

Project Endorsement Form

1. PROJECT TITLE

Full title	<i>The role of the Agulhas Current on the Coastal Environment</i>
Acronym	
Website	n/a
Keywords (up to 10, describing the project research)	Agulhas Current, coastal interactions, shelf edge upwelling, phytoplankton, zooplankton, eDNA, metabarcoding, flow cytometry
New initiative or continuing programme?	New initiative

2. APPLICANTS

Lead applicant / Project Leader / key research contact person:

First name	Tamaryn
Last name	Morris
Affiliation	South African Environmental Observation Network (SAEON), Egagasini Node
Postal address	5 th floor, Foretrust Building, Martin Hammerschlag Way Foreshore, Cape Town
Country	South Africa
Telephone	+27 82 509 1713
Email address	t.morris@saeon.nrf.ac.za
Institutional or personal website	https://egagasini.saeon.ac.za/

Other key participants / research team leaders: (repeat as needed)

First name	Shaun
Last name	Deyzel
Role in the project	Co-PI
Affiliation	SAEON, Elwandle Node
Country	South Africa
Email address	hp.deyzel@saeon.nrf.ac.za
Institutional or personal website	https://smcri.saeon.ac.za/

First name	Jenny
Last name	Huggett
Role in the project	Co-PI
Affiliation	DFFE Ocean and Coasts
Country	South Africa
Email address	jenny.huggett@gmail.com
Institutional or personal website	n/a

First name	Juliet
Last name	Hermes
Role in the project	Co-PI
Affiliation	SAEON, Egagasini Node
Country	South Africa

IIOE-2 Project Office (PO)

Indian National Centre for Ocean Information Services (INCOIS)

Pragathi Nagar, Hyderabad, Telangana 500 090, India.

Phone: +91-40-2388 6038

E-mail: iioe-2@incois.gov.in

<https://iioe-2.incois.gov.in>

Email address	jc.hermes@saeon.nrf.ac.za
Institutional or personal website	https://egagasini.saeon.ac.za/

First name	Tommy
Last name	Bornman
Role in the project	Co-PI
Affiliation	SAEON, Elwandle Node
Country	South Africa
Email address	tg.bornman@saeon.nrf.ac.za
Institutional or personal website	https://smcri.saeon.ac.za/

First name	Jethan
Last name	D'Hotman
Role in the project	Co-PI
Affiliation	SAEON, Egagasini Node
Country	South Africa
Email address	js.dhotman@saeon.nrf.ac.za
Institutional or personal website	https://egagasini.saeon.ac.za/

N.B.: Please note that all these names and contact details will be added to the IIOE-2 membership database.

3. ABSTRACT– Brief description of the project: (1/4 page maximum)

This will be placed on the IIOE-2 Website after endorsement.

The Agulhas, a fast-flowing and powerful western boundary current, is incredibly difficult to monitor. Previous expeditions have deployed full-depth water column moorings from the shelf edge across the Agulhas Current core using large, state-of-the-art research vessels. The costs associated with the installation and subsequent maintenance of full-depth moorings is very high, and the logistics incredibly time-consuming. The value of such data is important for climate dynamics, especially if a program of this nature can be maintained for several years. However, in today's economic climate such a program cannot be supported solely from a South African perspective. The objectives also may not represent the needs of the South African coastal communities, likely focusing instead on the understanding of the global climate and the impacts the Agulhas Current has on this. As a current that drives significant changes globally, but also locally, very little is understood of the Agulhas Current itself. As an ocean science community, few studies have looked at the relationship between the Agulhas Current and the local climate, on the influence on local subsistence fisheries, on tourism, safe shipping and efficient port operations. While these issues are not in themselves simple, we know that only through a multi-disciplinary approach can we begin to address some of these ideas.

For this proposal, we refer to anomalies as unusual physical circumstances within the Agulhas Current that may potentially drive changes in the biogeochemical and biological processes along the shelf edge and coastal ecosystems adjacent to the Agulhas Current and the anomalies themselves. These anomalies can be trapped cyclonic eddies propagating south-westwards inshore of the Agulhas Current from the KwaZulu-Natal region. From anecdotal knowledge, we know that trapped cyclonic eddies allow for cooler north-westward flowing waters along the east coast, and when well timed, can assist ships with safer passage northwards and influence such phenomena as the Sardine Run. What maybe is not as well understood, is

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what nutrients and biodiversity is trapped and transported with those cyclonic eddies. We also refer in this proposal to unusually warming events along the inshore region potentially linked to marine heatwaves, and in reverse, intensive or prolonged cooling events, such as the Port Alfred upwelling cell, and understanding these dynamics and the impacts on coastal ecosystems. Filaments of enriched productive waters carved off of the Agulhas Current as it bifurcates off the shelf south of Port Alfred, particularly where the filament impacts Algoa Bay, is another physical mechanism that warrants further investigation.

