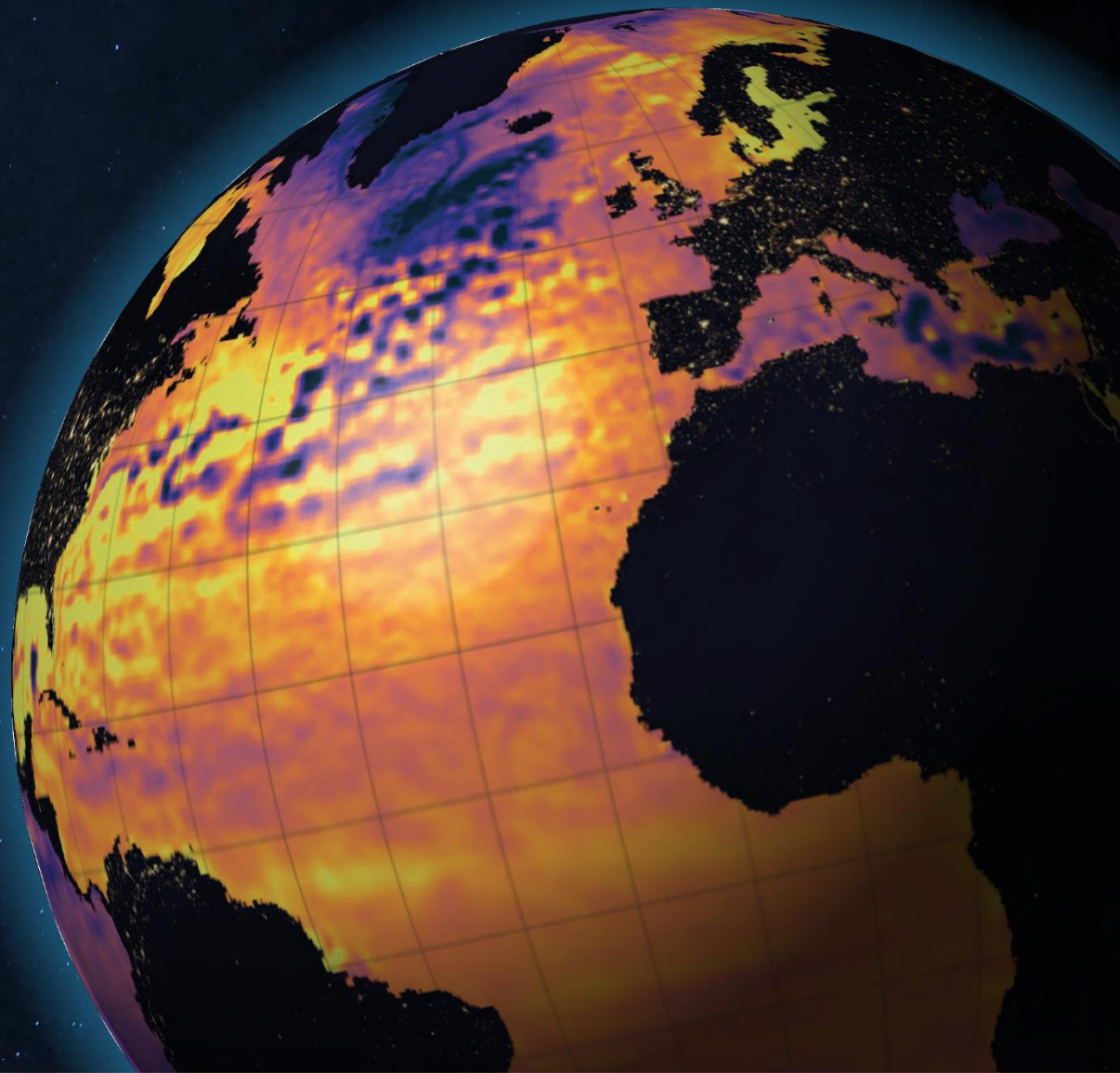
Co-development of an Operational Rip Current Hazard Forecasts for the Cape Peninsula of South Africa

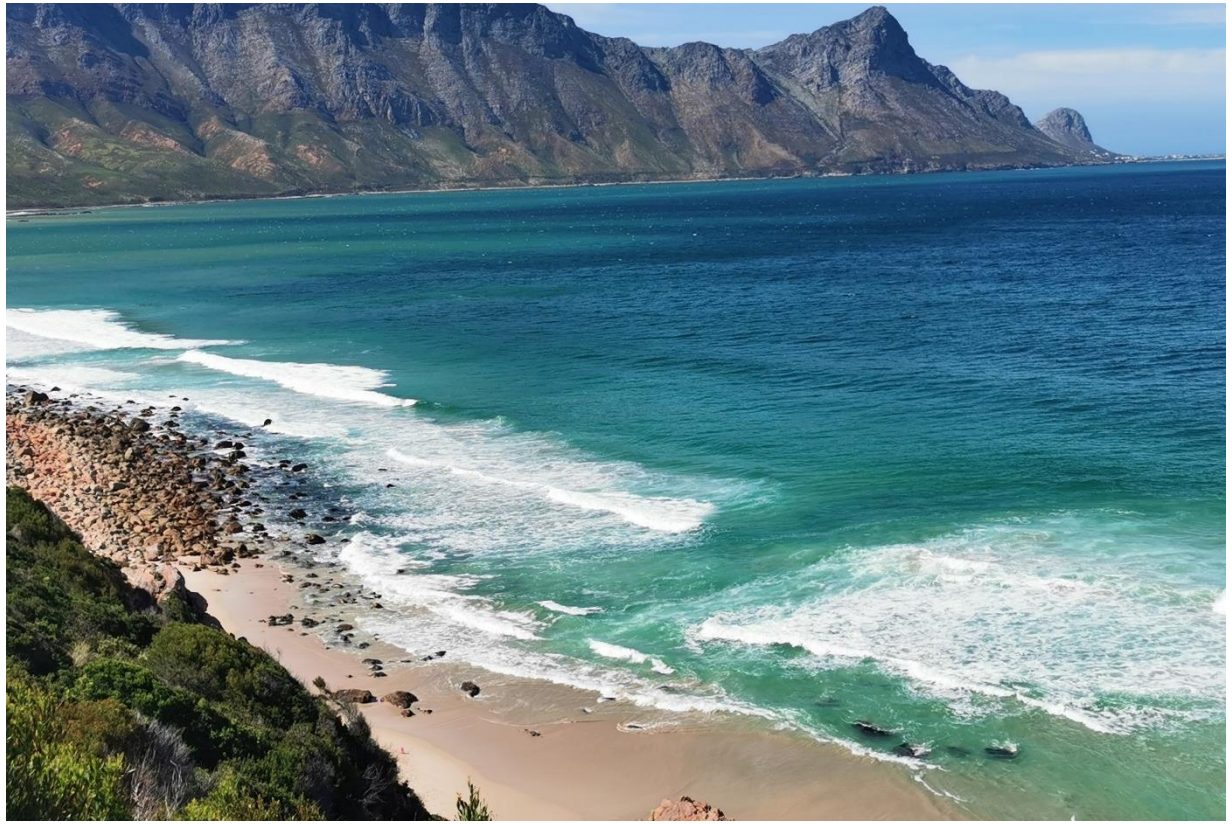
Carla-Louise Ramjukadh, South African Weather Service

