

Towards a National Rip Current Forecast: South Africa

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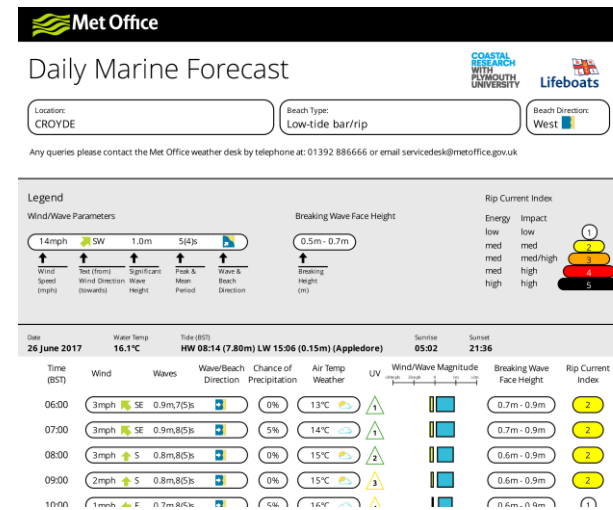
**NATIONAL
SEA RESCUE
INSTITUTE**



**UNIVERSITY OF
PLYMOUTH**

Rationale

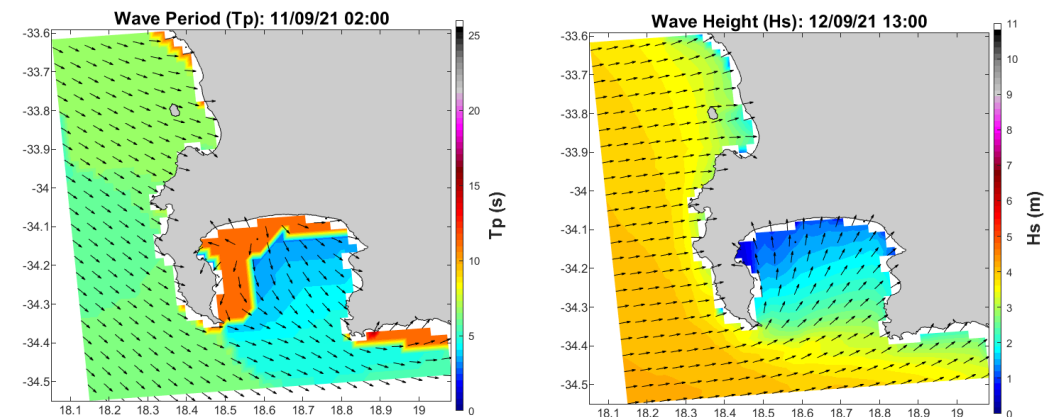
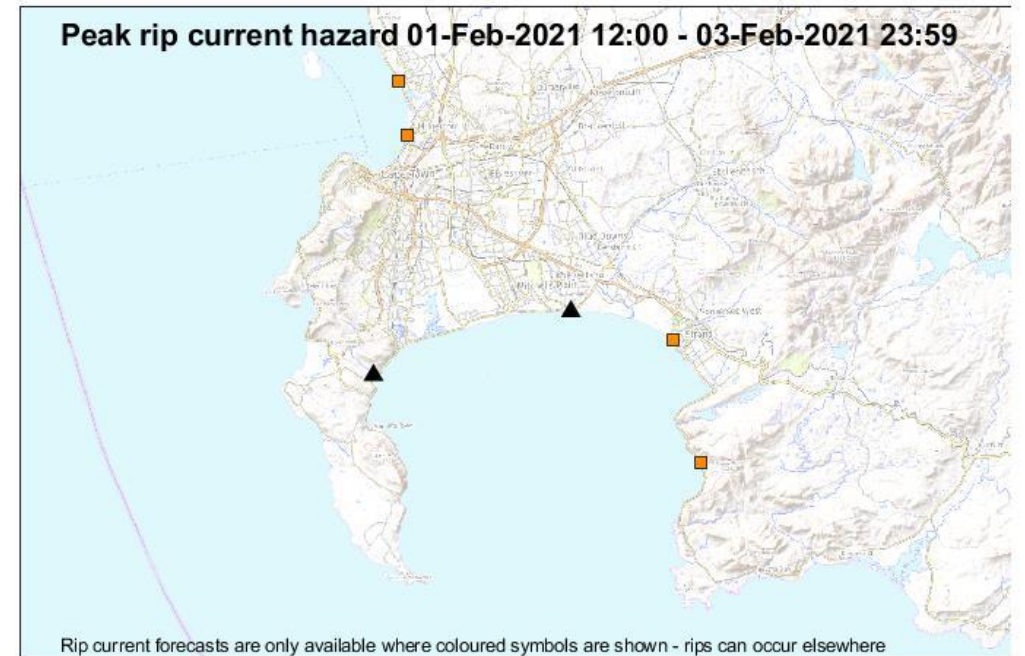
- Global estimates - ~1,000 drownings per year^{1,2,3,4}
- SA estimate- ~50 drownings per year⁵
 - Fewer than 1 in 6 can swim⁶
 - Volunteer and Professional LG service
- National Rip Current Forecasts – UK, NZ, USA, South Korea



SA Project

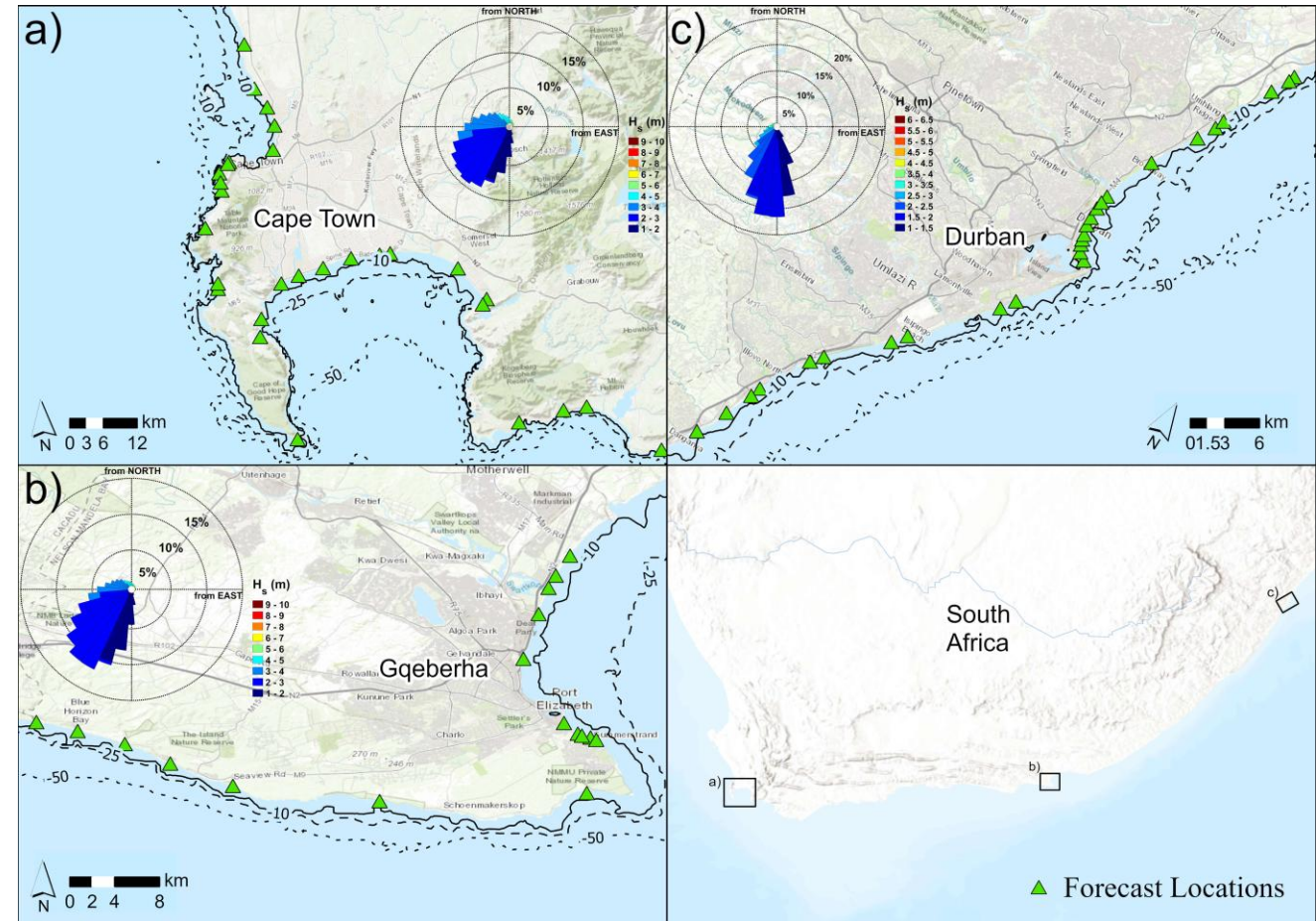
- Original project designed for Cape Town – five beach locations
- Current project: Gqeberha, Durban and other high population areas
- Rip forecast for >120 beach locations
 - Support lifesaving services
 - Raise public awareness

