



Hatchling lost years: insights from numerical modelling in South Africa



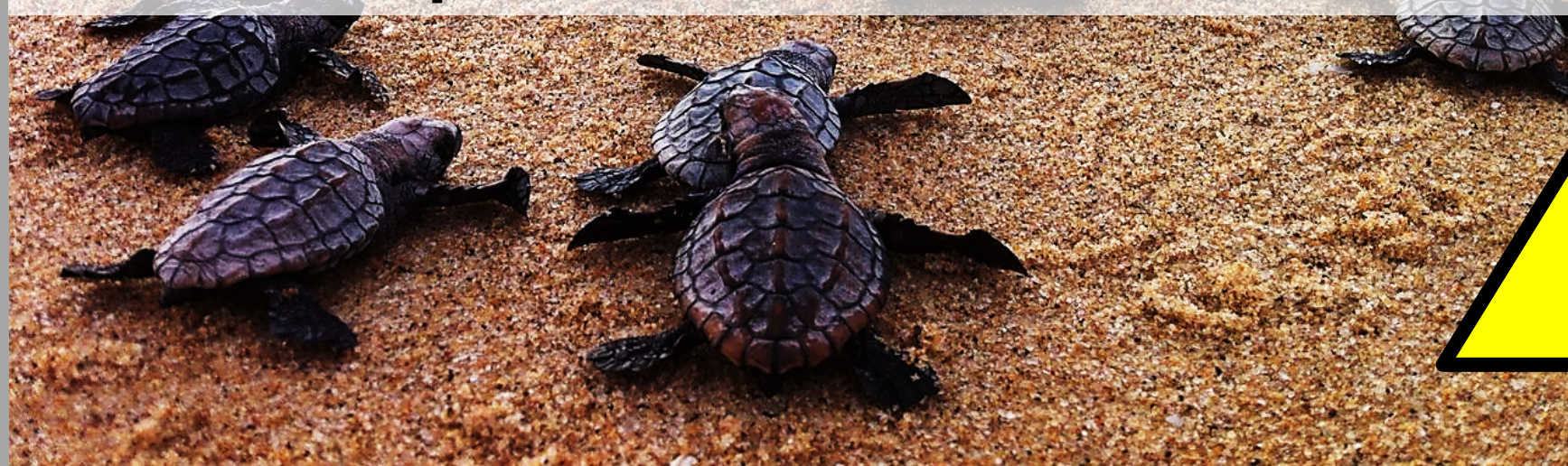
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Background

