

DIAGNOSING RECENT CHANGES IN ONSET & CESSATION OF WET SEASON OVER AFRICA

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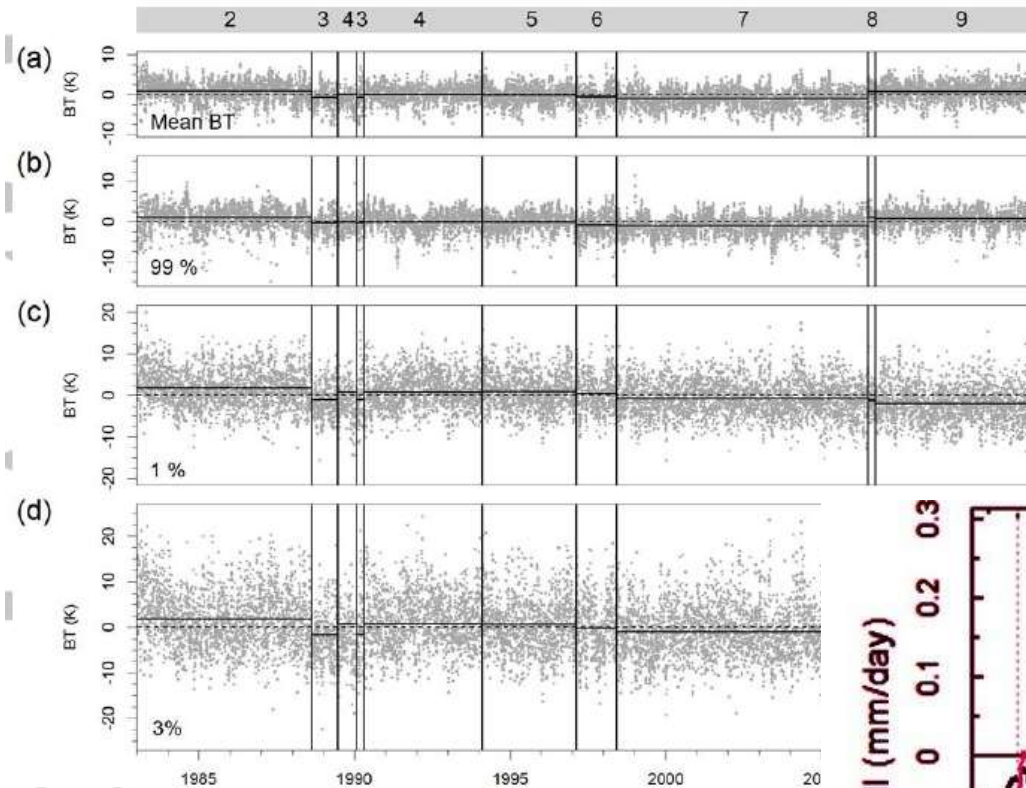
@rpallanuk