● Rips unlikely ■ Rips likely ◆ Rips strong ▲ High wave warning

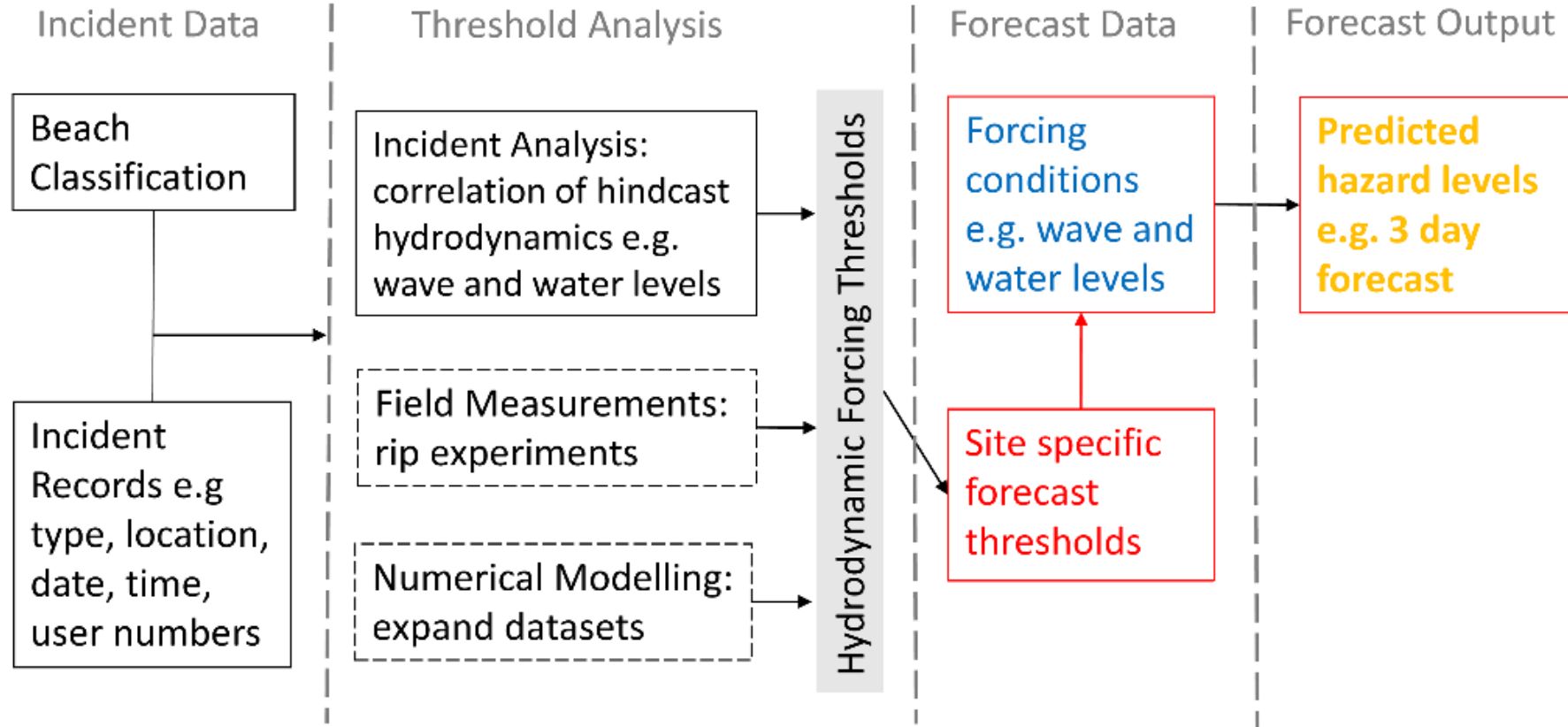


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Forecast

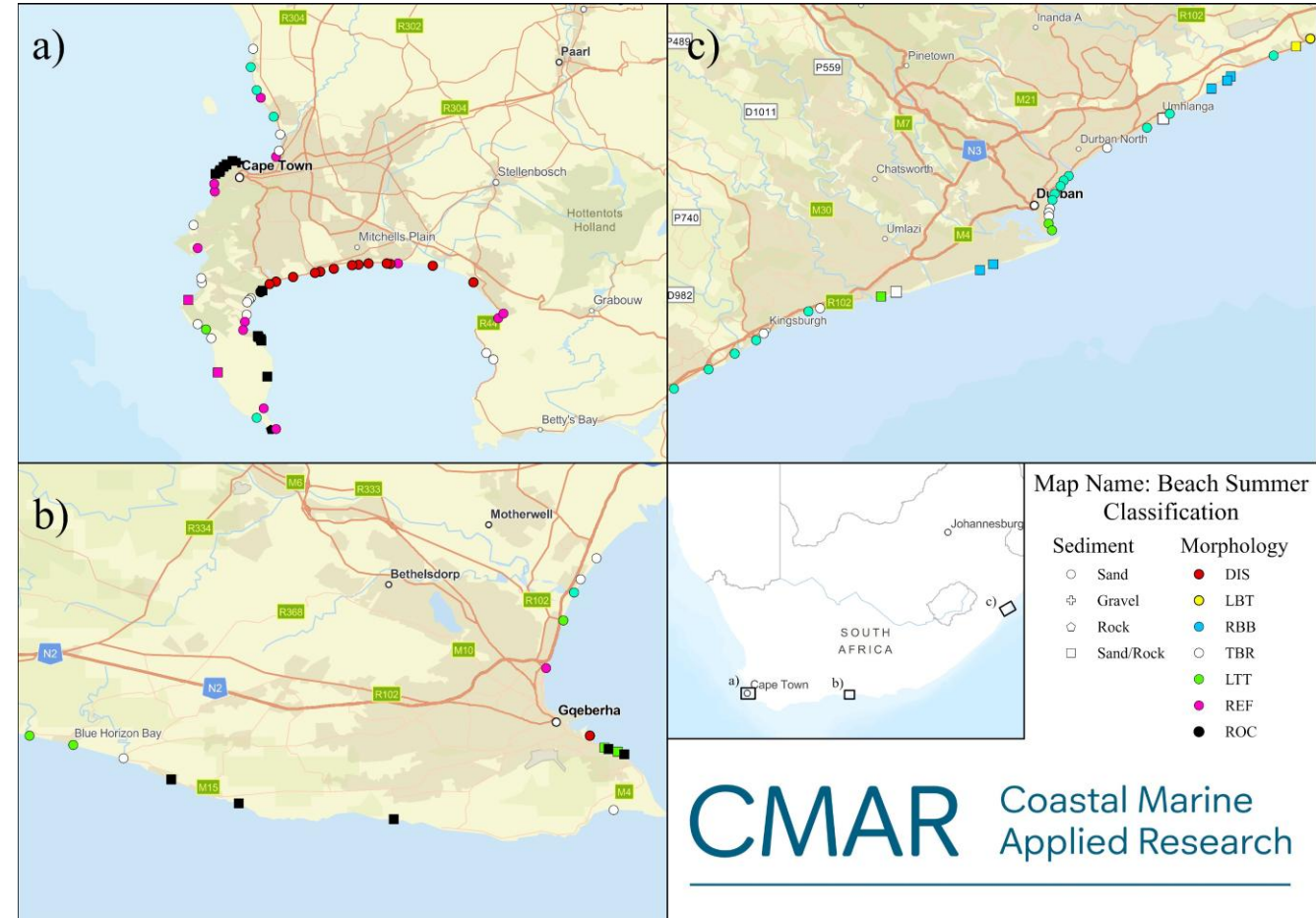


Forecast

Incident Data

Beach
Classification