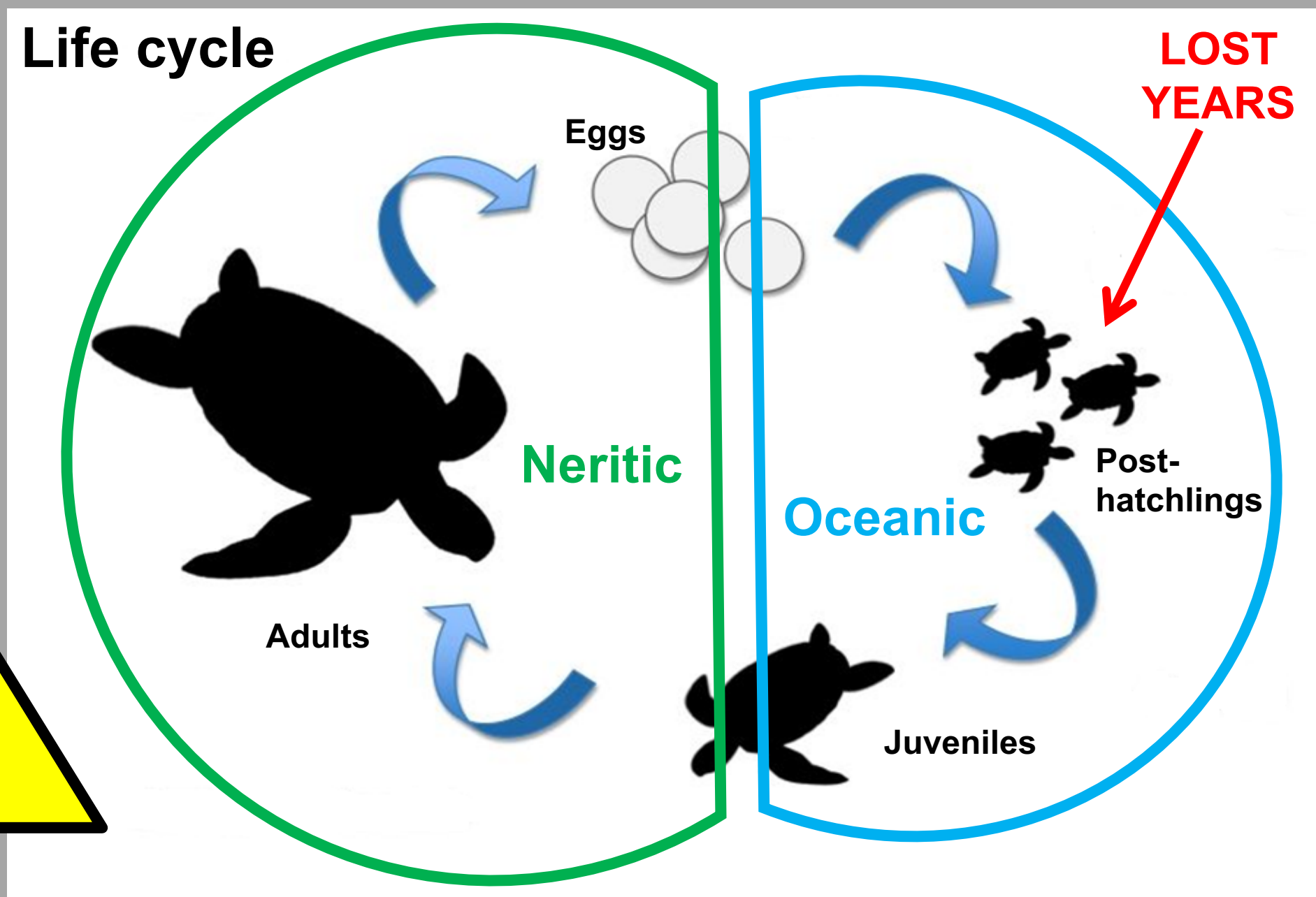
Post-hatchling dispersal the "lost years"

- Swim offshore & remain in pelagic habitats
- Passive drifters within ocean currents
- Occupy sea surface habitats
- Ectotherms: old stunning & growth arrest at low temperatures