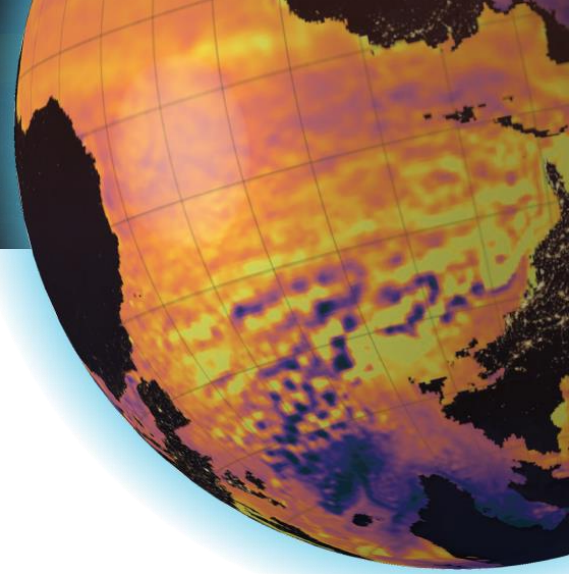
Acknowledge: Coastal Marine Applied Research, University of Plymouth and UK Met Office




The Beaches of the Cape Peninsula

Cape Peninsula Rip Currents





Rip Currents

Rip currents are **powerful, narrow channels of fast-moving water** that flow from the shore out to the sea.

They often form when **waves break over a sandbar or reef near the shore**, pushing water toward the beach. This water, seeking to return to the ocean, escapes through **narrow streams called rip currents**.