Caroline Dunning, Ross Maidment, Emily Black

NCEO national conference 2016
University of Warwick

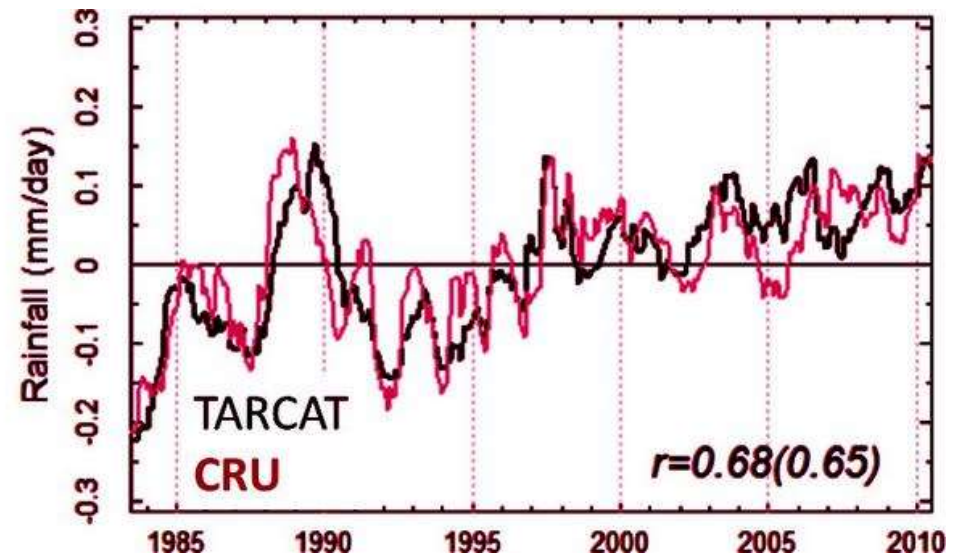


HOMOGENEOUS AFRICA RAINFALL RECORD FROM METEOSAT



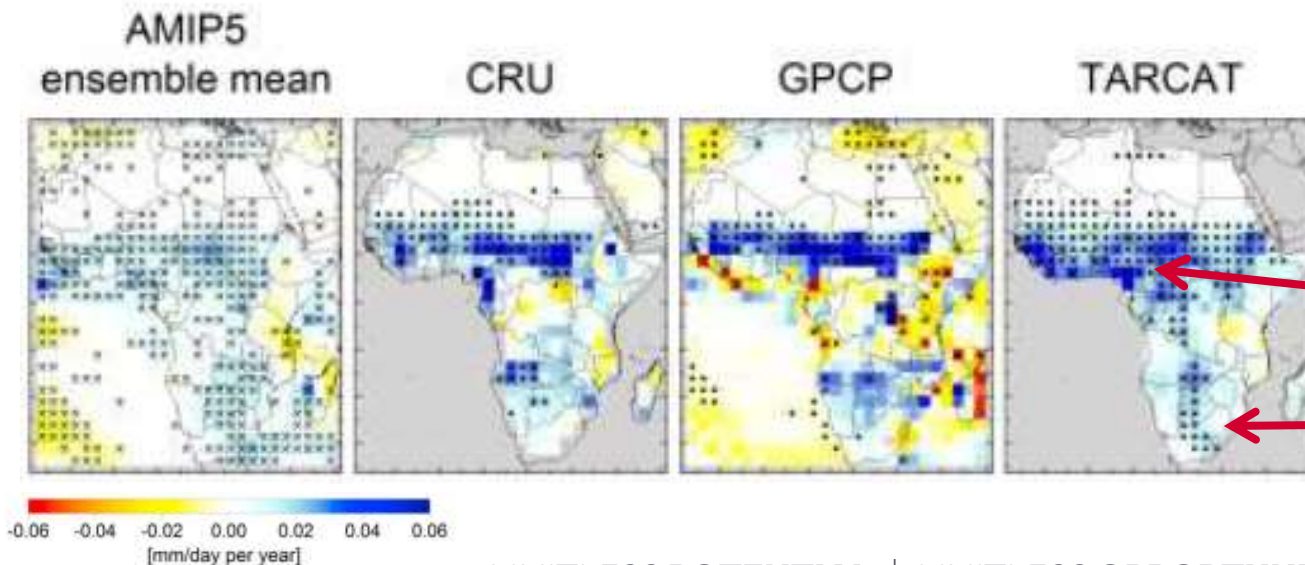
- 30 year Meteosat 10.8/11.5 μm window channel BT record
- Cold Cloud Duration rainfall proxy [Maidment et al. \(2014\)](#)
- Climate model BT simulations (MSc project)

Rain-gauge (CRU) variability captured by TAMSAT \rightarrow



TRENDS IN AFRICA RAINFALL

- Regional rainfall sensitive to radiative forcings, inter-hemispheric heating & internal variability
- Africa susceptible to changes in water cycle: monitoring essential (e.g. [TAMSAT](#) group)
- West Africa - mix of pollution/cloud/dynamics: [DACCIWA](#) project, [Knippertz et al. 2015](#)
- Recent trends Africa rainfall: [Maidment et al. \(2015\) GRL](#)

