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INTERANNUAL VARIABILITY OF RED SEA OVERFLOW WATER PATHWAYS IN THE WESTERN ARABIAN SEA IN AN EDDY RICH OCEAN REANALYSIS

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Inter-hemispheric Water Exchange in the Indian Ocean: Discovering the Red Sea Overflow Water Pathways and Variability

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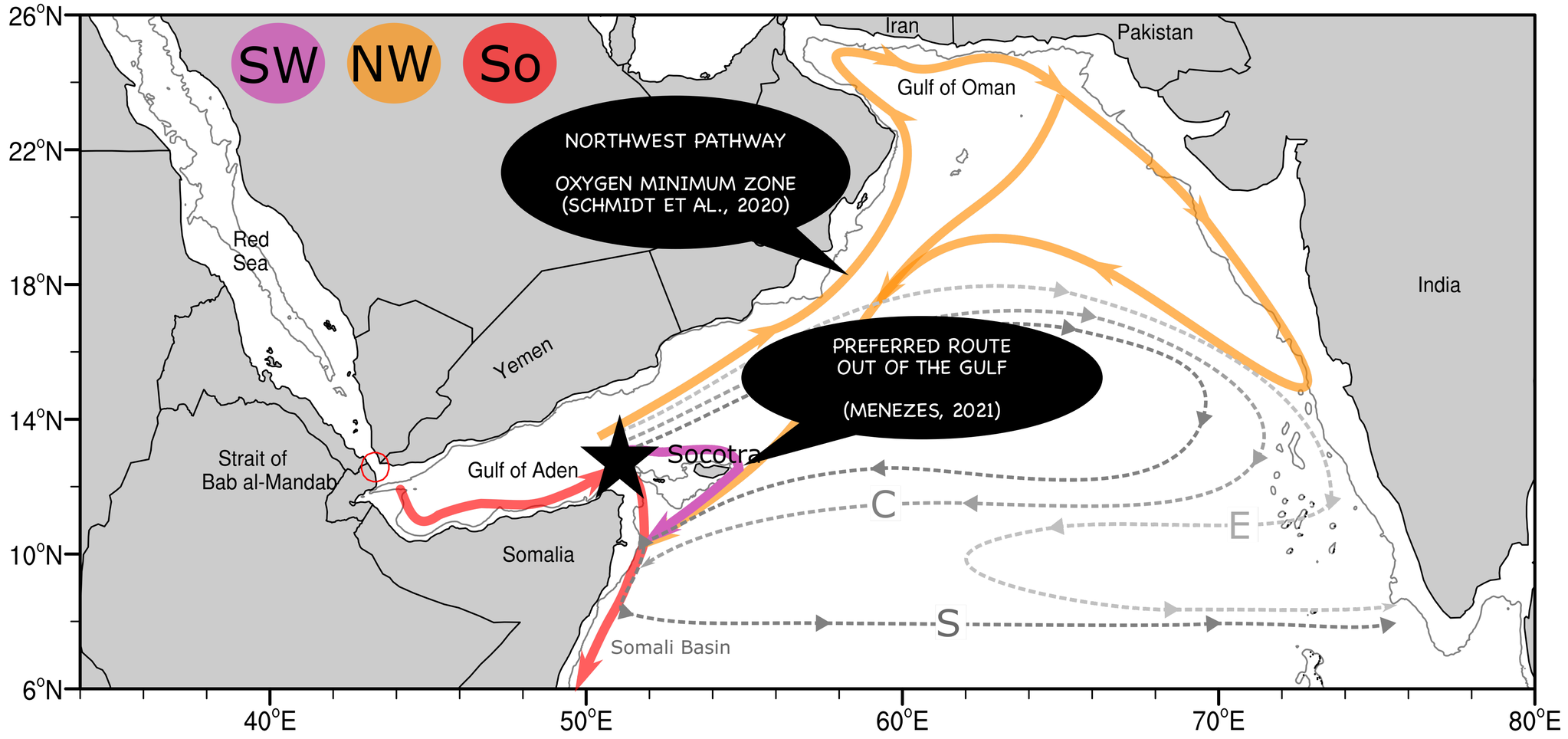
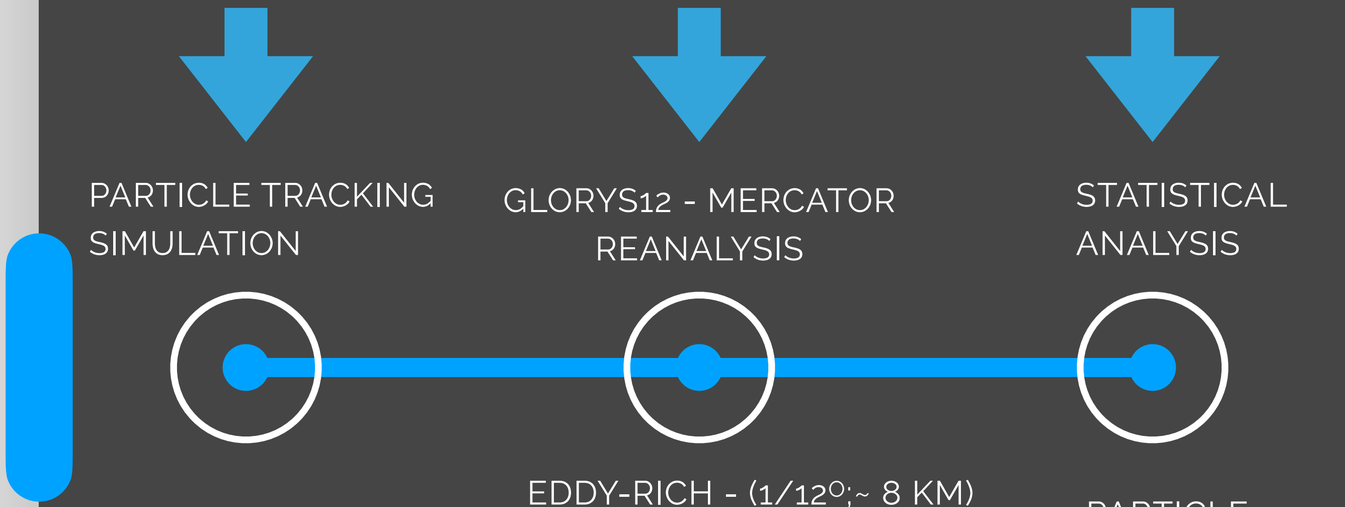
RSOW PATHWAYS IN THE ARABIAN SEA