Incident
Records e.g
type, location,
date, time,
user numbers



Forecast

Incident Data

Threshold Analysis

Beach
Classification

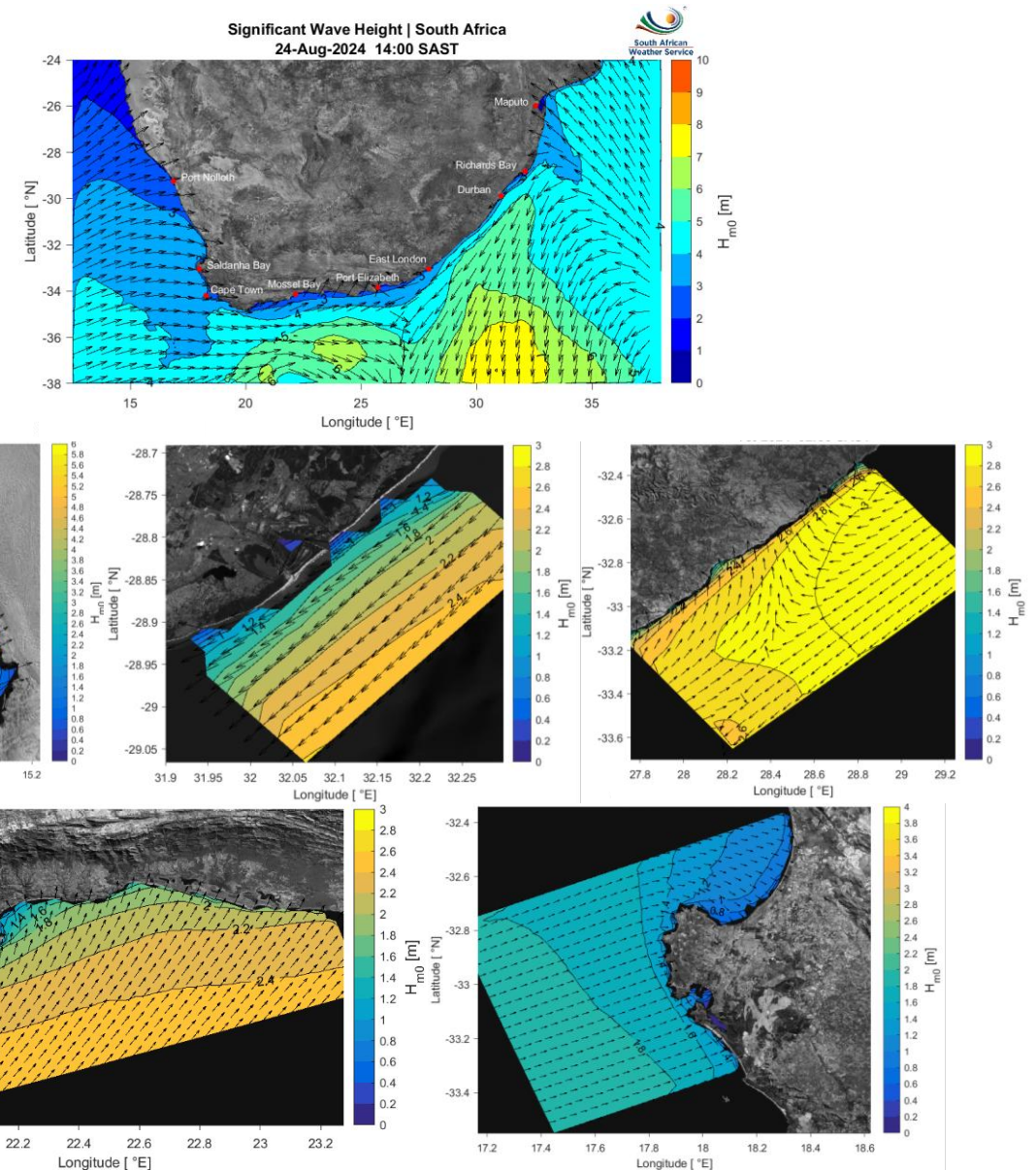
Incident Analysis:
correlation of hindcast
hydrodynamics e.g.
wave and water levels