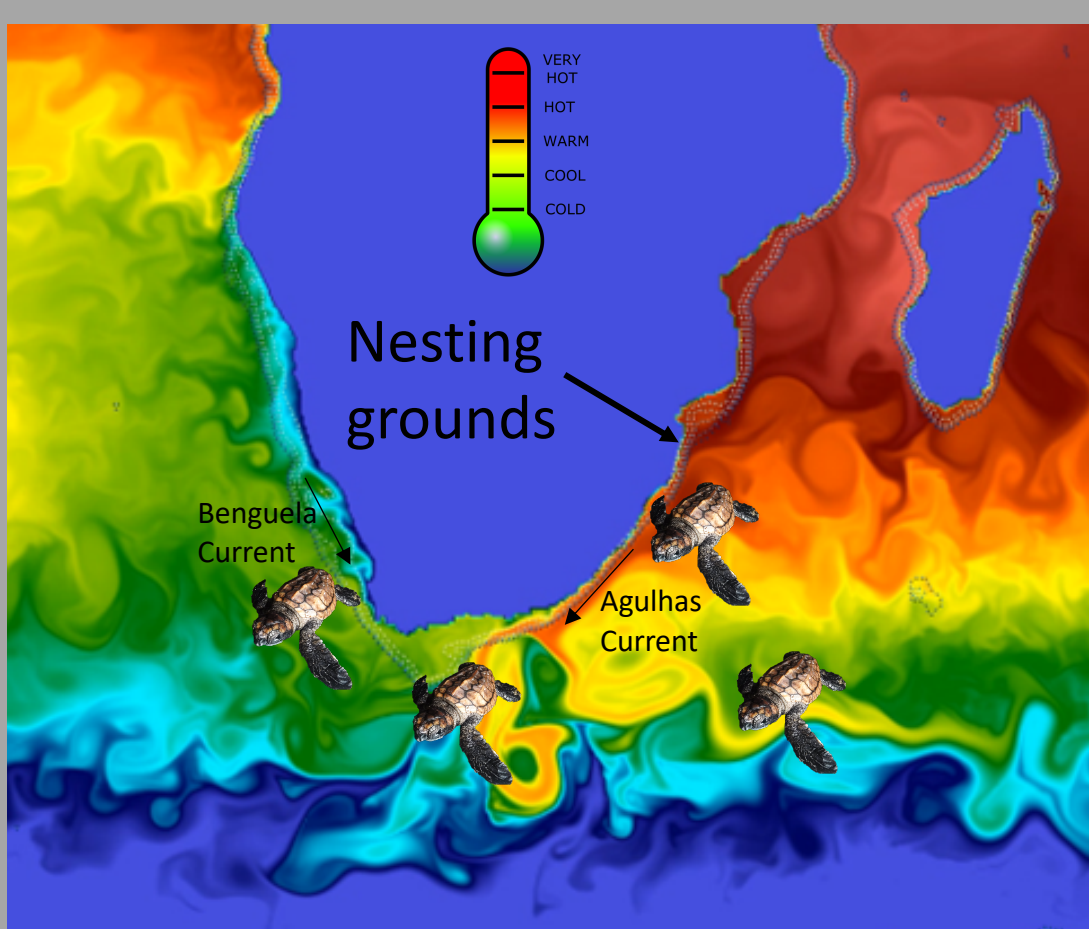
! Least understood life stage

Life cycle



Aim: Identify potential dispersal pathways and investigate the effects of swimming behaviour on loggerhead and leatherback post-hatchling dispersal ability

H: Hatching dispersal will mainly be controlled by water circulation with swimming having little effect on their trajectory



Methods

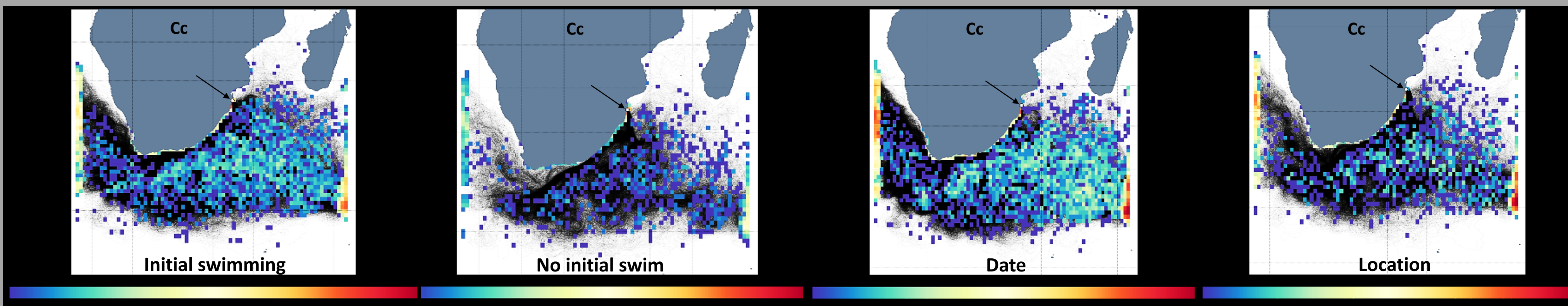
- Dispersal trajectories of virtual hatchling particles
- NEMO oceanographic model
- Lagrangian particle tracking framework

