Shark strike in the northern Red Sea

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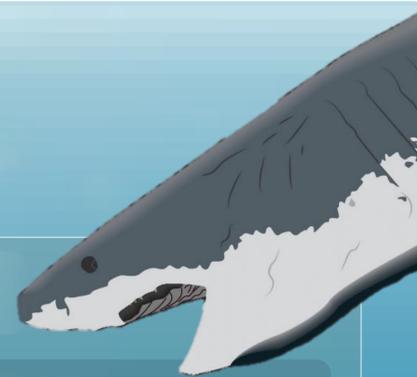
Background

- A KAUST **seaglider was attacked by a shark** at approximately 09:10 Arabian Standard Time at a depth of **56.39m** off the coast of Duba, Saudi Arabia.

- Seagliders are **long-range autonomous underwater vehicles** (AUVs) that can profile the ocean for many months at a time at a fraction of the cost of traditional methods.

- Shark attacks are a **threat to the integrity of the data** recorded by AUVs.

- This study quantifies the **damage inflicted** on the seaglider, as well as discussing the strike mechanics and potential **attack motivation.**

Damage Report

Bite profiles were used to compare the inflicted damage on the Seaglider to the **known pelagic species** inhabiting the Red Sea.
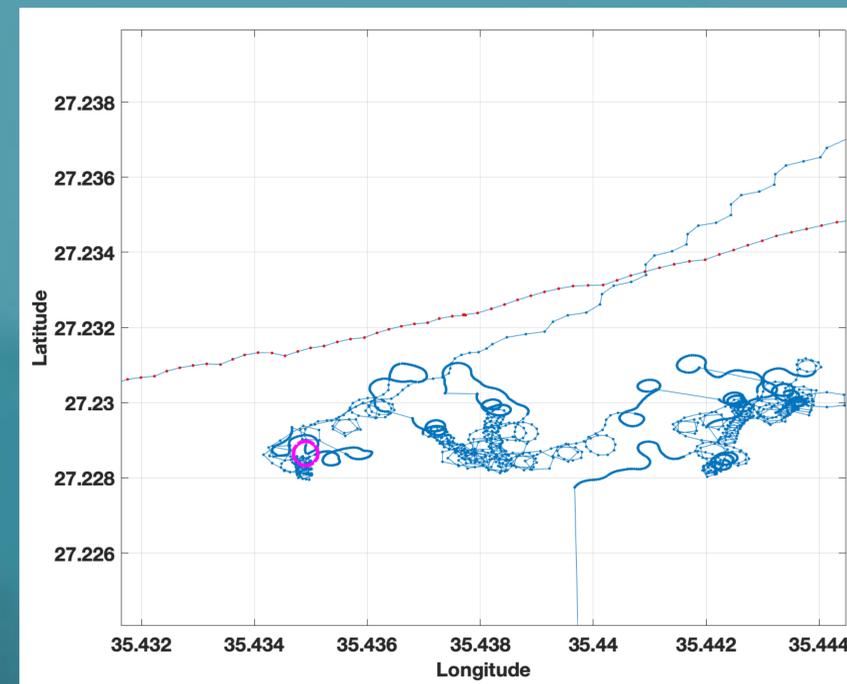
This included a **tooth fragment** and **bite location** on the Seaglider.

Strike Event

- Seaglider 213 was deployed from 5th October 2015 until an **emergency recovery** on the 14th November 2015, **70km offshore** of Duba.

- During this time, communications with the glider had been challenging, where **buoyancy** and **direction** of the Seaglider were near impossible (*blue spirals*).

- The Seaglider had been **struck twice**.

- This created an **ingress of water**, **severed oxygen sensor** and **removed a wing** of the Seaglider (*pink circle*) causing difficulties in control.

- A **second glider was struck** during the summer of 2018.

Attack Motivation

- **Heavy fishing** in the Red Sea has reduced prey items.

- **Pelagic sharks** tend to display **territorial behavior.**

- **Sharks are curious** and test with their mouths; the color, noise, and biofouling could **attract attention**.

- The **only records** of shark attacks on AUVs have been from **white sharks**, which are **not found in the Red Sea**.

- Potential species include the **Oceanic Whitetip** and the **Shortfin Mako**.

Future Work

- Future studies should focus on **Artificial Intelligence** software that can be developed to learn the normal patterns of **vertical velocity**, **pitch**, and **roll** of seagliders.

- Sharp and jagged movements are abnormal and could be interpreted as a shark strike to alert the Seaglider pilot in order to **abort the mission**.

- To **identify the potential species** of the attacks, pelagic baited remote underwater video surveys **(BRUVS)** should be conducted at the **site of attack** after a mission has been aborted due to a shark strike.

References
1. **Stanway, M. J. et al. (2015)** White shark strike on a long-range AUV in Monterey Bay.
2. **Levine, M. et al. (2010)** Shark Cognition and a Human Mediated Driver of a Spate of Shark Attacks.