Field Measurements:
rip experiments

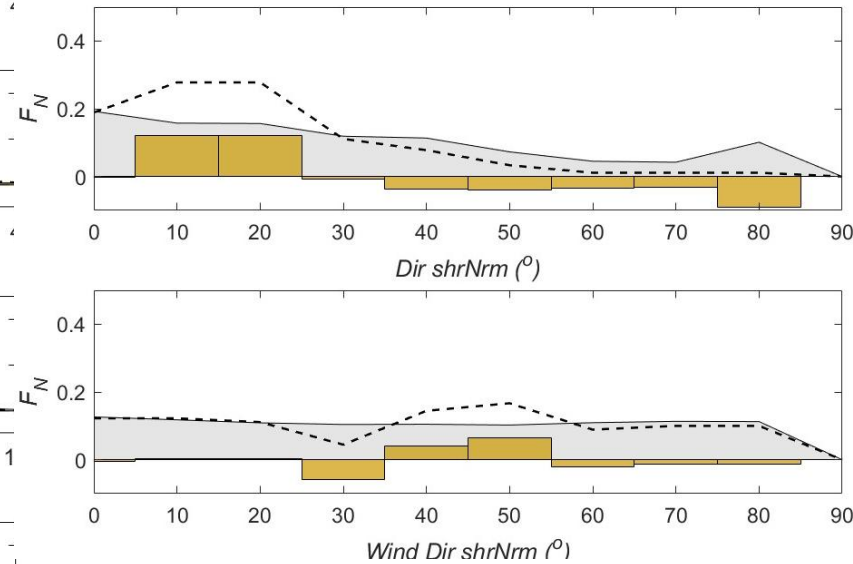
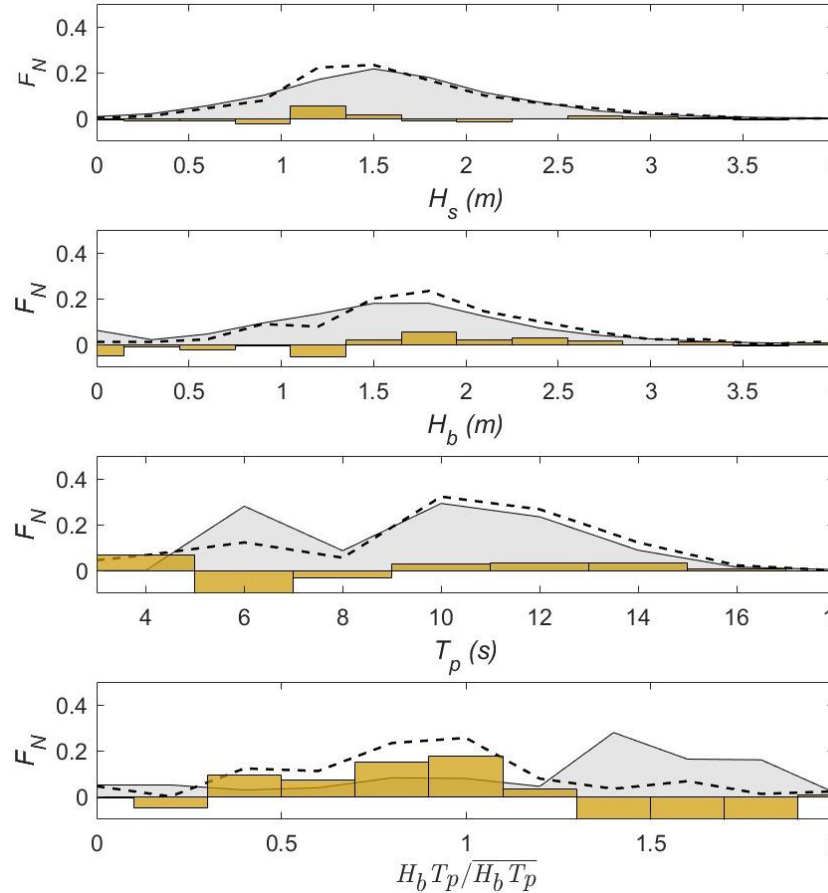
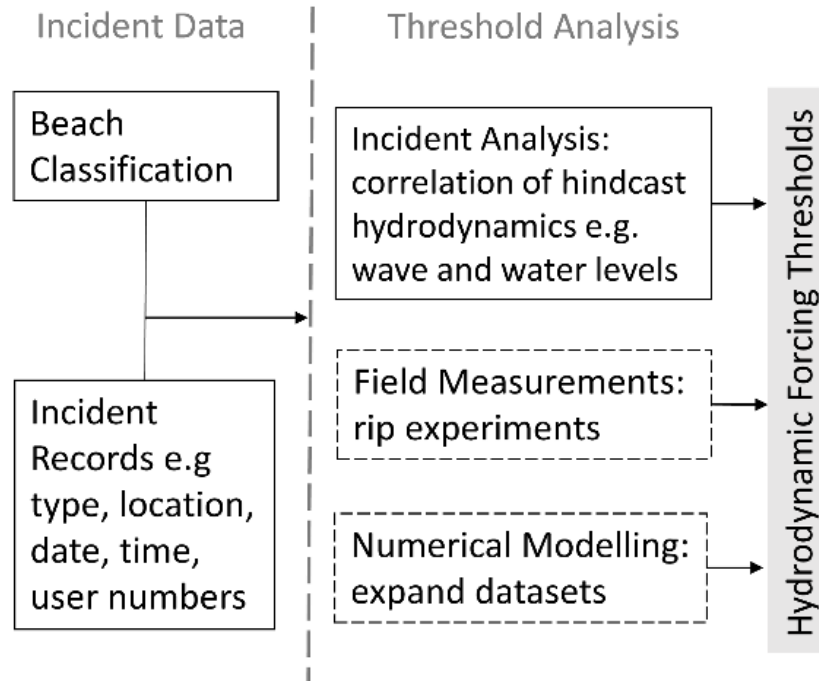
Numerical Modelling:
expand datasets

Incident
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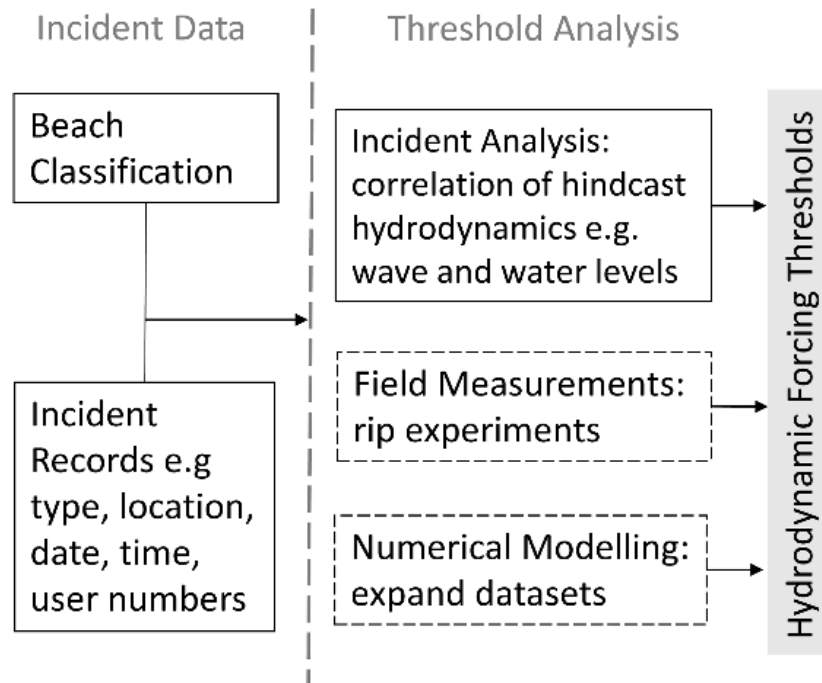
Hydrodynamic Forcing Thresholds



