

# FIRST INSIGHTS ON *Vazella pourtalesii* ASSEMBLAGE DYNAMICS

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**Introduction:** In certain areas of the Nova Scotian shelf, *Vazella pourtalesii* (Hexactinellid) forms dense monospecific aggregations (Fig.1A). *Vazella* creates complex 3-dimensional structures, which provide habitat to a wide range of associated species, enhancing local diversity. In 2013, the Canadian authorities established the Sambro Bank Sponge Conservation Area (Fig. 1B), banning bottom fishing activities. However, this protection zone has not incorporated a management plan that accounts for this benthic communities' natural variability.

**Method:** To elucidate assemble dynamics and response to environmental variability, a NIOZ-designed lander equipped with a HD-video camera, ADCP, CT and oxygen sensors was deployed at 154m depth for 10-months. A total of 5151 still images were obtained of which 1157 were manually analyzed with the BIIGLE software, and posteriorly used to train a convolutional neural network (Fig. 2).

## Results:

- 73236 organisms belonging to 11 species were observed. An unidentified actinian and the Acadian red fish, *Sebastes fasciatus*, were the most abundant organisms, accounting for 93% and 4% of observed organisms, respectively.
- Non-metric multidimensional scaling analysis and Adonis test revealed that assemblage composition did not significantly differ between seasons (Fig. 3).
- Benthic storms which lasted for several days caused high sediment resuspension and the dislodgment of sponge and actinian individuals.
- *S. fasciatus* abundance significantly decreased with lower *V. pourtalesii* abundances

