicator 6.6.1 aims to understand how and why these ecosystems are changing. Tracking degree to which the extent of the water related ecosystems are changing over time