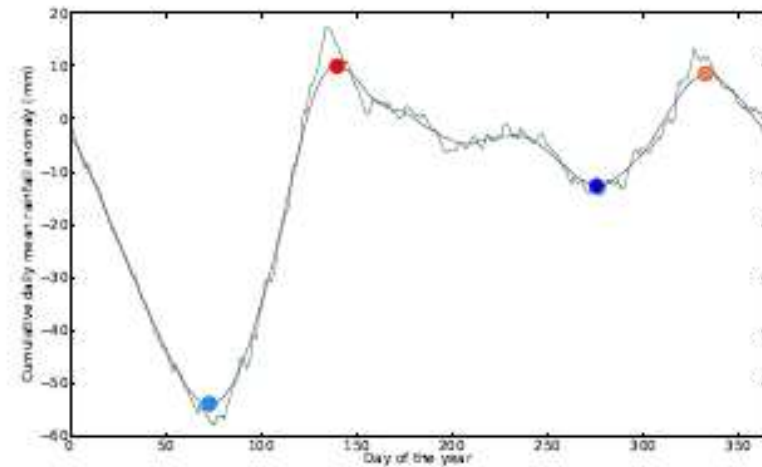
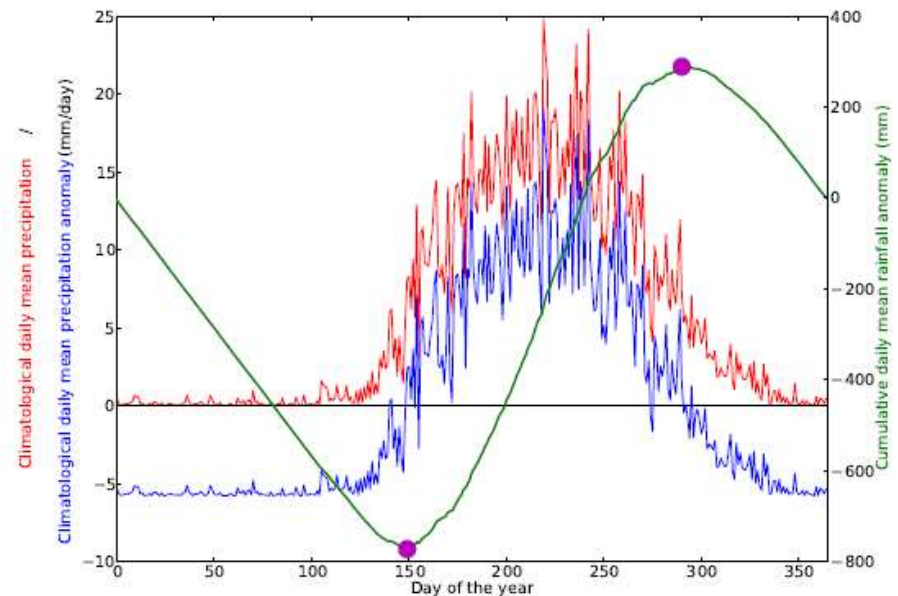


Radiative forcing?

