

# Modelling the movements of microplastic debris

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# Debris causes damage

## Animals

Ingestion

Entanglement

Food chain

## Habitats

Scouring

Beach composition

## Economy

Reducing appeal of  
tourist locations





# Animals accidentally ingest plastics

100s of species reported to consume plastics

- Birds
- Whales
- Turtles
- Fish
- Plankton

Well documented in wild animals

Few laboratory studies



Cole, et al. 2013



# Microplastics: Where do they come from?



5mm

Virgin pellets

Degraded plastics

Fibres

Micro-scrubbers



# Debris is an emerging issue in the GBR



**Serious lack of knowledge about Debris in the GBRMP**

- Where is it coming from?
- **Where is it accumulating?**
- What damage is it doing?





# The SLIM

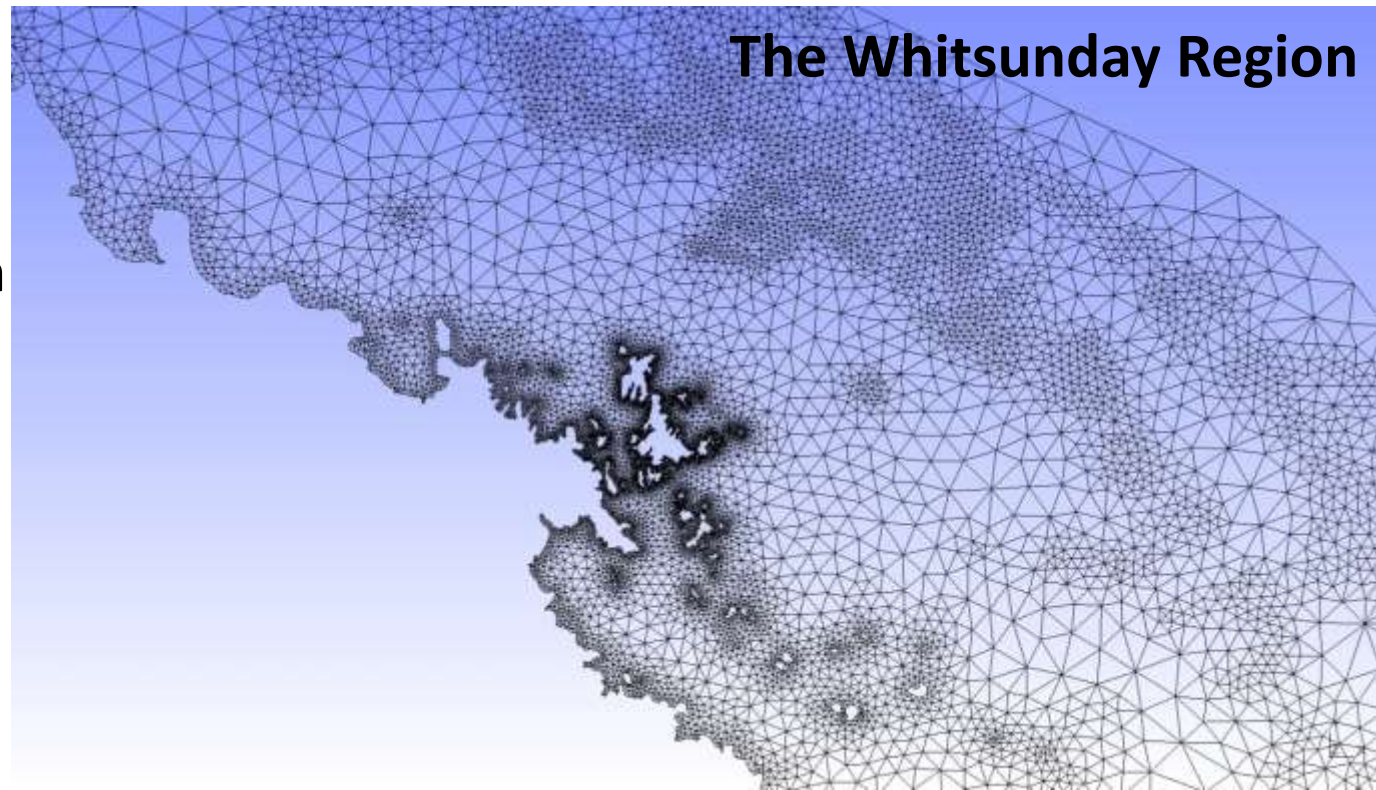
Second-generation Louvain-la-Neuve Ice ocean Model  
(Lambrechts, et al., 2008)