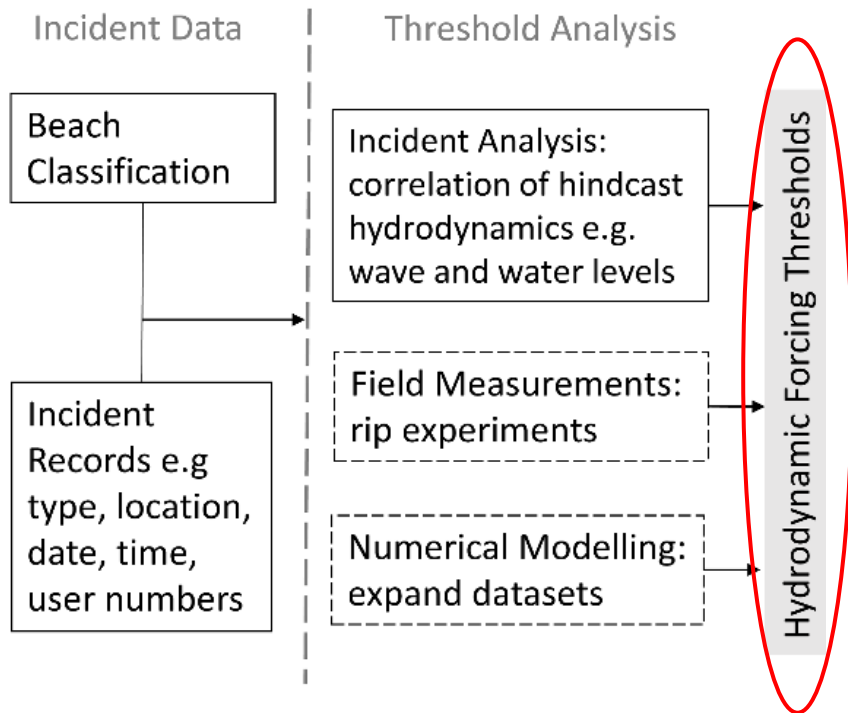
Forecast



Forecast

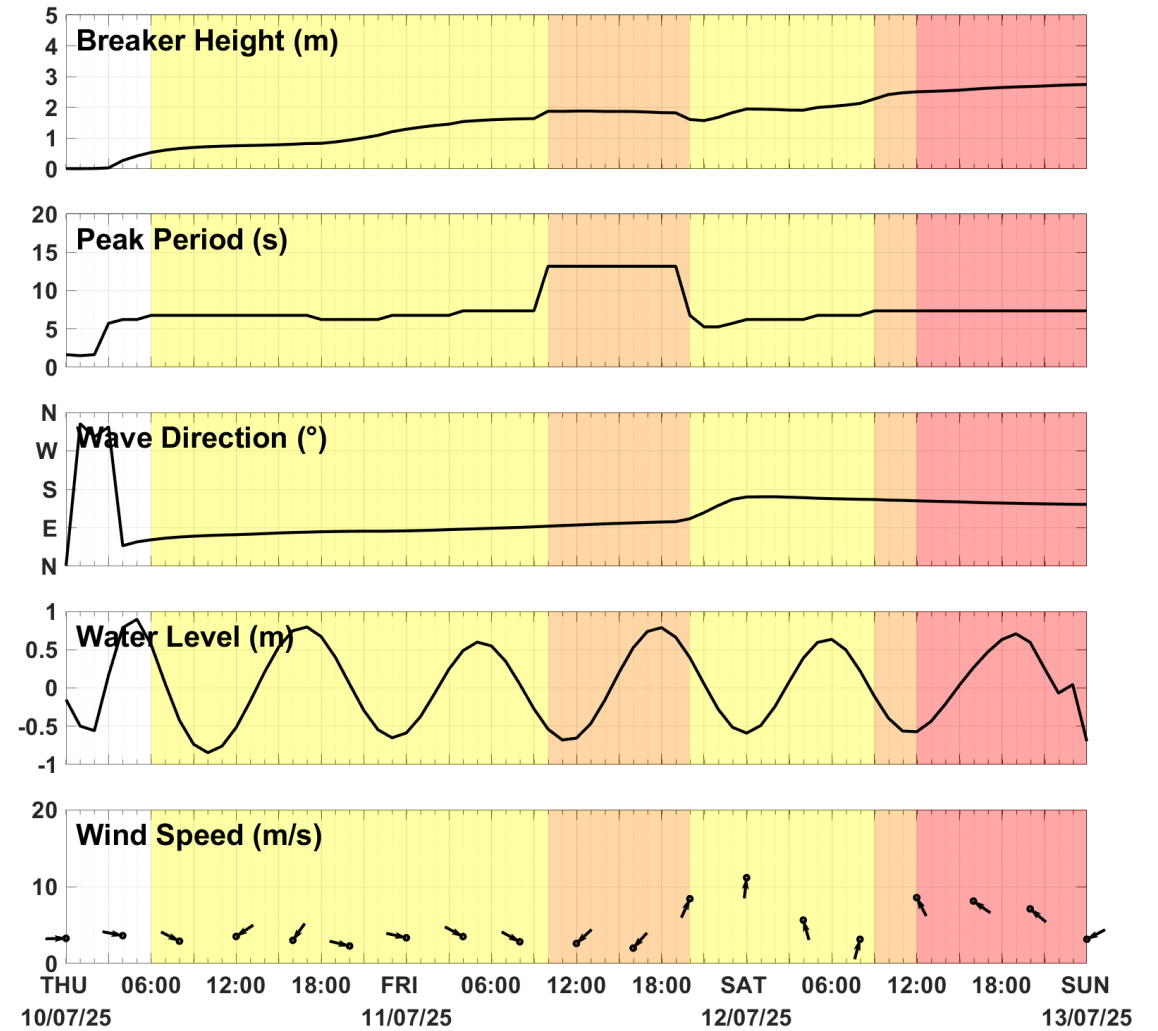
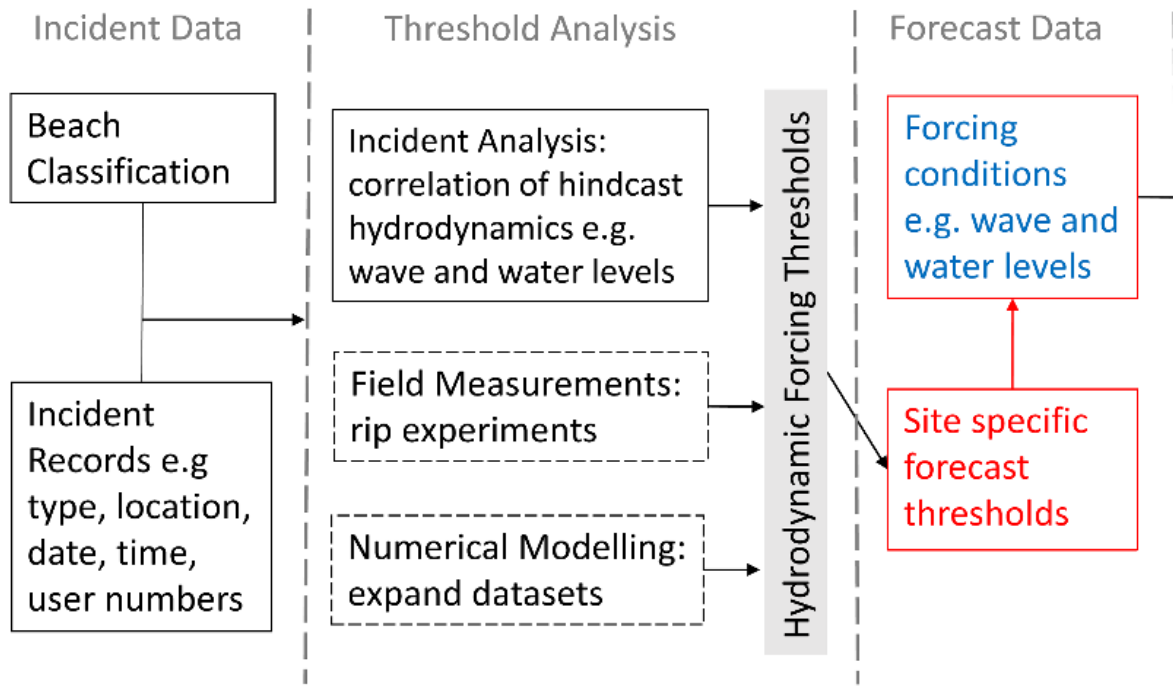