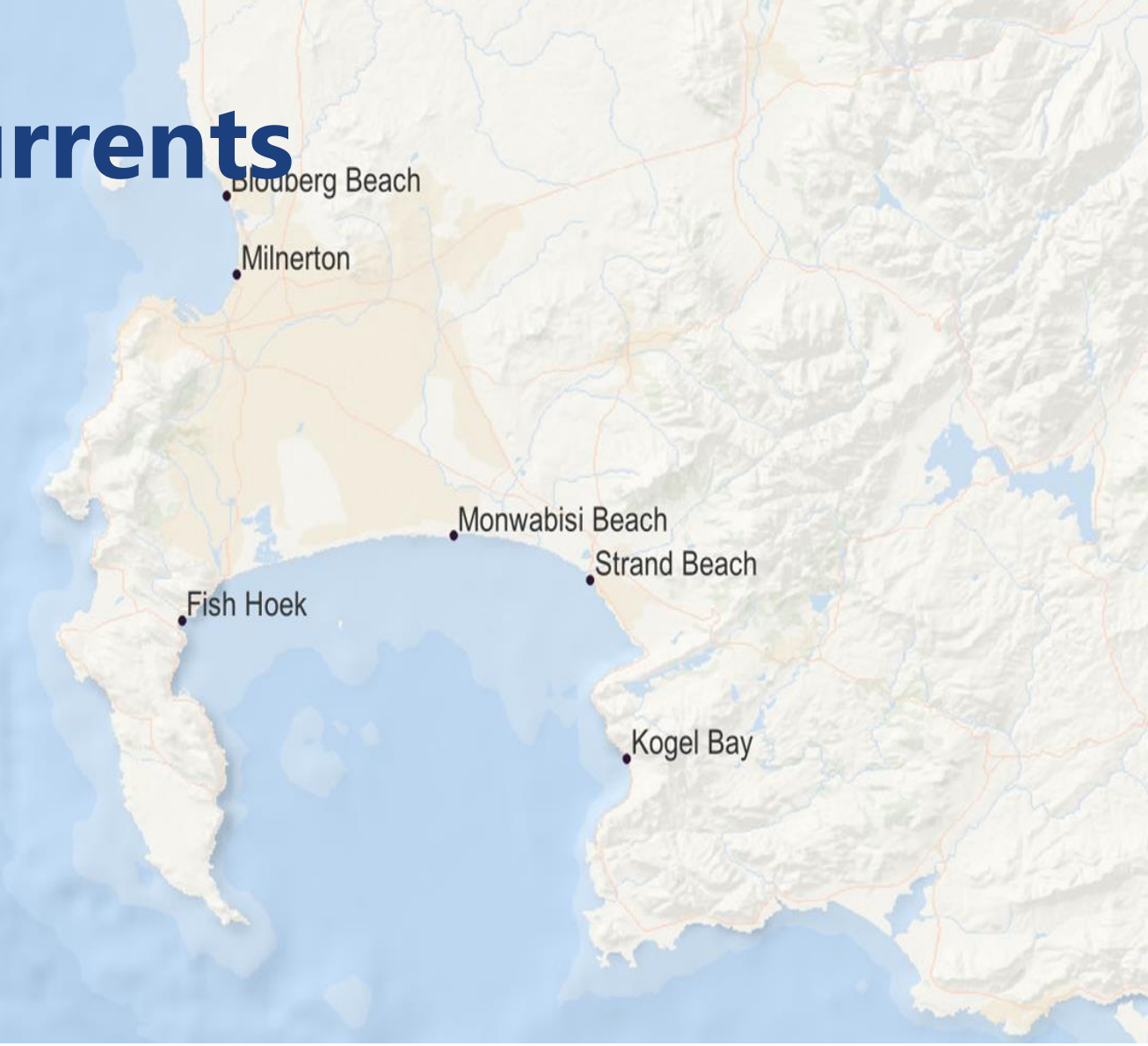
The Danger of Rip Currents

10 000’s Beach Rescues

100’s Fatal Drownings

Cape Town Metro

30 Fatal Drownings



Rip currents ripping through Cape shores

CAPETIMES NEWS

NSRI warns of 'stronger than normal' rip currents after drowning incidents

RIP: Bather (22) caught in rip currents drowns at Plettenberg Bay beach

A bather swimming in an unprotected beach in Plettenberg Bay drowned after he was sadly caught b

by Sino Naile | 20-12-2023 19:06 | in News

ger drowns at Sonwabe Beach, Cape Town

Milnerton Beach: lifeguards battle rip currents as NSRI issues urgent beach safety appeals

Kailin Daniels

Tygerberg

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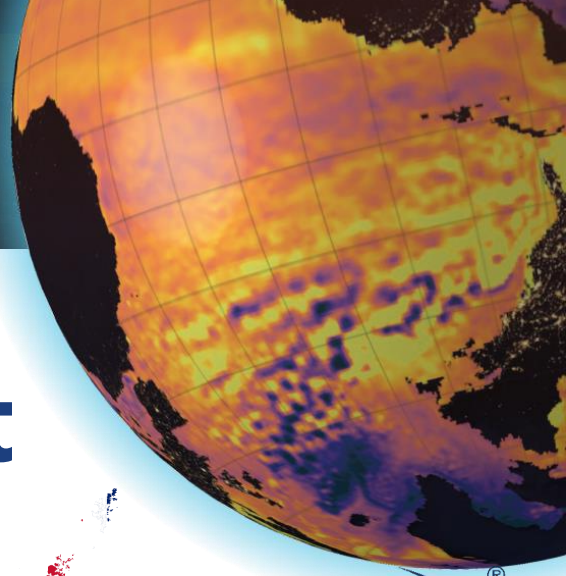

Global Collaboration, Local Impact

- WCSSP-SA: UK Met Office
- Project Partners:
  - Coastal Marine Applied Research (CMAR), University of Plymouth: Coastal hazard forecast modelling and research.
  - South African Weather Service (SAWS): Operational lead.
- Collaboration integrates science with local knowledge to tackle a pressing local issue.

South African Weather Service

UNIVERSITY OF PLYMOUTH

CMAR
Coastal Marine Applied Research

Met Office

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https://youtu.be/g_jy4hqTClg

Co-Development of an Operational Rip Current Hazard Forecast

"The forecast brings together vital elements needed to predict when rip currents will be most hazardous, including analysis of past lifeguard incidents and modelling and measurements of wave and tide conditions."