Variable resolution

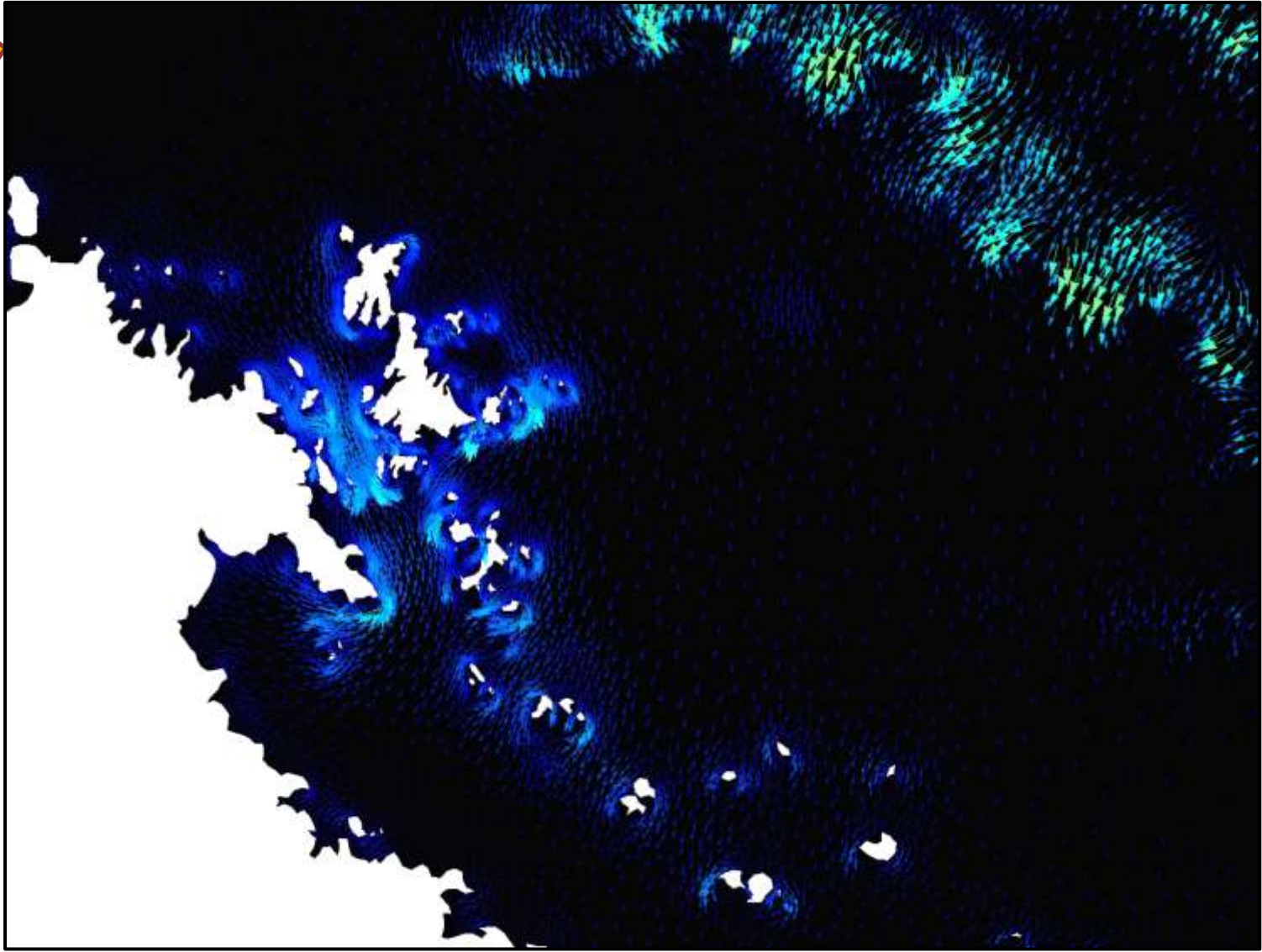
Finite Element

Hydrodynamic

Advection-dispersion  
model



# Complex hydrodynamics in a topographically complex region



# Complex hydrodynamics = Complex accumulation patterns

Influencing factors:

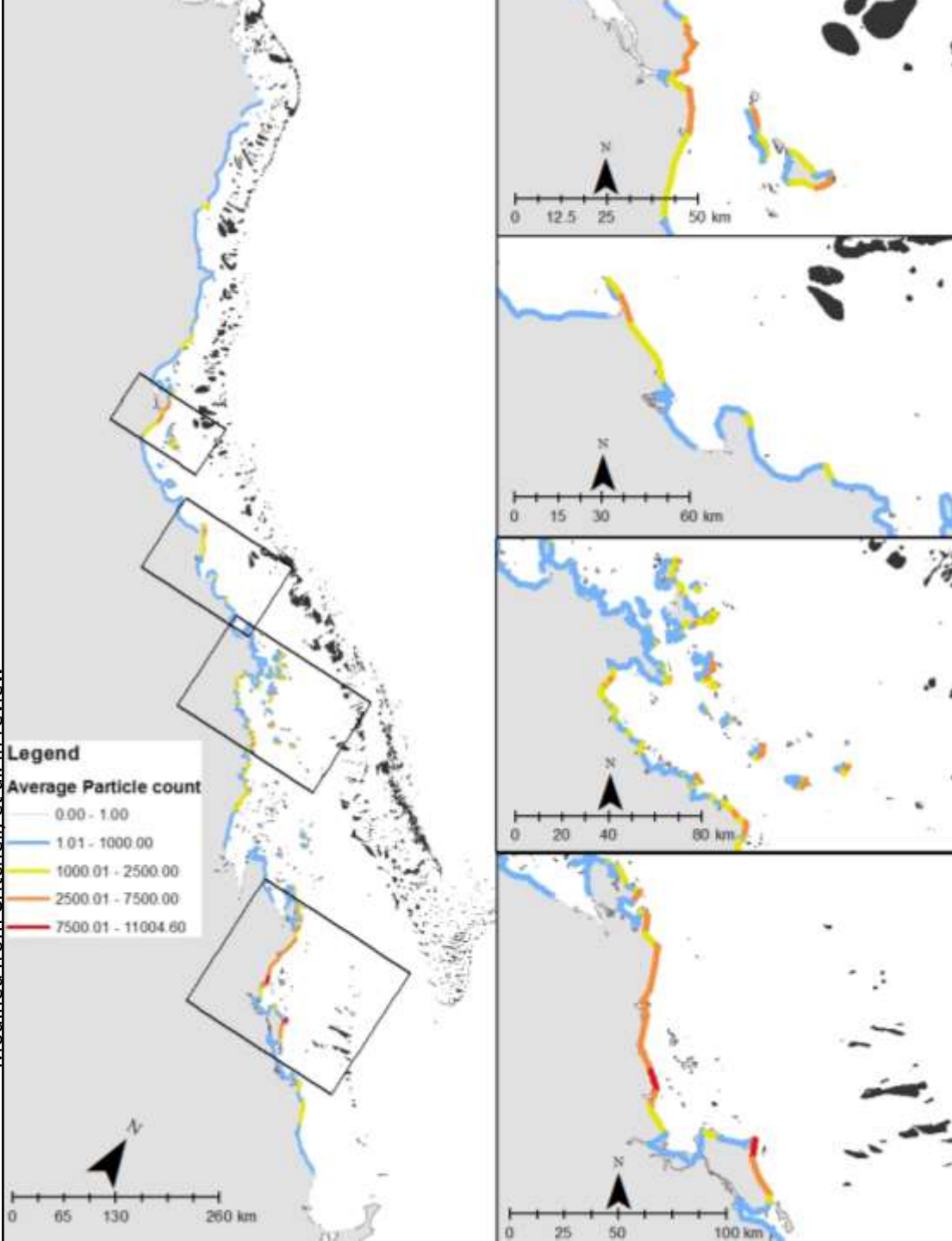
Wind

Tide

Location of release

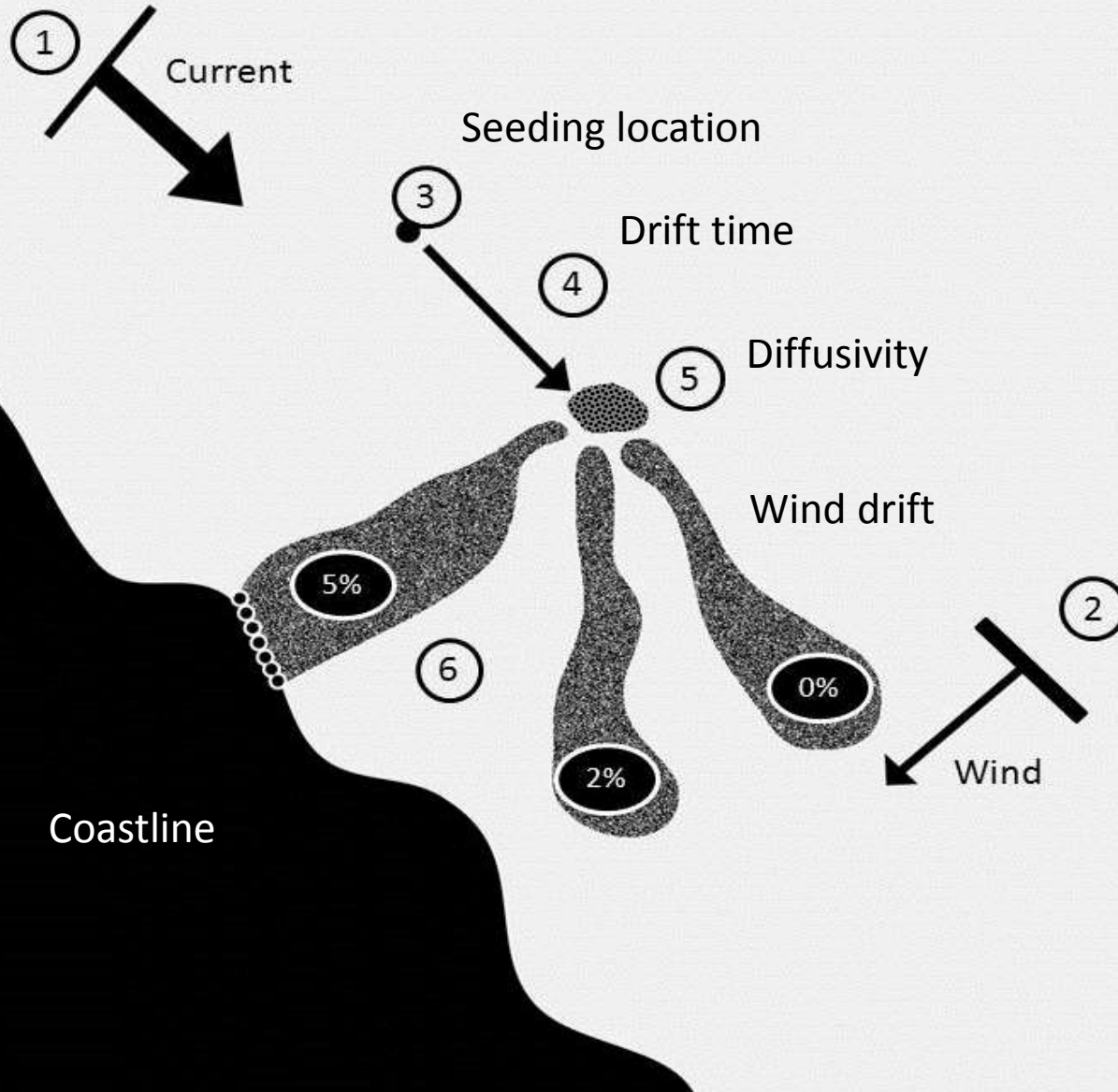
Coastline orientation

Modified from Critchell, et al. in review





# Lots of factors affect the final destination of debris



7. Degradation
8. Settling
9. Resuspension
10. Wind fields

# Next steps

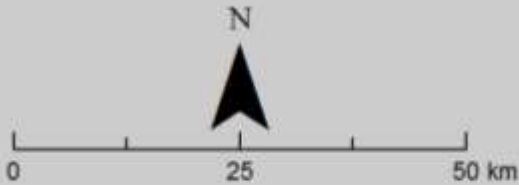
- Sensitivity analyses
- Experiments with Engineering students
- Simulations
- Probably some more simulations
- Experiments with fish
- Create an exposure map!
- Use the exposure map in risk assessment of microplastics in the Whitsunday region

# Take home messages

- Lots more research into marine debris needed
- Modelling is useful and awesome
- Don't forget your canvas bags when you go to the supermarket 😊



# Thanks For Listening!!



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