

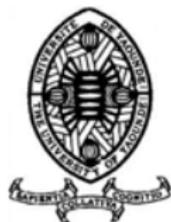
Tropical Instability Waves and Its Feedback in the Atlantic Ocean

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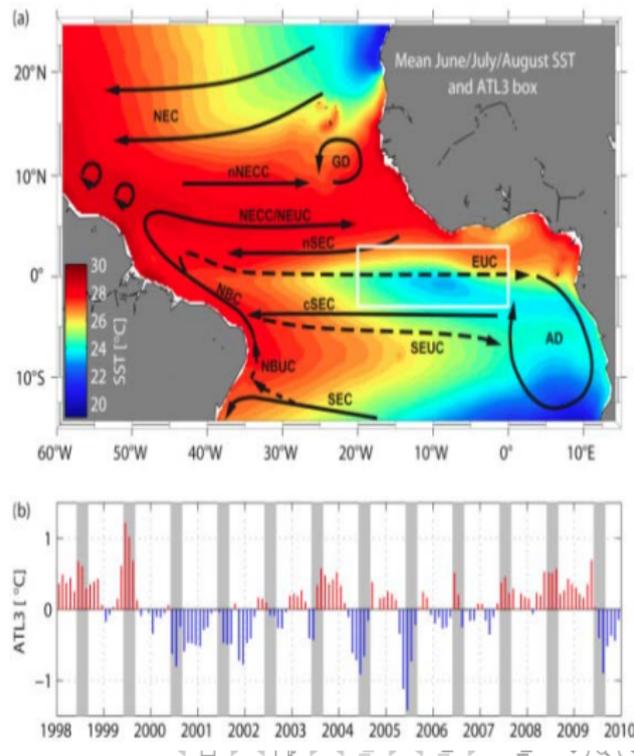
INTRODUCTION

Tropical Atlantic Variability

- ▶ Cold SSTs develops during boreal summer in the Eastern Equatorial Atlantic
- ▶ Strong interannual variability and long term warming trend.
- ▶ ATL3 annual cycle:
 - ▶ Max in April $\sim 29^{\circ}\text{C}$
 - ▶ Min in Aug. $\sim 24^{\circ}\text{C}$
- ▶ Seasonal dependence of interannual variability: Strongest during (JJA)

Brandt et al. (2011)

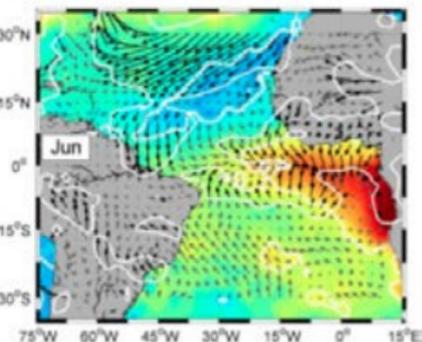
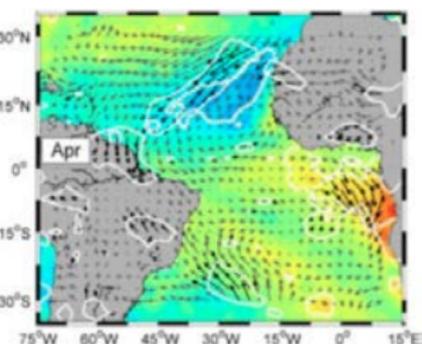
Equatorial Cold Tongue



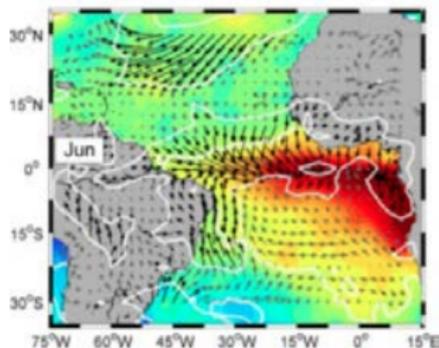
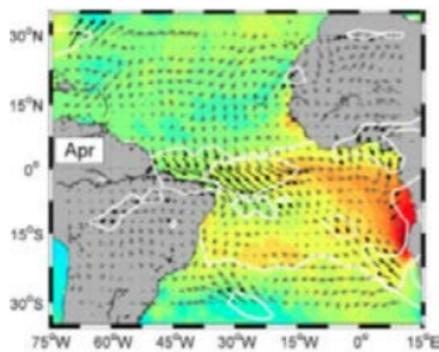


MOTIVATION

WAM



ACT



West African Monsoon onset:

- ▶ southward (northward) wind anomaly north (south) of the ACT
- ▶ eastward wind anomaly in the west during spring (preconditioning of the ACT)
- ▶ ACT and WAM onsets are associated with warm SST

Brandt et al. (2011)

DATA

- ▶ SMOS level 3 SSS maps (combined ascending and descending orbits) averaged with 7-day, $100 \times 100 \text{ km}^2$ running windows and sampled daily over a $0.25 \times 0.25^\circ$ grid.
- ▶ SST from the Operational Sea Surface Temperature and Sea Ice Analysis (OSTIA) from the UK Met Office on a global 0.054° grid.
- ▶ The SST maps were resampled over the same $0.25 \times 0.25^\circ$ grid as the SSS maps.

METHODS

- ▶ SSS and SST signals associated with TIWs have been isolated using both 28 - 40 day butterforth filtering (referred to as 33-day) and 13-22 day band-pass (17-day) filtering, corresponding to 33 and 17 day periods, respectively.

SUMMARY

- ▶ TIWs are observed in boreal summer to propagate westward in the both hemisphere nord and south of the equator, even though northern TIWs are larger, and their amplitude is subject to important interannual variability.
- ▶ The amplitude of the SSS anomalies associated with the TIWs is approximately ± 1 psu in boreal summer.
- ▶ The SMOS satellite mission provide an unprecedented and successful space-borne observation of the SSS from 2011 allowing the study of the SSS variations associated with TIWs during strong, moderate Atlantic Cold Tongue installation.
- ▶ Since SSS SMOS from 2010 - 2014, we'll study the seasonal intra variability at interannual of TIWs in the tropical Pacific and Atlantic.

THANK YOU !