Menezes (2021) & Menezes (2022, under review)

IS THERE SIGNIFICANT INTERANNUAL VARIABILITY IN THE RSOW PATHWAYS?



Menezes (2022, under review)

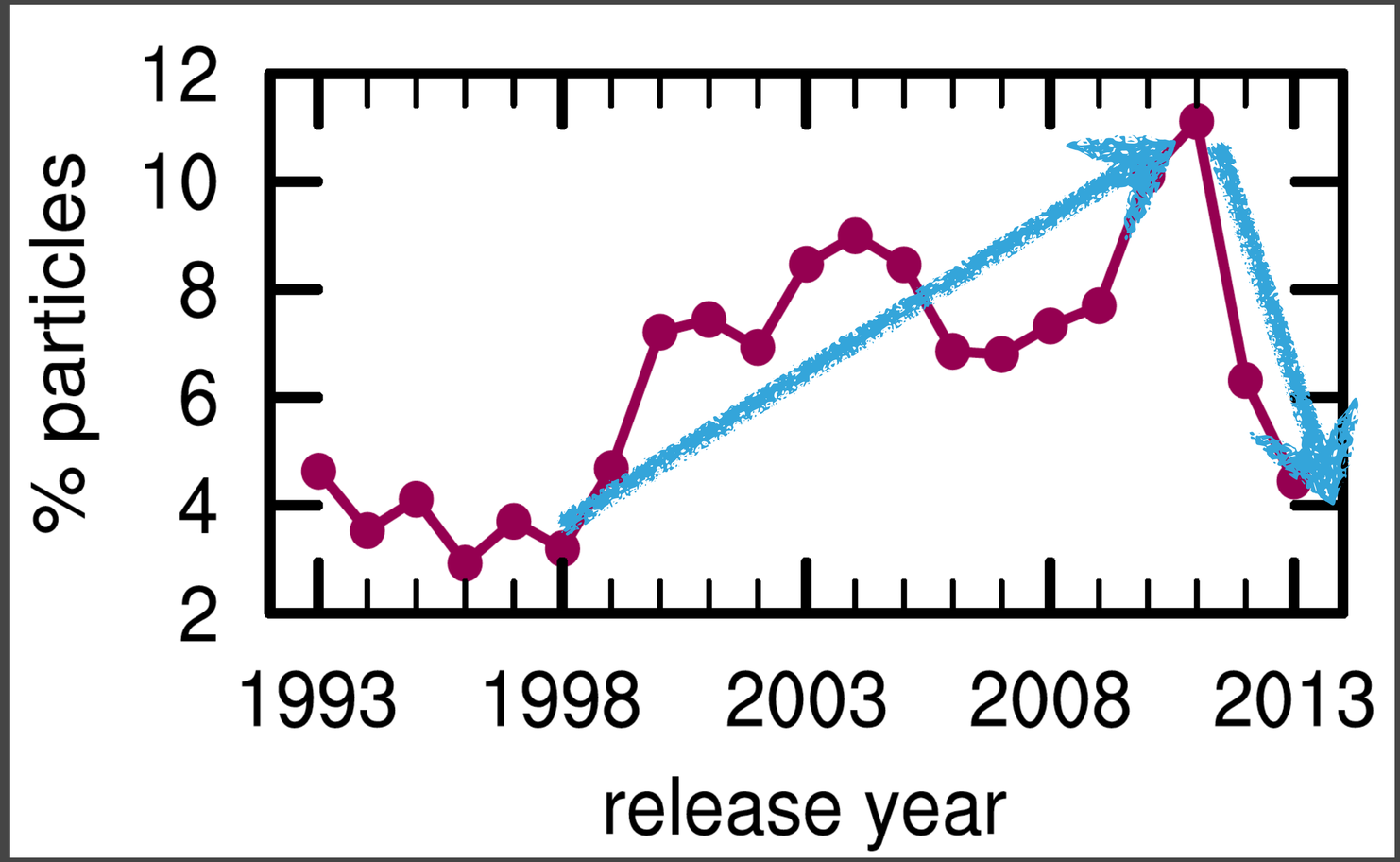
A seesaw between the Northwest (northward advection) and the Southwest Pathways (southward advection – East of Socotra) was observed between 1993 and 2018