Dr. Christopher Stokes, UK Met Office

WCSSP 2023 Programme Impact and Achievements Brochure

Operational Rip Current Hazard Forecast Development

Rip Current Incident Data

- Historical data to identify risk conditions

Metocean Conditions

- Fore- and hindcasts to predict rip current formation

Beach Type

- Local baseline data for the forecast model

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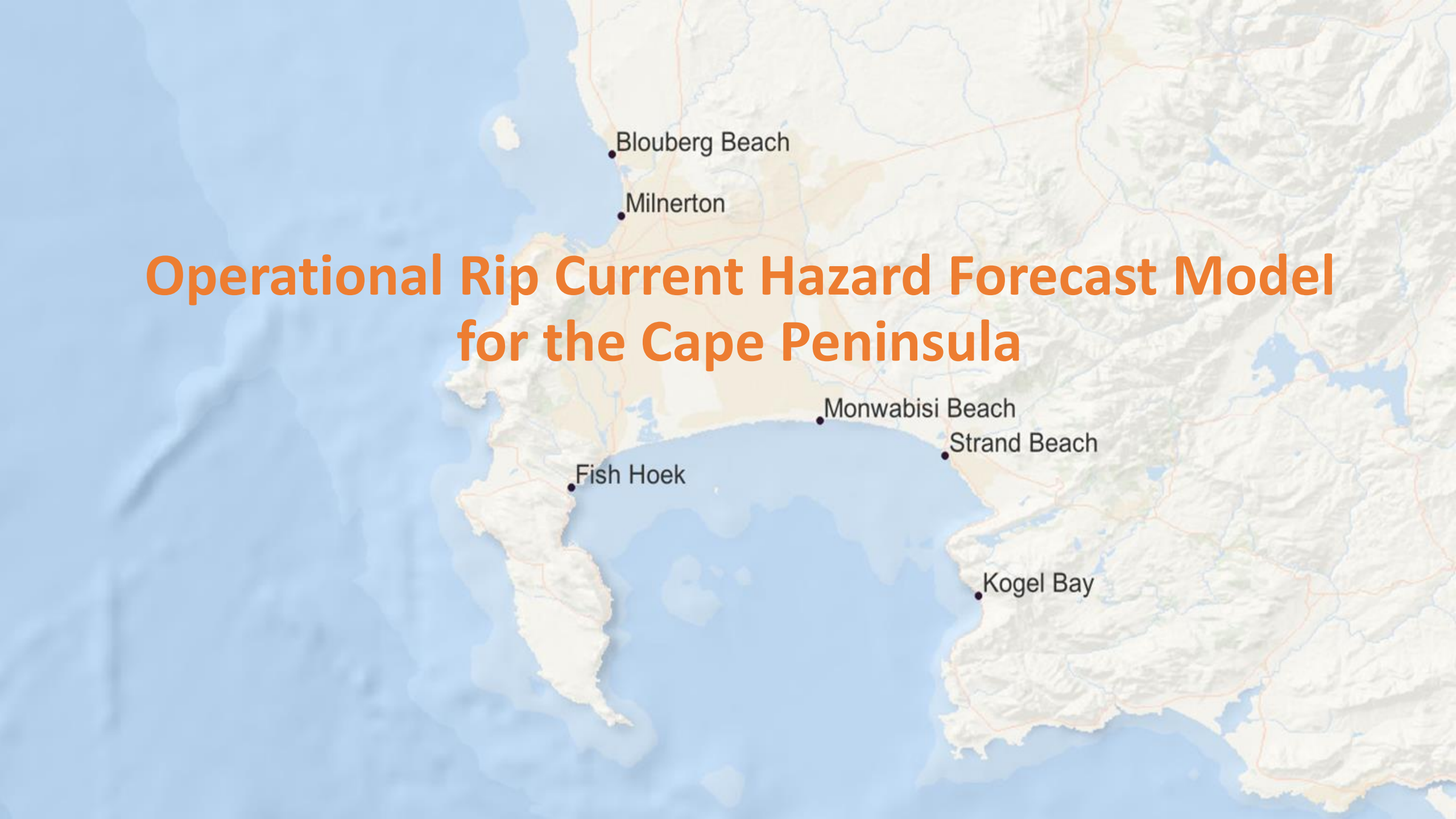
CMAR
Coastal Marine Applied Research

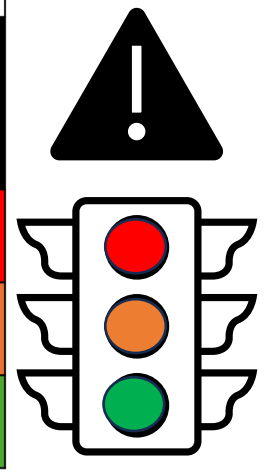
South African Weather Service

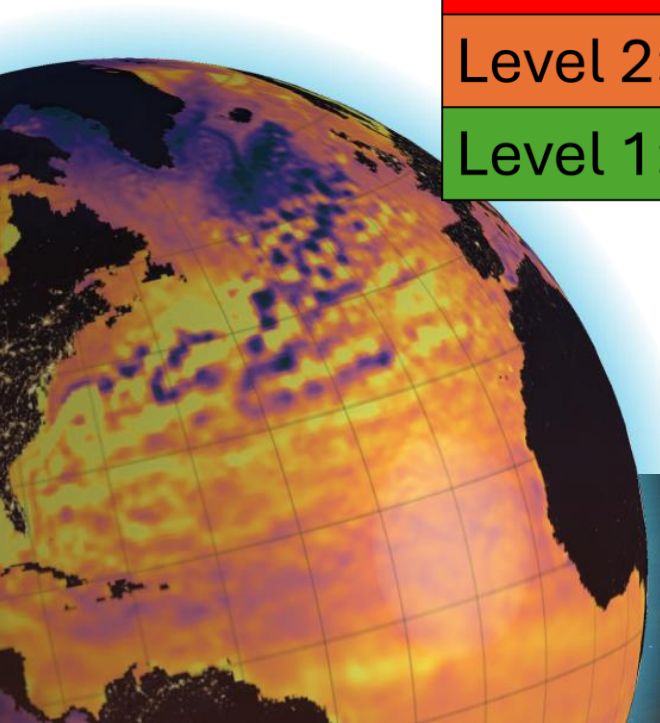


Operational Rip Current Hazard Forecast Model for the Cape Peninsula

Threshold Based Rip Risk Levels

Risk Level	Rip Risk
Level 4: High Wave Warning	High Waves and Strong Currents
Level 3: High Risk	Rips Strong
Level 2: Medium Risk	Rips Likely
Level 1: Low Risk	Rips Unlikely