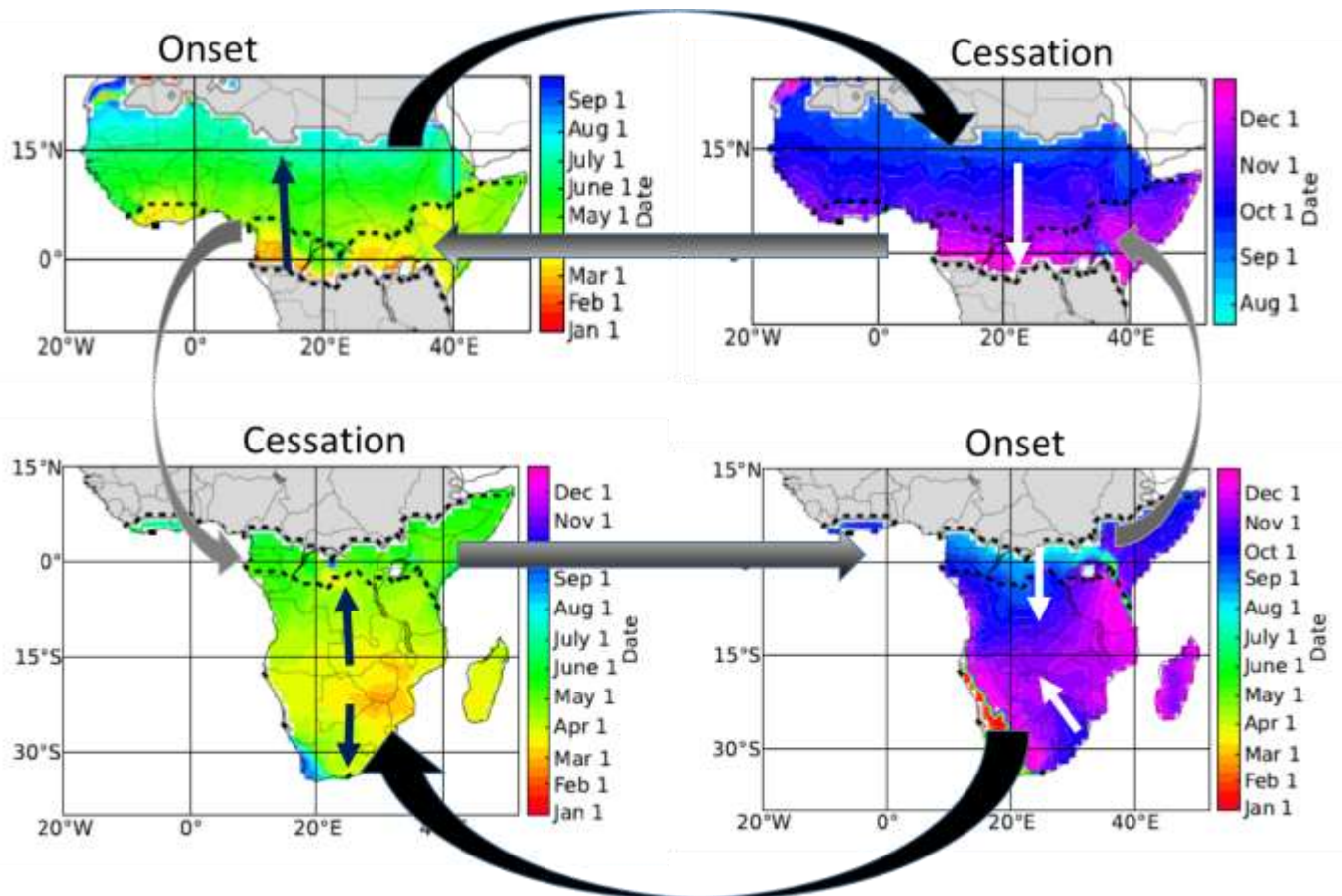
Internal variability?

DIAGNOSING ONSET/CESSATION OF WET SEASON

- Harmonic analysis to diagnose single/double wet season or humid/arid regimes
- Use cumulative daily rainfall anomalies (multiple satellite and gauge datasets)
- Apply [Liebmann et al. \(2012\)](#) method to diagnose min/max for single season regimes
- Modify method to apply to 2 wet season regimes
- Consistency across datasets and indigenous methods (Dunning et al. 2016, submitted)



