00 0000 0	INTRODUCTION	TROPICAL INSTABILITY WAVES	CONCLUSION	THANK YOU
	00	0000	0	

### Tropical Instability Waves and Its Feedback in the Atlantic Ocean

#### FRANCK E. KEMGANG GHOMSI<sup>1,2\*</sup>

#### <sup>1</sup>University of Yaounde I <sup>2</sup>Fisheries and Oceanographic Research Station

#### October 18, 2016



CONCLUSION o

### 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 ~ 29°C
  - Min in Aug.  $\sim 24^{\circ}$ C
- Seasonal dependence of interannual variability: Strongest during (JJA)

Brandt et al. (2011)

#### **Equatorial Cold Tongue**



ACT

### MOTIVATION

WAM



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)

INTRODUCTION	TROPICAL INSTABILITY WAVES	CONCLUSION	THANK YOU
00	0000	0	

#### DATA

- ► SMOS level 3 SSS maps (combined ascending and descending orbits) averaged with 7-day, 100 × 100 km<sup>2</sup> running windows and sampled daily over a 0.25 × 0.25° 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 × 0.25° 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.

CONCLUSION

### COASTAL UPWELLING OBSERVATION







210501.au.30.0501 - junites: "Cl



<ロト < 母 ト < 豆 ト < 豆 ト < 豆 - の < ○</p>

CONCLUSION o

### **EFFECTIVE PRESENCE OF TIWS**



- SST (black contours) which run along this front of SSS are much more narrow.
- ► TIWs reaches their max propagation along 1°- 2°N for SSS and SST.
- ► The minimum of SST anomaly coincides with the maximum of ASSS.
- Vertical strokes show the presence of the TIWs within the periods of 17 and 33 days.

# TIWS PROPAGATION AND VARIABILITY (JJAS)



- The negative correlation between SSS and SST indicate coherent physical processes that regulate the two variables.
- Advection of the equatorial upwelling plume by horizontal flows
- ► The minimum of SST anomaly coincides with the maximum of ASSS.
- The largest filtered SSS and SST signals appear around 2°NW of 10°W.

Introduction 00	TROPICAL INSTABILITY WAVES	CONCLUSION •	THANK YOU

## 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.