Forecast

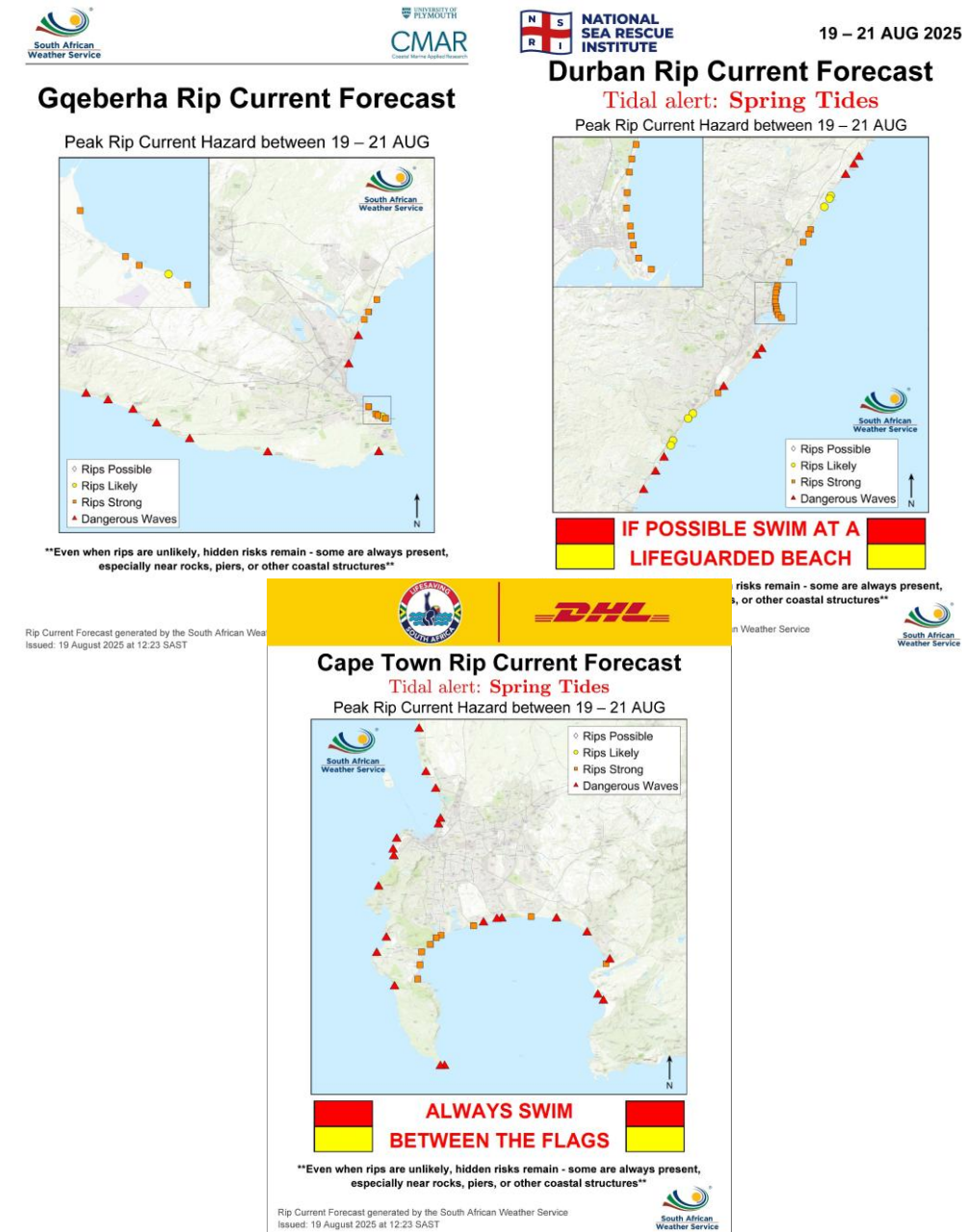
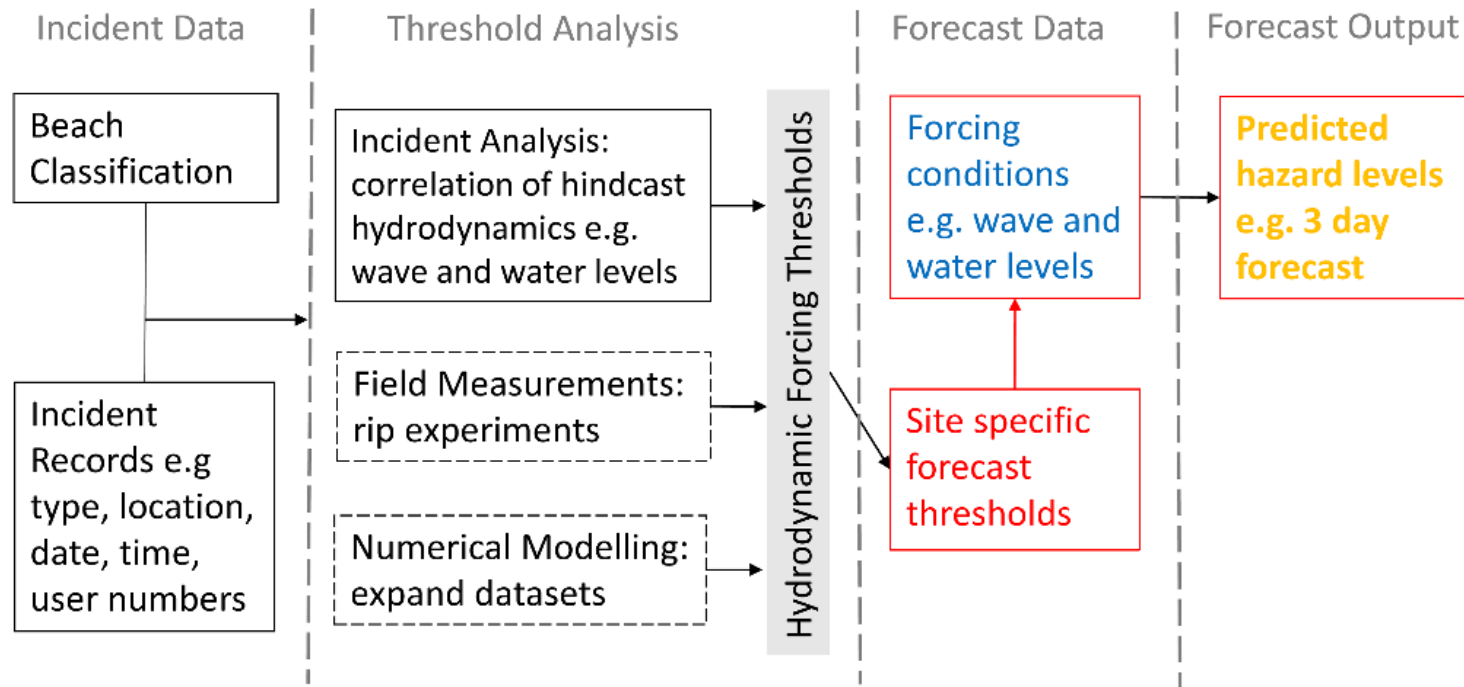