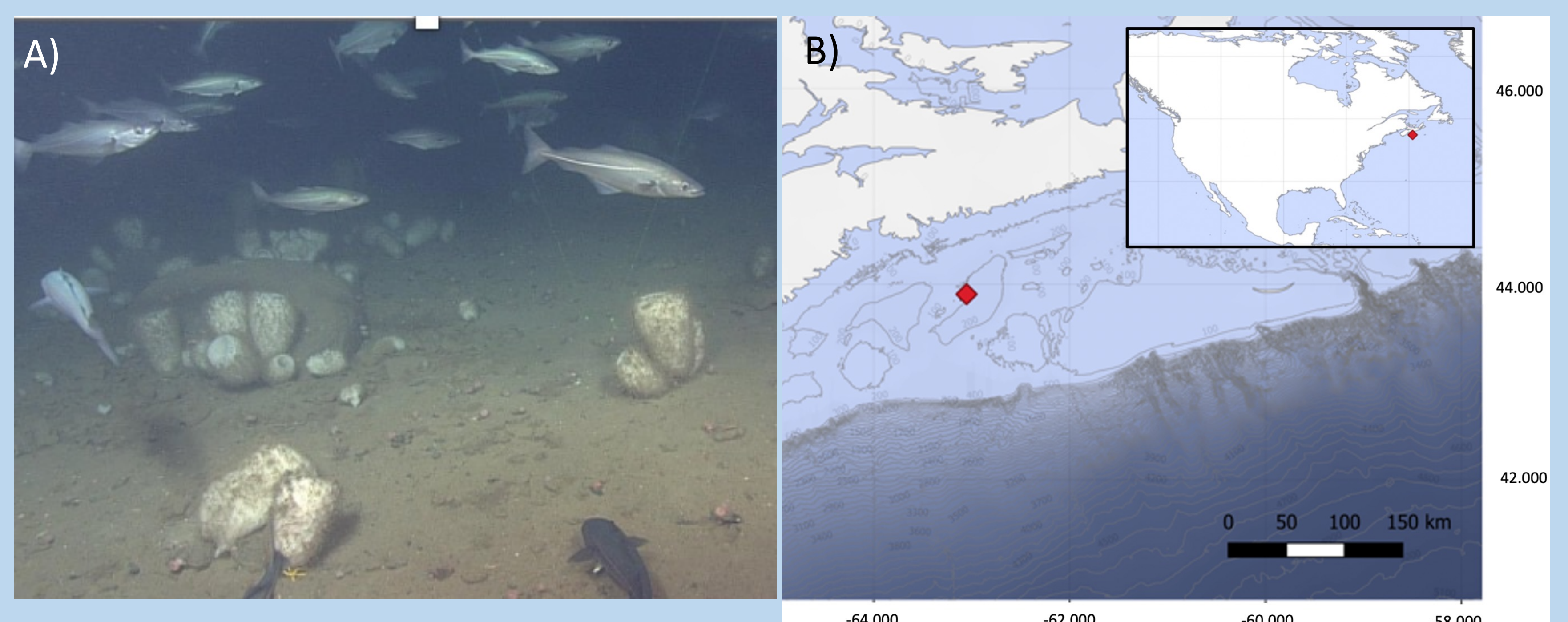


Fig. 1 A) *Vazella pourtalesii* aggregation with a bank of *Pollachius virens* B) Location of the Sambro Bank Conservation Area in the Scotian shelf

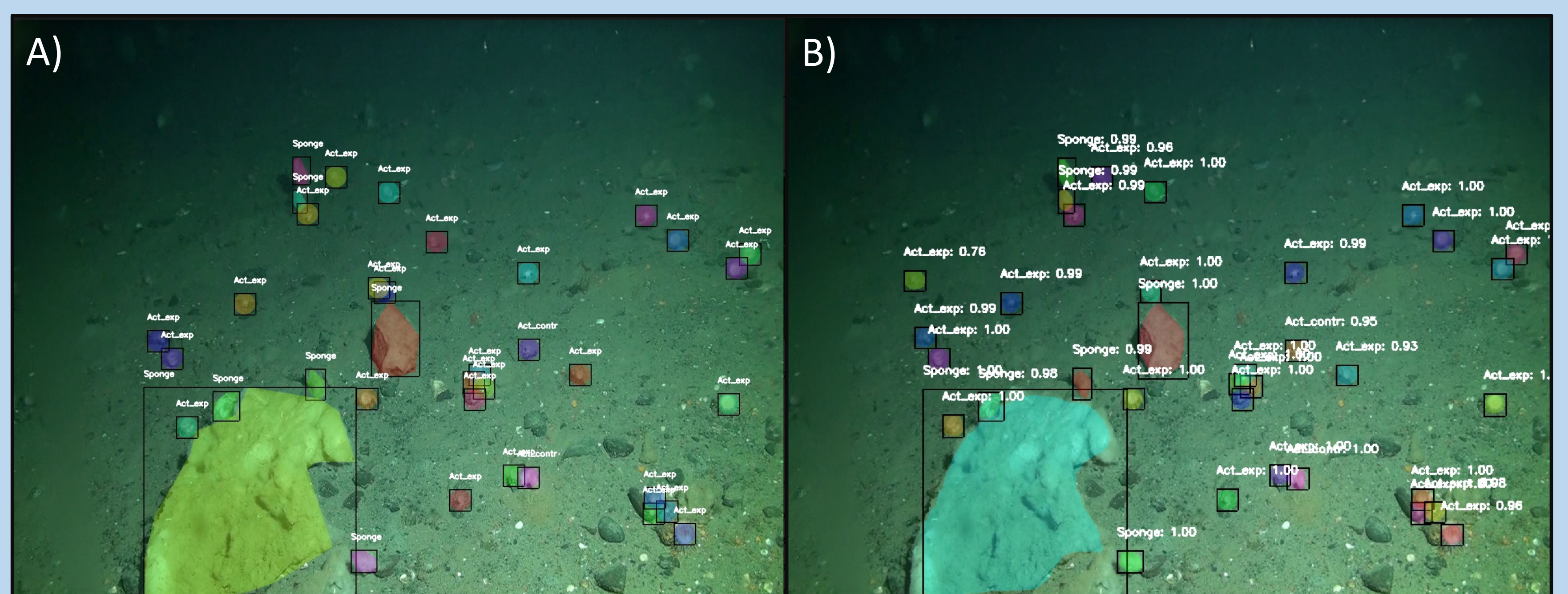


Fig. 2 A) BIIGLE manual classification B) Convolutional neural network object detection.