Variables tested

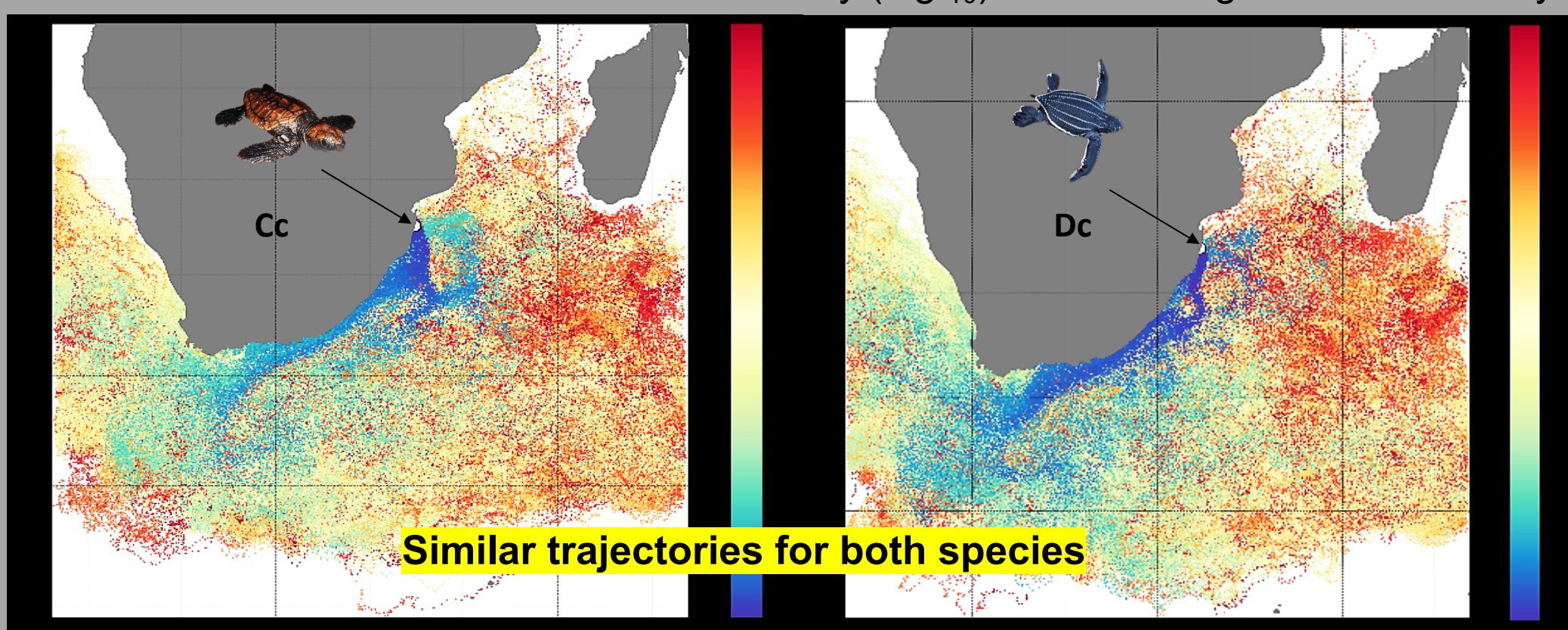
- **Date:** spatio-temporal oceanic variability
- **Location:** high/low nesting density (~ 50 km)
- **Swimming behaviour:** active/passive