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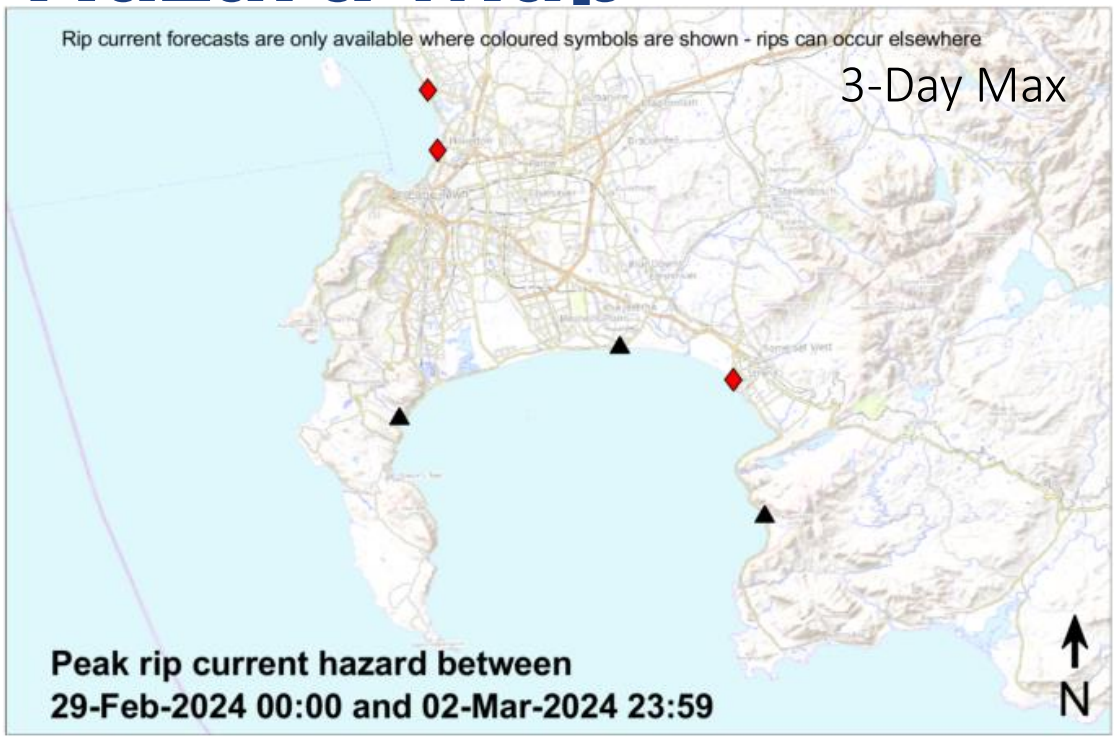
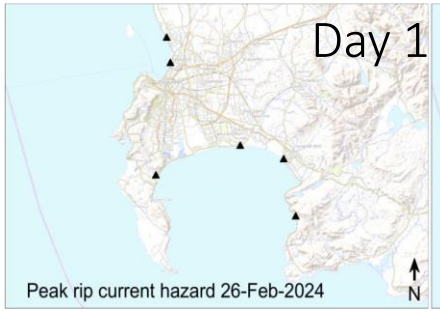
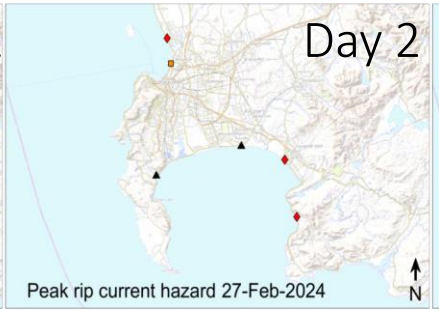
Forecast Outputs: 3-Day Peak Rip Current Hazard Map

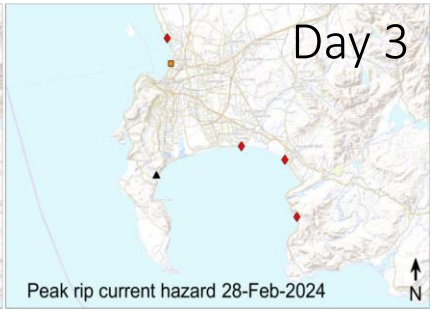


Rip Current Hazard:

- High waves and strong currents
- Rips strong
- Rips likely
- Rips unlikely

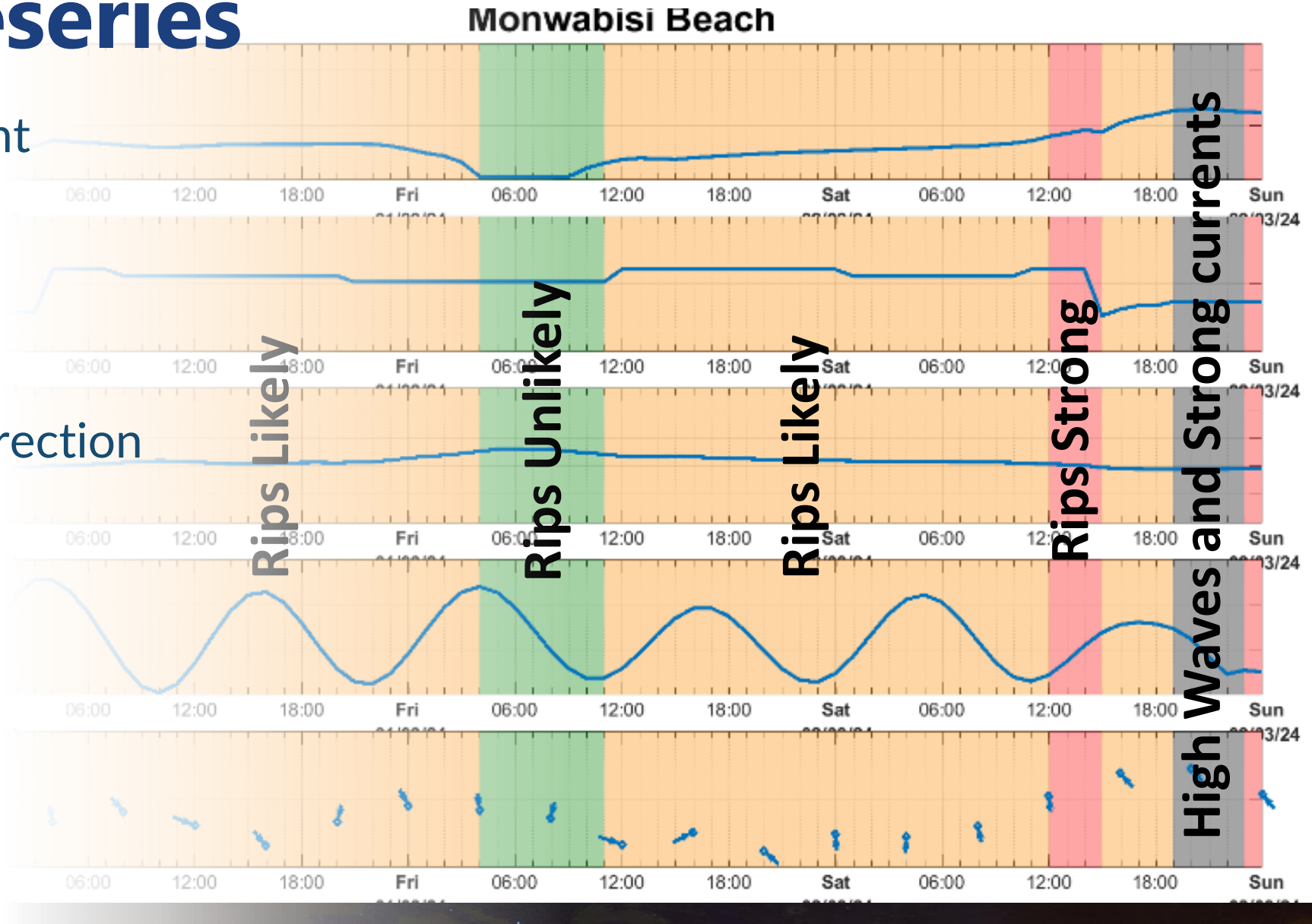






Forecast outputs: 3-Day Rip Current Hazard Timeseries

- Breaker Wave height
- Peak Period
- Wave Direction
- Water Level
- Wind Speed and Direction