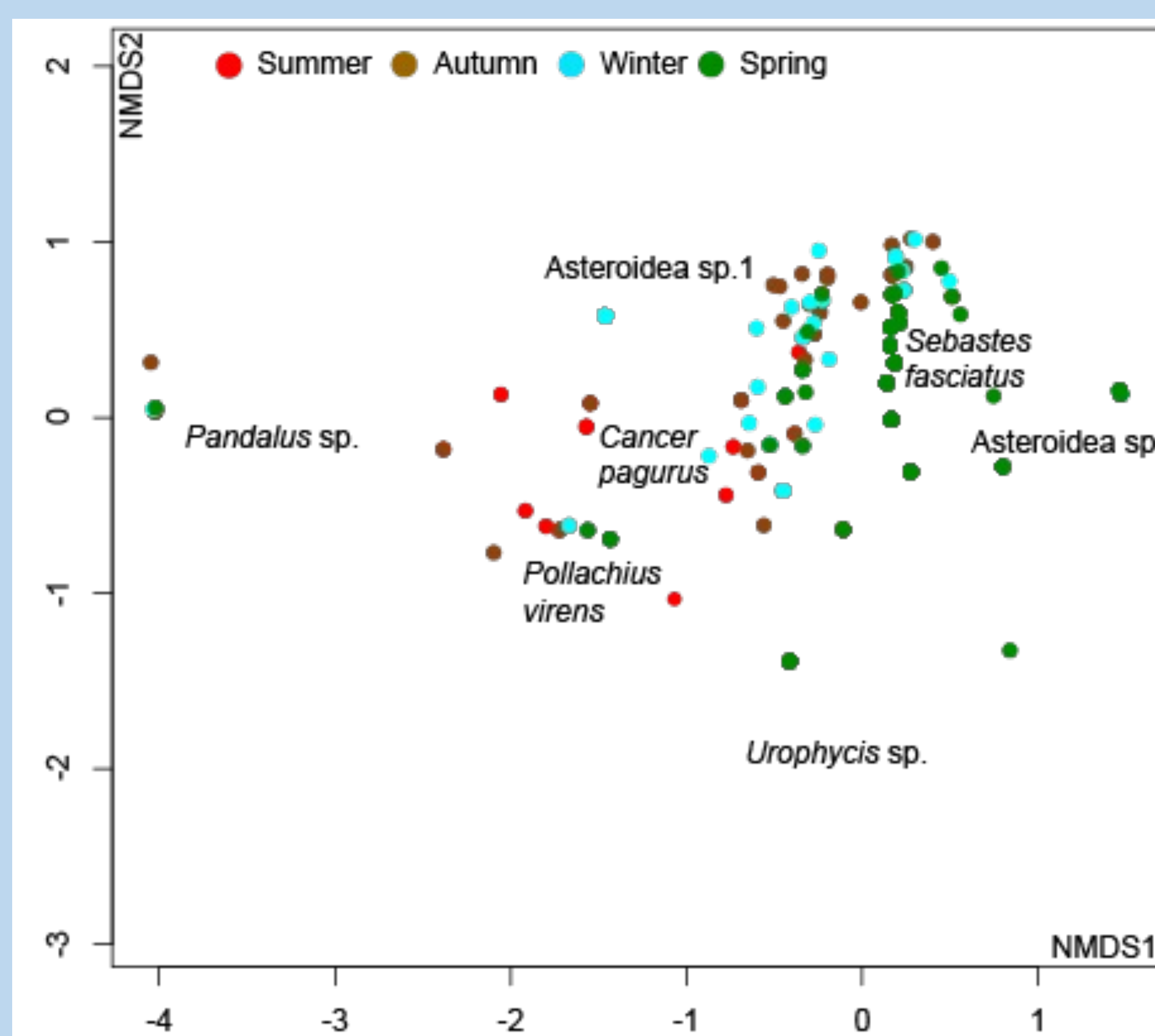


Fig 3. Non-metric multidimensional scaling (stress: 0.0435)

## Conclusions:

- No variations in assemblage composition were observed amongst season contrasting with other shelf and slope studies [1].
- Environmental processes do not appear to have a major influence in assemblage composition, yet hydrodynamic process can cause variations in sessile species standing stock.
- *S. fasciatus* abundance appears to be influenced by the occurrence of *V. pourtalesii* agreeing with this species previous observations [2].

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## Reference:

- [1] Doya et al., 2017. PlosOne. E0176917  
[2] Auster, 2005. Springer, Berlin, Heidelberg, 747-760