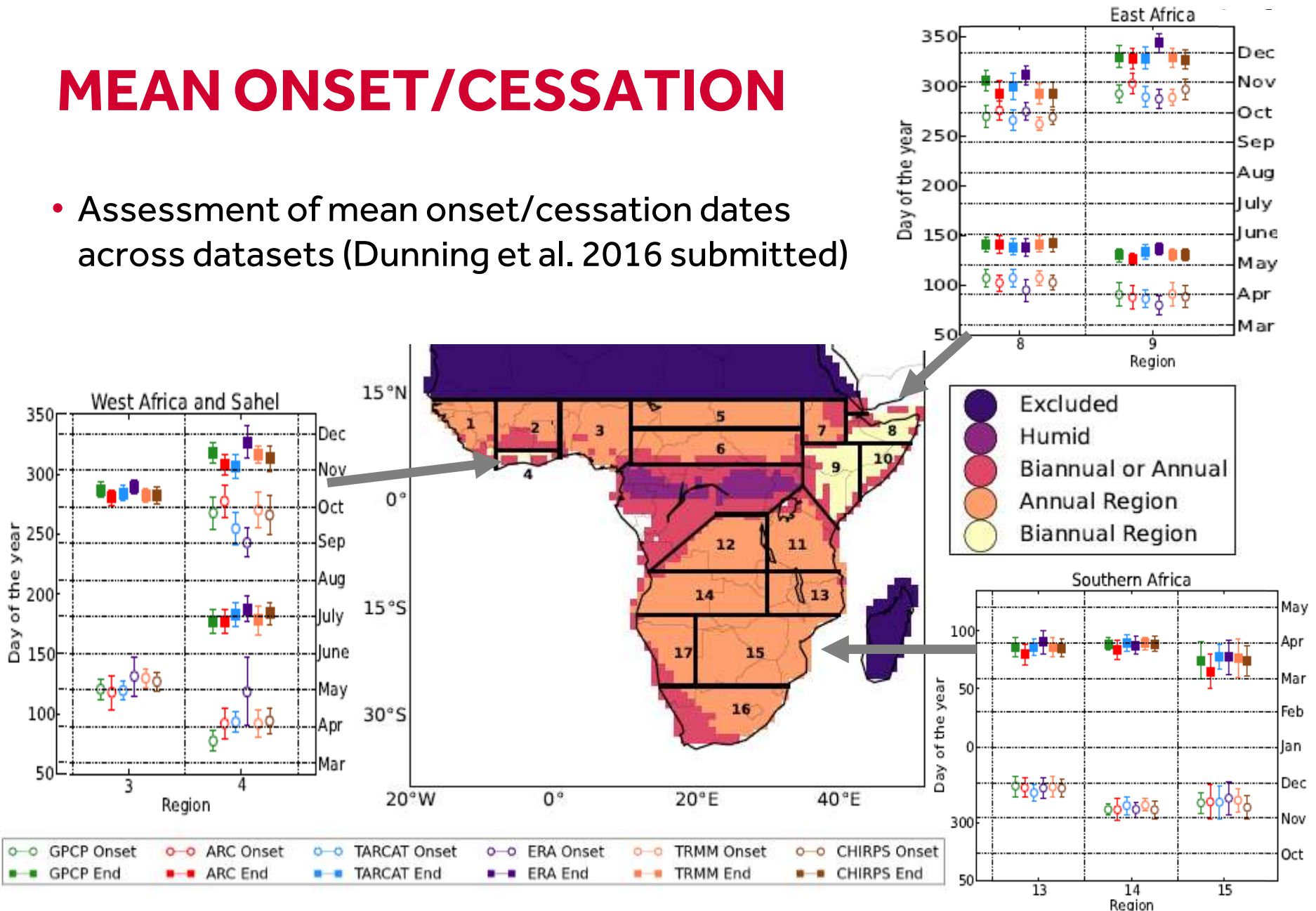
EXAMPLE PROGRESSION OF ONSET/ CESSATION OF WET SEASON(S) - GPCP



Considered GPCP 1DD, TRMM 3B42, ARCV2, TARCATv2, CHIRPS, ERA Interim in subsequent analysis (Dunning et al., 2016, submitted)

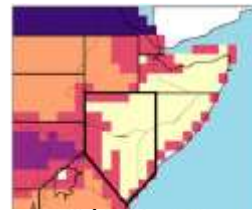
MEAN ONSET/CESSATION

- Assessment of mean onset/cessation dates across datasets (Dunning et al. 2016 submitted)