This proposal looks to develop a monitoring program that will study these processes and anomalies within and inshore of the Agulhas Current and relate these back to coastal ecosystems. The focus initially will be on the southern Agulhas Current – off of the Port Alfred region and southwards – and work to establish a second monitoring program of anomalies south of Durban when funding and opportunity arises. The value of surveying a trapped cyclonic eddy south of Durban, and again once it reaches Port Alfred or Algoa Bay would be incredibly beneficial in terms of structural changes of the eddy, biogeochemical and biological changes and the potential transport these anomalies have for nutrients, larvae, and even pollutants.

4. LINKS TO IIOE-2 SCIENCE PLAN: (1/2 page maximum)

How do you anticipate your project to contribute to the IIOE-2 strategy and science delivery, with reference to which (either one or more) of the six IIOE-2 Science Plan themes that your project responds. Please state the specific issues and questions addressed by your project in the context of the IIOE-2 Science Plan themes and key issues.

Our project fits most closely with two Science Themes under the IIOE-2 initiative:
ST2 – Boundary current dynamics, upwelling variability and ecosystem dynamics
ST4 – Circulation, climate variability and change

The Agulhas Current is understudied, yet critical to the understanding of our climate in the global context. Importantly though, the Agulhas Current also directly impacts South African weather and particularly rainfall, fisheries, ports and shipping operations and we do not have enough of an understanding of how the Agulhas influences our coastal, shelf and slope regions.

5. INTERNATIONAL COLLABORATION(S):

Is the project part of a related multi-national activity? **NO**

If No, would you welcome international collaboration in your project? **YES**

6. REGION(S) OF STUDY

Provide a description of ‘where’ the research is to be conducted (for field based activities) and/or the region or regions to which the research pertains (you are encouraged to consider providing either the coordinates of the area of studies or the coordinates of the planned cruise tracks, as well as a figure as an addendum to your proposal).

The project is based in Algoa Bay, South Africa, undertaking surveys from inshore to off the shelf and slope and impacting with the Agulhas Current.

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6. TIMETABLE OF THE PROJECT

Start date: 01/04/2024	End date: 31/03/2027
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7. LINKAGES WITH OTHER PROJECTS / PROGRAMMES / INITIATIVES

Is the project part of a related national or multi-national activity?

If yes, provide the related activity title and website for reference, if available:

The project is linked to two research infrastructure programs in South Africa:

- 1) The South African Polar Research Infrastructure (SAPRI) – <https://www.sapri.ac.za/>
- 2) The Shallow Marine and Coastal Research Infrastructure (SMCRI) - <https://smcri.saeon.ac.za/>

Is your project part of, or affiliated to, another SCOR, IOC or IOGOOS activity or project?

If “yes”, please indicate which activity or project:

No

8. DATA MANAGEMENT AND SHARING

1. Will new data be collected as part of this project (yes or no)?

Yes

All data will be made available through the SAEON Ocean Database Portal.

2. Contact information if any, of the person in charge of the data management from whom the metadata can be accessed by interested IIOE-2 stakeholders.

Please note that for all IIOE-2-endorsed projects, IIOE-2 will have developed its own metadata portal. Once the project is endorsed, the project leader will be asked to provide the metadata information of the project.

t.morris@saeon.nrf.ac.za

3. Recognizing the need for an initial period of exclusive data use, would you be willing to provide timely access to all data generated under this project and associated metadata in accordance with relevant national and funding agency data sharing policies? **YES**

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9. FUNDING

Please note that IIOE-2 strongly encourages funded/resourced projects. However, IIOE-2 may endorse projects yet to receive funding/resourcing if IIOE-2 endorsement can be clearly shown to significantly aid in prospects for funding/resourcing.

Has funding and resources to successfully achieve and undertake the project been obtained? Indicate the sources of funding and resources that have been approached and/or secured.

The project is funded through the NRF ACEP project as a three-year project grant.
Grant #: ACEP23041994746

10. BENEFITS FROM IIOE-2 ENDORSEMENT (1/4 page maximum)

Specify why you are seeking endorsement and how the activity would benefit from endorsement, and how the IIOE-2 SC could assist in the implementation of your project.

The primary benefit of IIOE-2 endorsement would be awareness of our research and to create opportunities for young emerging researchers within the project as post graduate students.
At this stage, the project is funded, and so the support required from the IIOE-2 SC would be minimal.
We of course would welcome any ideas the science leadership would have for the work.

11. OPTIONAL: CAPACITY DEVELOPMENT (length and detail may be at the discretion of and as deemed necessary by the applicant)

Please feel free to provide this information relevant to the capacity development component of this project.

Several capacity development initiatives will take place under this project:

- 1) Master's and PhD student projects, data acquisition and processing
- 2) At-sea training opportunities for students, interns, technicians and scientists
- 3) We are also looking to build homegrown drifter buoys for schools to develop and deploy and plot their progress at sea. This is a type of innovation project linking to the SAEON education and outreach teamwork.

12. OPTIONAL: OTHER COMMENTS/INFORMATION/MATERIAL (length and detail may be at the discretion of and as deemed necessary by the applicant)

Please feel free to provide any other comments, information or materials that you feel relevant to your proposal for the IIOE-2 Steering Committee's information and benefit. You may provide this as general information or provide the additional comments/information/materials as relevant to any of the specific Sections above.

None at this time.

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2015-2025



(Signature of the PI)

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