TAKEAWAY #1

NORTHWEST PATHWAY HAS BECOME MORE COMMON

Positive trend from 2-4% (1993-1998) to almost 12% in 2011

% of released particles that followed the Northwest Pathway

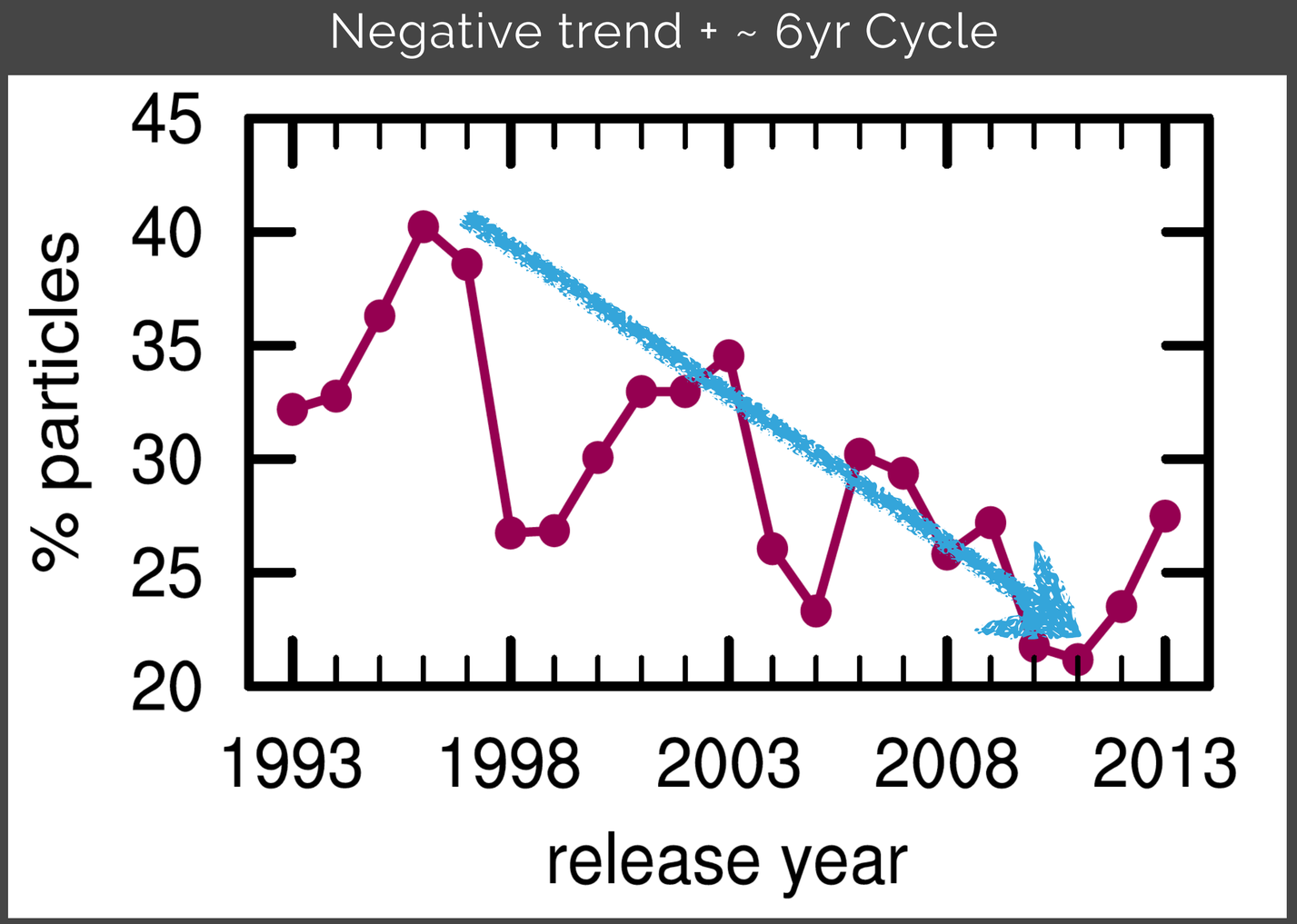


Then and a sharp decline back to early 1990's levels

Each dot represents a 5-year integration

DECLINE OF THE SOUTHWEST PATHWAY

Wine-color Curve is % of released particles that followed the Southwest Pathway



Each dot represents a 5-year integration

Coherent eddy signatures are prominent in the Northwest Pathway trajectories, while the transport in the Socotra Pathway is driven by powerful western boundary undercurrents (Socotra and Somali Undercurrents)