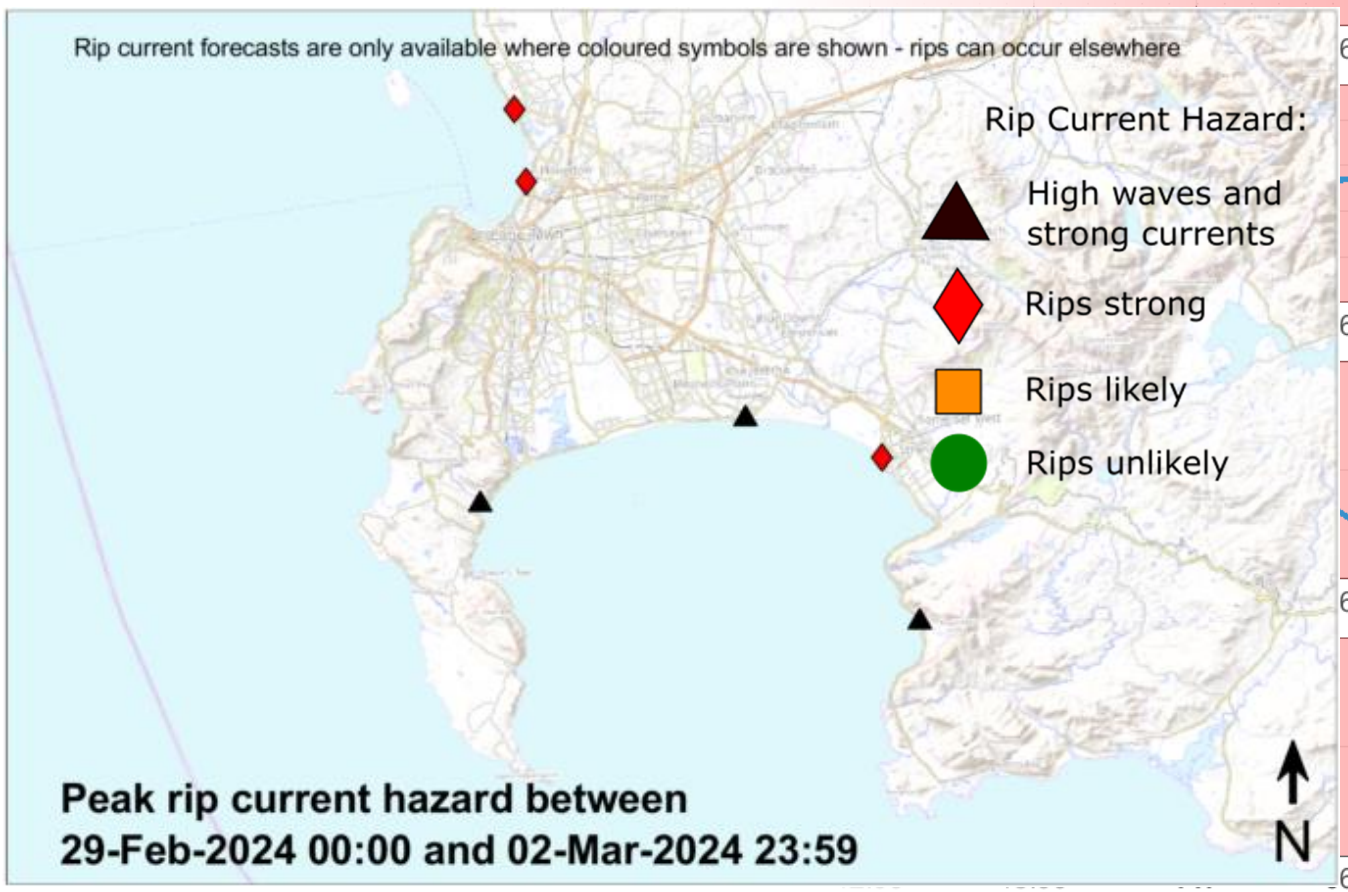


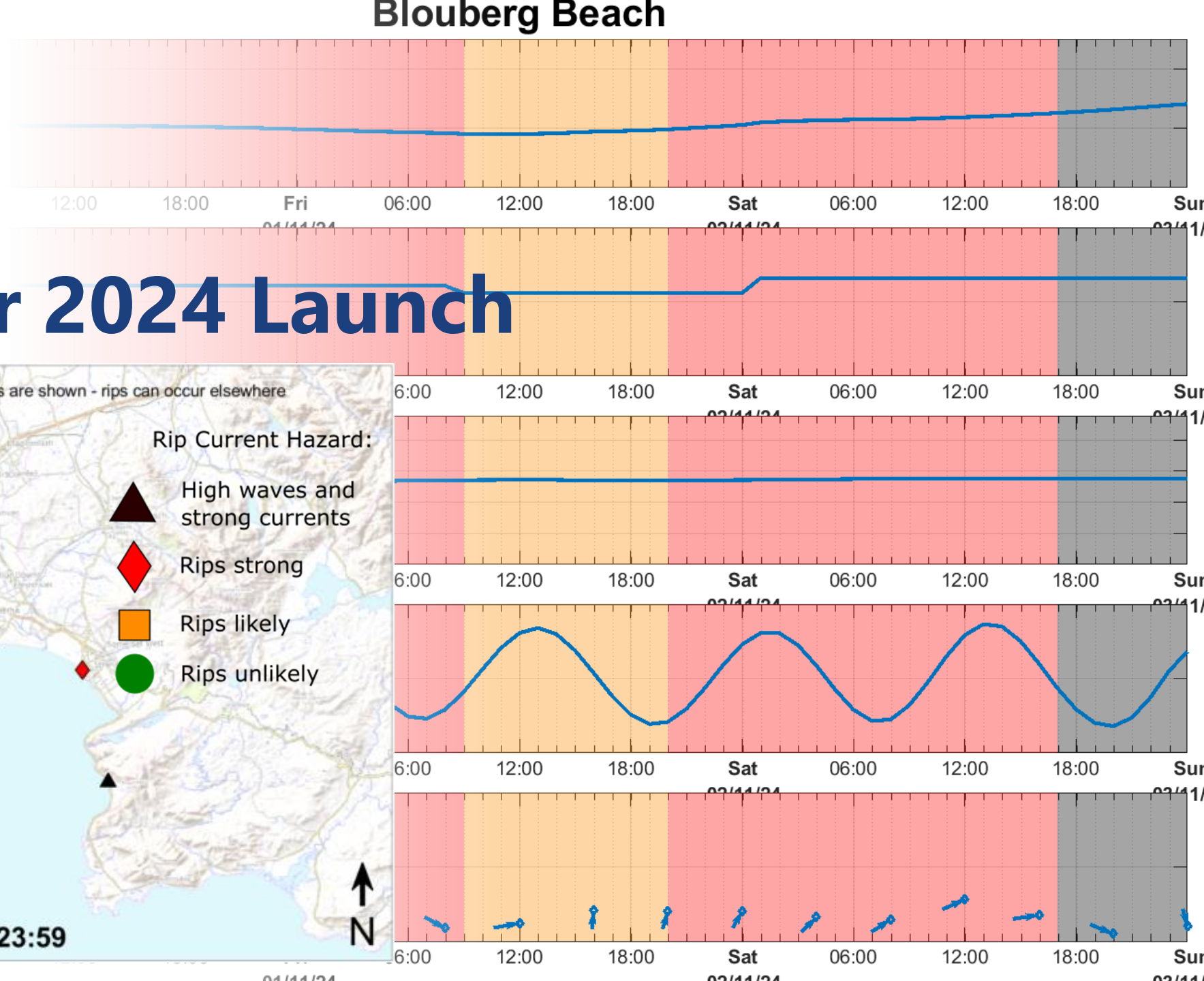
Forecast Outputs: 3-Day Rip Current Hazard Timetable

Rip Forecast for Blouberg Beach

08-Feb 2024	Hb (m)	Tp (s)	Waves from	Wind (m/s)	Wind f rom	water level (m LLD)	Rip current haz ard
06:00	"2.2"	"10. 3"	'W-SW'	"3.5"	'SW'	"-0.6"	'Rips strong'
07:00	"2.2"	"10. 3"	'W-SW'	"2.4"	'SW'	"-0.6"	'Rips strong'
08:00	"2.2"	"10. 3"	'W-SW'	"1.9"	'W-SW'	"-0.4"	'Rips strong'
09:00	"2.2"	"10. 3"	'W-SW'	"2.0"	'W-NW'	"-0.1"	'Rips strong'
10:00	"2.2"	"10. 3"	'W-SW'	"2.4"	'NW'	"0.2"	'Rips strong'
11:00	"2.2"	"10.	'W-SW'	"2.7"	'NW'	"0.5"	'Rips strong'