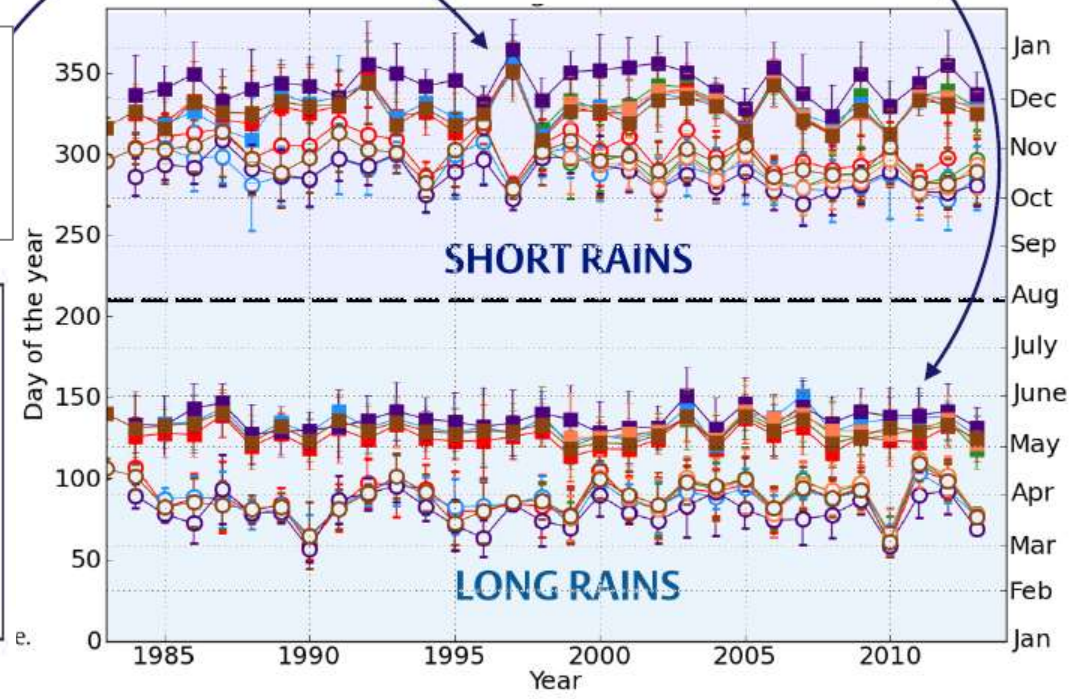
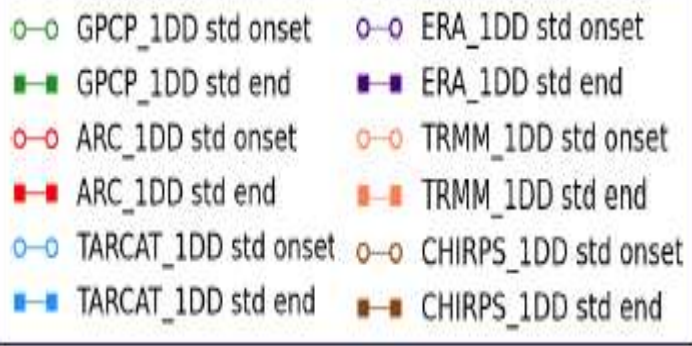
INTERANNUAL VARIABILITY: EAST AFRICA

- Next steps: assess physical mechanisms, evaluate climate models and develop impact-relevant metrics



Weak long rains in 2011 associated with humanitarian disaster

Early onset/late cessation associated with flooding during 1997 El Nino



CONCLUSIONS

- Rainfall proxies from 10.8/11.5 μ m BT: consistent variability compared with homogeneous gauge-based estimates ([Maidment et al. 2014, JGR](#))
 - MSc project plans to use simulated window channel BT to diagnose synthetic relationships
- Africa rainfall trends: [Maidment et al. \(2015\) GRL](#)
 - Coherent increases in Sahel rainfall 1983-2012 related to radiative forcing
 - Increases in southern Africa rainfall linked to Pacific decadal variability
- Methodology to diagnose the onset and cessation dates of wet seasons over Africa (in prep)
- Future work will apply methodology to climate model simulations, investigate mechanisms and develop impact relevant metrics (PhD project)

