The Angola Current at 11°S: Observations and Response to Tropical Atlantic Variability
TAV during the last decade(s) and Angola Current variability since July 2013
Long-term Tropical Atlantic Variability

Tokinaga and Xie 2011
- Long-term warming trend in the equatorial and eastern tropical Atlantic
- Cooling during the last decade or so

Robson et al. 2016
Evolution during Last Decades

- Long-term JJA SST trend reversed since about 2000
- JJA SST difference between eastern and western box
Benguela Niños

Interannual SST variability in the upwelling region

- Warm period in the late 1990ies
- Cold period after 2011 Benguela Niño
- Weaker warm event in 2015/2016

adapted from Rouault et al., 2007
Rabe et al. (2008) showed Ekman divergence forcing of STC with impact on EUC.
Equatorial Undercurrent at 23°W

- 5 yr to decadal changes of EUC strength are associated with changes of the Sverdrup streamfunction 2°N-2°S
- Strongest changes at the boundary between tropical and equatorial gyre
SLA shows Kelvin wave propagation along the equator and further along the coast of Africa reaching ABA in Oct. 2015.

High SLA in Jan.-Mar. 2016 off West Africa seems not be related to equatorial dynamics.
SST & Wind during 2015/16
SST & Wind during 2015/16
Alongshore Wind Forcing

- With the onset of warm event persistent southward wind anomalies until Feb. 2016
- Wind reversal in Mar. 2016 terminates the event
Angola Current at 11°S

- Below strong intraseasonal fluctuations from mooring data

Update of time series presented in Kopte et al., submitted to JGR
Cooling of the equatorial and eastern South Atlantic during the last decade associated with wind stress changes (STC & Sverdrup)


Southward wind anomalies along the Angolan coast enhanced warm anomaly

Warm event terminated by wind reversal in March

Surface flow at 11°S mostly southward; below strong intraseasonal variability
Open Questions

- What forces the strong equatorial Kelvin wave: weak wind anomalies along the equator, wind curl north of the equator?
- Does ocean-atmosphere interaction play a role in establishing the southward wind anomalies along the Angolan coast?
- What forces strong intraseasonal variability of the Angola Current and how is it related to the warm event?
SMOS SSS east of 8°E: freshwater anomaly propagates farthest south during 2015/16 warm event.

Data provided by Meike Sena Martins, IfM, University Hamburg.

Climatological salinity distribution at 11°S from Kopte et al., submitted.