Hazard Level	Rip Threshold
Level 1: Low	$H_b < 0.5 \text{ m}$
Level 2: Medium	$0.5 \text{ m} > H_b \text{ AND } H_b T_p / \overline{H_b T_p} < 1.2$ OR $H_b < 0.5 \text{ m}$ AND WL between -0.4 and 0 m
Level 3: High	$0.5 \text{ m} > H_b \text{ AND } H_b T_p / \overline{H_b T_p} > 1.2$ OR $0.5 \text{ m} > H_b \text{ AND } H_b T_p / \overline{H_b T_p} < 1.2$ AND WL between -0.4 and 0 m
Level 4: Dangerous Surf	$H_b > 2.5 \text{ m}$

Forecast

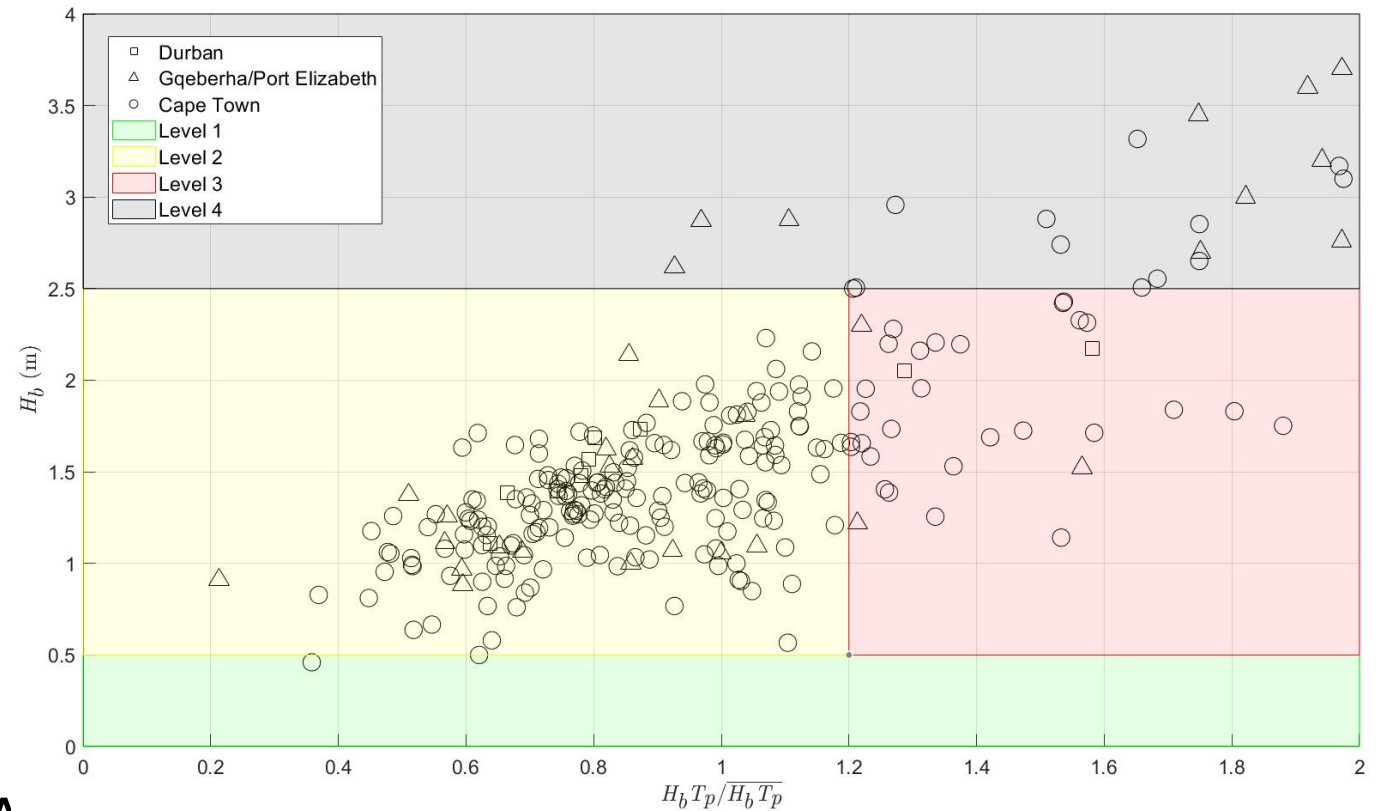


Forecast



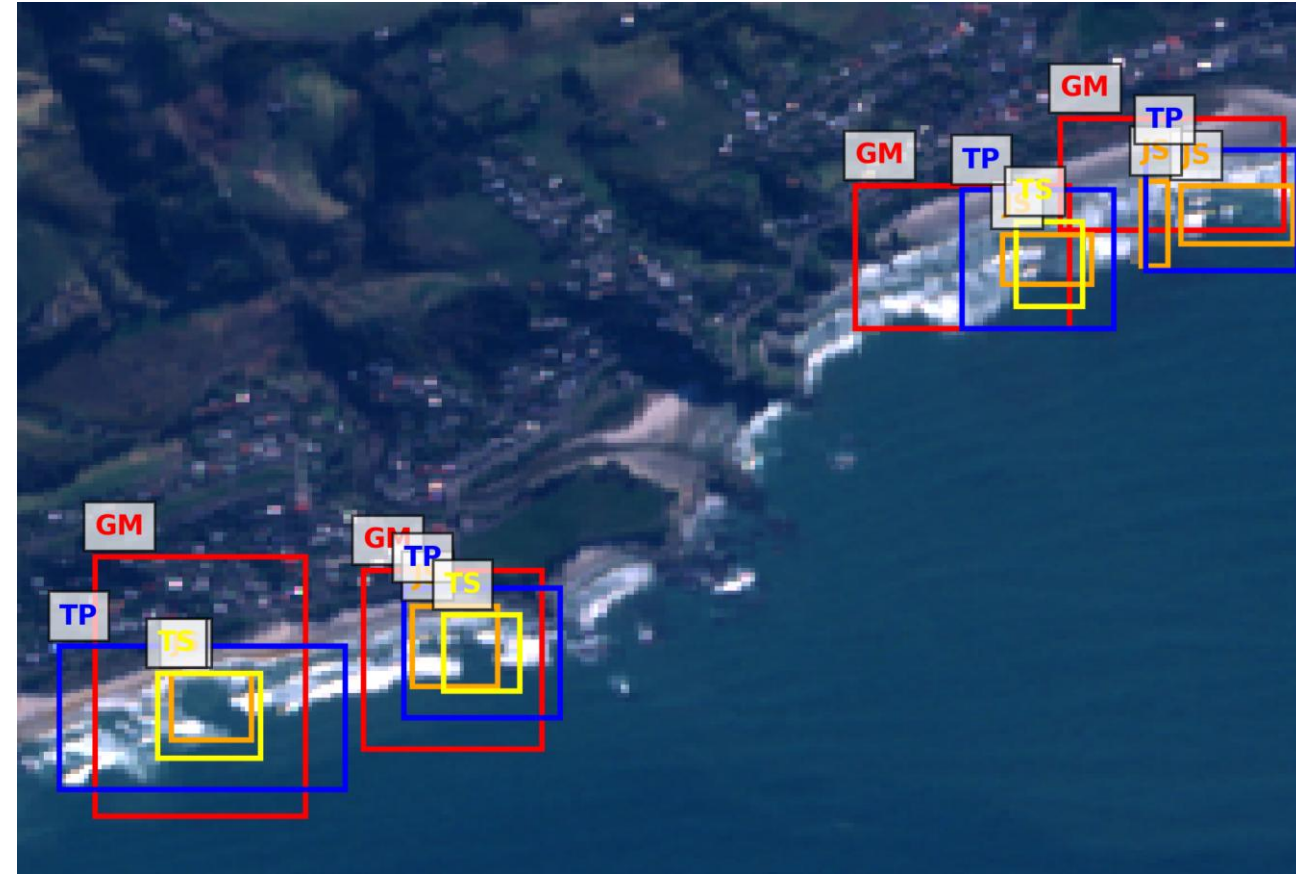
Next Steps

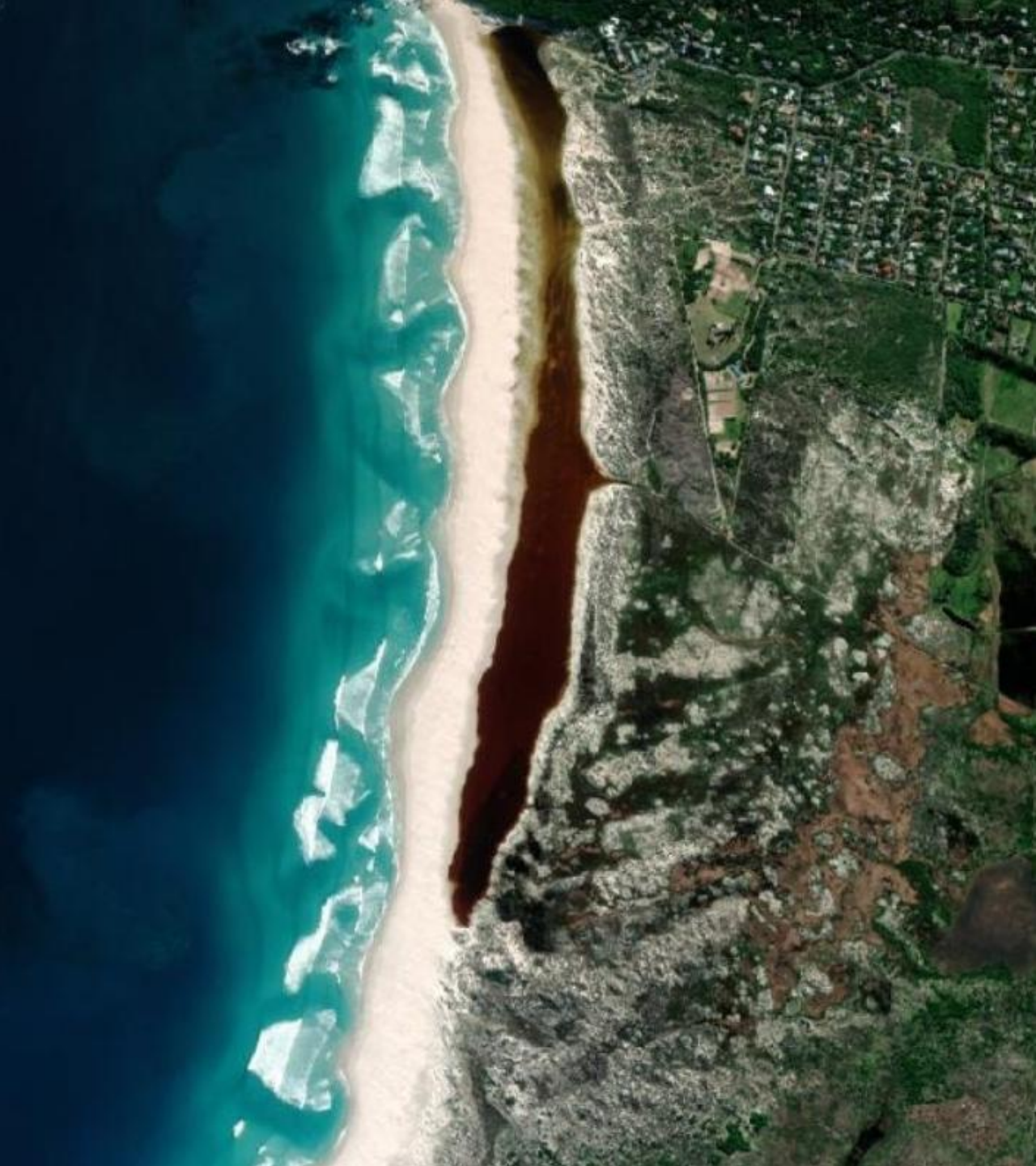
- Fieldwork data collection
- Live forecast by January 2026
- Rip workshops and validation
- Satellite detection of rips
- Further implementation across SA
 - (Funding dependent)



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Thank You



References

- 1 Díez-Fernández, P., Ruibal-Lista, B., Lobato-Alejano, F. & López-García, S. (2023) 'Rip current knowledge: do people really know its danger? Do lifeguards know more than the general public?', *Heliyon*, 9(7).
- 2 RNLI (Royal National Lifeboat Institution). (2023) *Rip currents: the hidden danger on UK beaches*. [Online]. Available at: <https://rnli.org/safety> (Accessed: 02 September 2025).
- 3 **National Weather Service (NOAA)** (2024) *Rip currents*. Available at: <https://www.noaa.gov/jetstream/ocean/rip-currents> (Accessed: 22 September 2025).
- 4 Surf Life Saving Australia 2021, 'Rips remain most deadly hazard on Australian beaches', Surf Life Saving Australia, viewed 02 September 2025, <https://sls.com.au/rips-remain-most-deadly-hazard-on-australian-beaches/>.
- 5 TygerNews 2024, 'First-of-its-kind rip current hazard model launched in South Africa', TygerNews, 29 November, viewed 02 September 2025, <https://tygerburger.co.za/first-of-its-kind-rip-current-hazard-model-launched-in-south-africa-20241126/>.
- 6 NSRI (National Sea Rescue Institute) 2022, 'Keeping our kids safe', NSRI, viewed 02 September 2025, <https://www.nsri.org.za/2022/02/keeping-our-kids-safe/>.