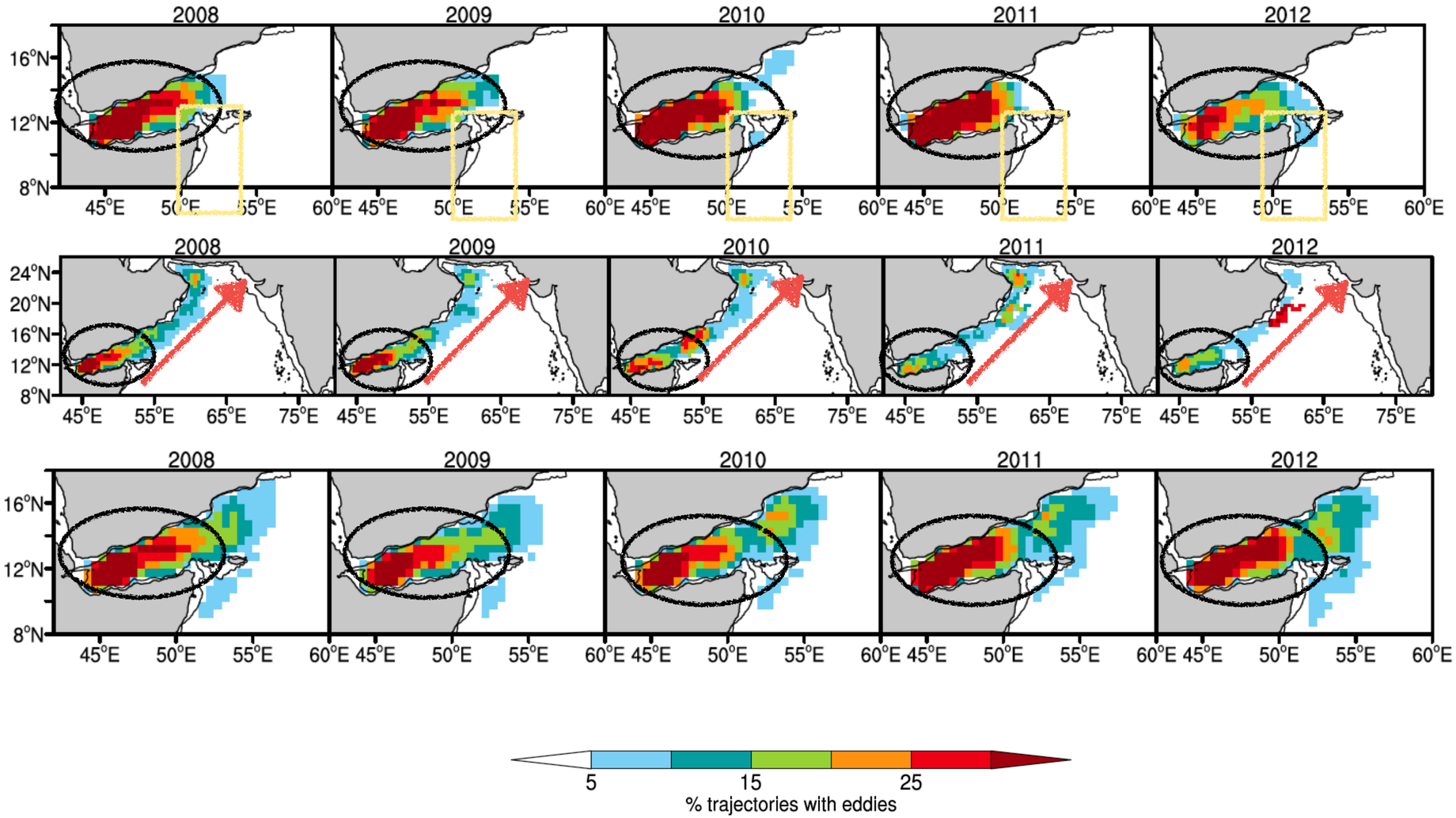
TAKEAWAY #2

STATISTICS: COHERENT EDDIES IDENTIFIED IN THE TRAJECTORIES

Socotra

Northwest

Southwest



IN SUMMARY

- Strong interannual variability in the RSOW Pathways in the Western Arabian Sea, but NOT in transit times!
- The Northwest Pathway got increasingly more common between 1998 and 2011
- The Southwest Pathway (the most common pathway) has declined since 1996
- The Socotra Pathway peaked in 1998/1999 when there were strong IOD and El-Nino events, and the summer monsoon was in its weakest state. There is a significant lagged correlation between the Somali Undercurrent and IOD (0.55) and Indian Monsoon (0.53; 8-months)