Results

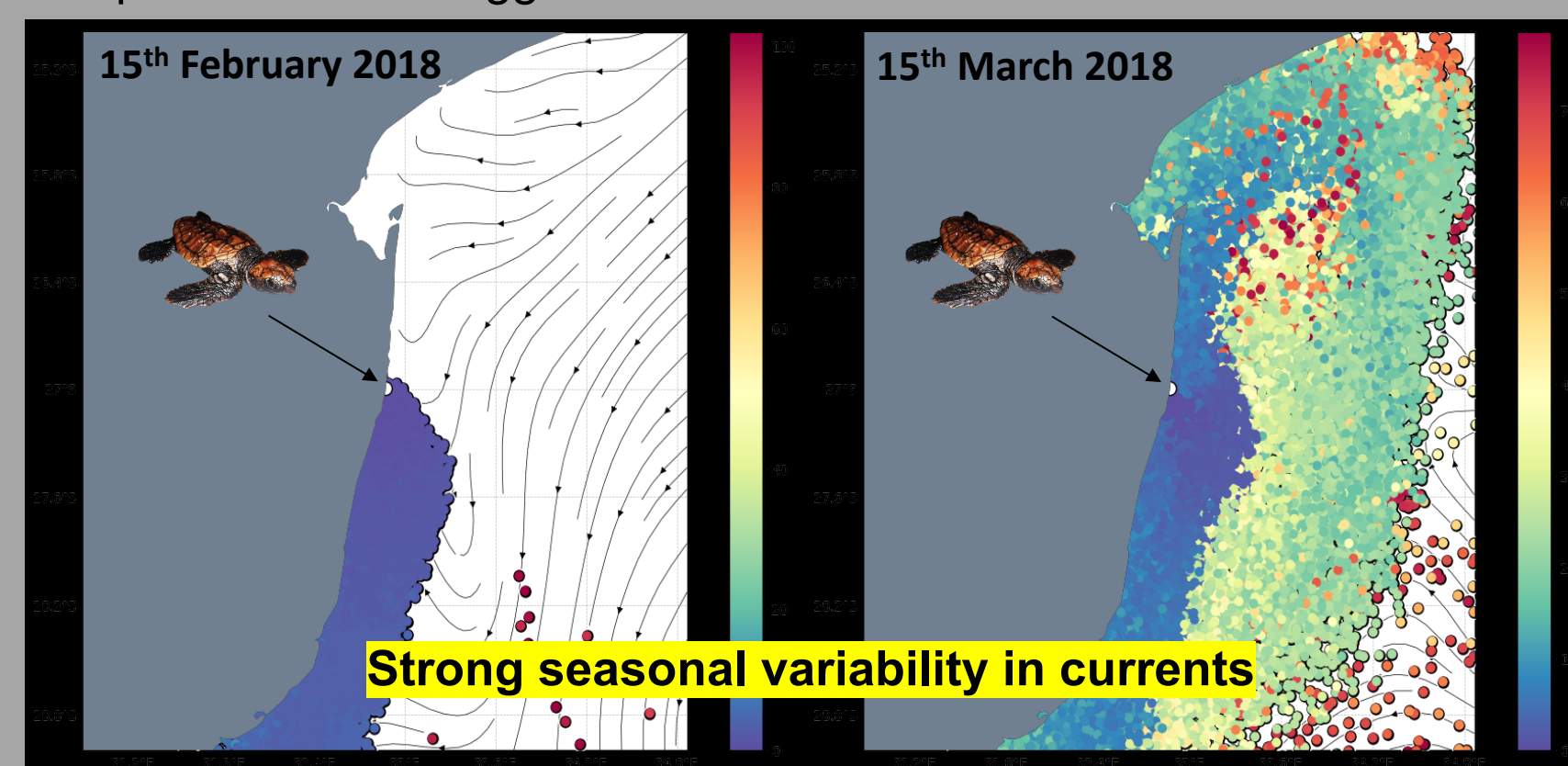
- Loggerhead (*Caretta caretta*) = Cc
- Leatherback (*Dermochelis coriacea*) = DC



Particle density (\log_{10}) within each grid cell after one year with different parameters for loggerheads in 2017



Dispersal trajectories for both species over one year



Zoom of particle density (\log_{10}) after 100 days for loggerheads

Summary

- This study is the **first attempt** to describe dispersal pathways of neonate turtles in the **SWIO**
- **Spatio-temporal oceanic variability** & **initial swim** are important in influencing hatchling dispersal
- **Both species** follow identical dispersal trajectories
- Modelling will allow us to **ID important developmental areas** for oceanic turtles
- **Conservation implications:** hot spots outside protected areas where potential **threats** occur (bycatch, harvesting)

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 Christiansen et al., 2016. Marine Ecology Progress Series 557: 247-259
 Mansfield et al., 2014. Proceedings of the Royal Society of Biology 282: 20133039

Putman et al., 2012. The Journal of Experimental Biology 215: 1863-1870
 Wyneken et al., 2008. Marine Biology 156: 171-178
 Godley et al., 2010. Journal of Applied Ecology 47: 769-778



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