Interannual AMOC Variability in the Eddying Ocean: Time Scales, Patterns and Origin

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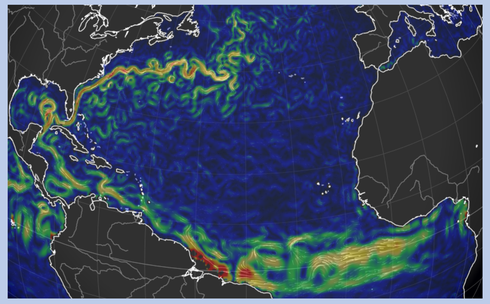
NSF PROJECT

Categorize the **North Atlantic** low frequency variability as **forced** or **intrinsic**, **local** or **remote**

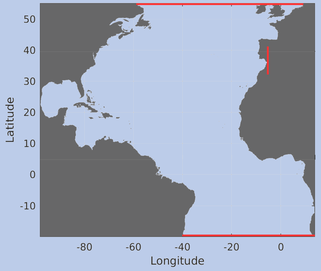


Surface currents illustrating the turbulent oceanic dynamics [https://earth.nullschool.net]

~80% of North Atlantic ocean low frequency variability is intrinsic [Penduff et al. (2011) ; Sérazin et al. (2015)]

METHOD

Regional configuration of the North Atlantic
MITgcm ; cheapAML ; 1/12°

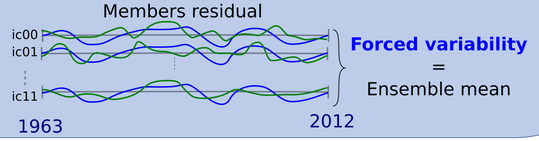


4 sets of experiments
Atmospheric *vs* Remote

ATM / OBCS	*Clim.*	*Fully Varying*
Clim.	**OCAC**	**OCAR**
Fully Varying	**ORAC**	**ORAR**

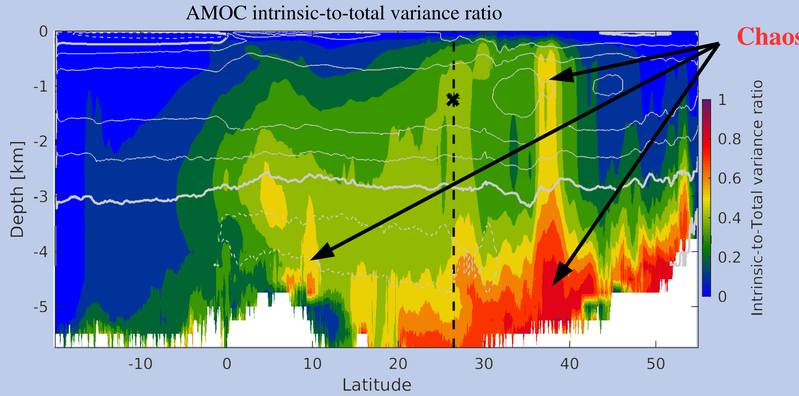
12-member ensemble strategy
Intrinsic *vs* Forced

Intrinsic variability
=
Members residual

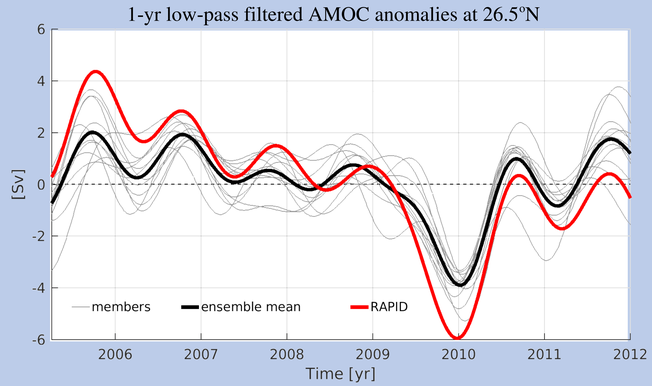


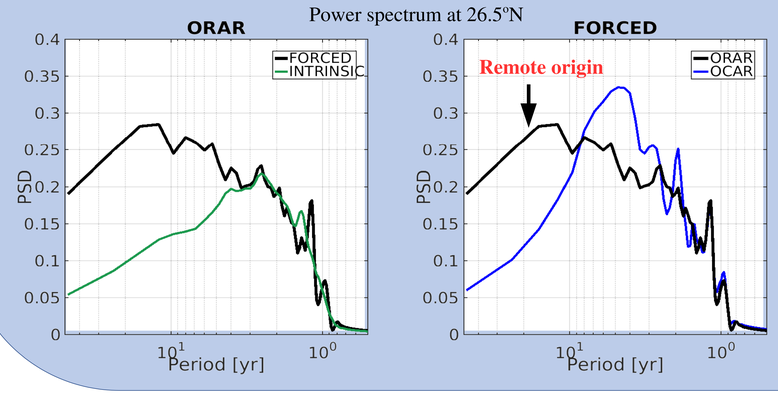
Forced variability
=
Ensemble mean

DEDICATED RESULTS



Chaos!





➔ Significant contribution of the intrinsic (chaotic) ocean dynamics for the AMOC low frequency variability

➔ RAPID-MOCHA-WBTS location (26.5ºN)
- **40-50%** (~1 Sv) at **interannual** time scales (2-5 years), associated with atmospherically forced signal
- **20-25%** (~0.3 Sv) at **decadal** time scales (10-20 years), associated with remote signal (open boundaries)

SUMMARY

➔ The Atlantic Overturning is chaotic !
➔ Mostly expressed at interannual time scales
➔ Presence of a remotely forced decadal mode of variability at 26.5ºN