Pilot Summer 2024 Launch

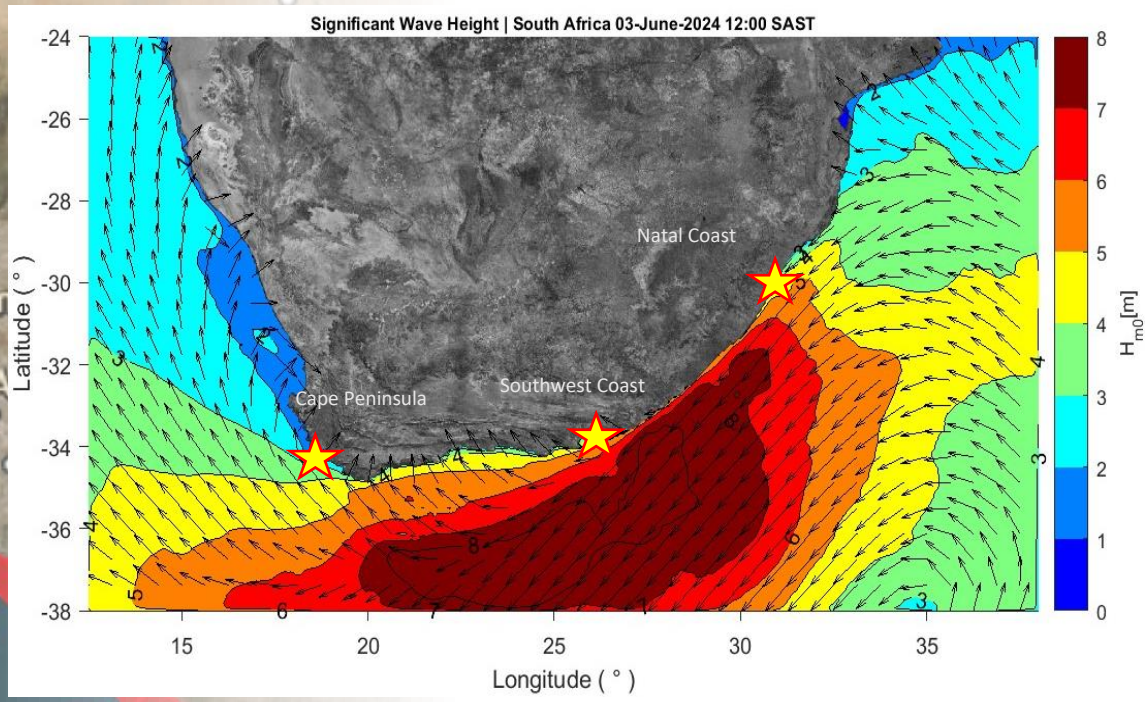




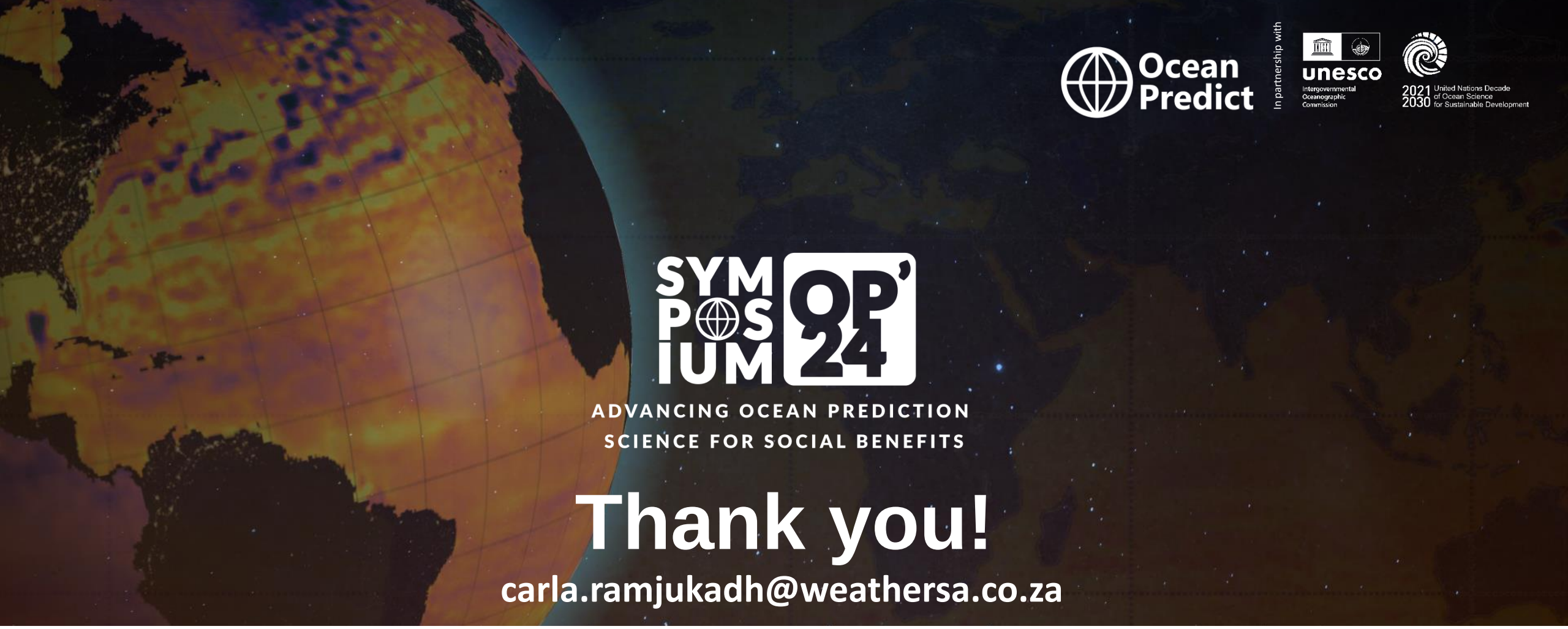
Vision for the Future

Advancing Rip Current Forecasts for Beaches Across South Africa

- Outreach and training
- Better design and symbology
- Hotspot rip detection - satellite images
- Field experiments at new locations
- Assess impact of forecast



National Weather Service
Los Angeles/Oxnard
RIP CURRENT RISK for 2/7/2024
Valid as of 237 AM PST
EXPERIMENTAL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