ITCZ variability

14 August – 17 December 1983
Time mean IR brightness temperature (top)
Three-hour standard deviation about the time mean (bottom)
ITCZ variability

November 2014–February 2015
Atlantic ITCZ latitude–time plot
TRMM rainfall (shaded) and climatological rain rates (mm/day; contoured)
Atlantic ITCZ latitude–time plot

TEMPA rainfall (shaded) and climatological rain rates (mm/day; contoured)
Propagating equatorial convection

1 April – 15 June 1998

CLAUS Brightness Temperature averaged 5° S–5° N
Propagating equatorial convection

1 April – 15 June 1998

CLAUS Brightness Temperature averaged 5° S–5° N
Propagating equatorial convection

CLAUS Brightness Temperature averaged 5° S–5° N

1 April–15 June 1998

Westward propagation

Eastward propagation
Kelvin waves

CLAUS Brightness Temperature averaged 5° S–5° N
Kelvin waves

**Wavelength**: 3,756 km

**Period**: 4.5 days

**Speed**: 11 m s⁻¹

Convectively suppressed (dashed)

Convectively active (solid)

1 April–15 June 1998

CLAUS Brightness Temperature averaged 5° S–5° N
Theoretical Kelvin wave structure
Observed Kelvin wave structure

Propagation (left) and vertical structure (right): **Real Kelvin wave**

Anomalous $T_b$ (shading; dark = active, light = suppressed convection)

*Kiladis et al. (2009)*
Observed Kelvin wave structure

Propagation (left) and vertical structure (right): **Real Kelvin wave**

Anomalous $T_b$ (shading; dark = active, light = suppressed convection)

Geopotential height (contours; dashed = negative)

*Kiladis et al. (2009)*
Observed Kelvin wave structure

Propagation (left) and vertical structure (right): **Real Kelvin wave**

Anomalous $T_b$ (shading; dark = active, light = suppressed convection)

**Geopotential height** (contours; dashed = negative)

**Winds** (vectors; largest = 2 m s$^{-1}$)

*Kiladis et al. (2009)*
Observed Kelvin wave structure

Propagation (left) and vertical structure (right): **Real Kelvin wave**

Anomalous $T_b$ (shading; dark = active, light = suppressed convection)

**Geopotential height** (contours; dashed = negative)

**Winds** (vectors; largest = 2 m s$^{-1}$)

**Kelvin wave** at the **star** on day 0

*Kiladis et al. (2009)*
Observed Kelvin wave structure

Propagation (left) and vertical structure (right): **Real Kelvin wave**

- Anomalous $T_b$ (shading; dark = active, light = suppressed convection)
- Geopotential height (contours; dashed = negative)
- Winds (vectors; largest = 2 m s$^{-1}$)
- Kelvin wave at the **star** on day 0

*Kiladis et al. (2009)*
**Observed Kelvin wave structure**

**Vertical structure:** Real Kelvin wave

**Top:** Evolution of $T_b$ associated with the Kelvin wave at the star on day 0
(negative = lower temperature & deep convection)

**Bottom:** Time–height section of zonal wind associated with the passage of the Kelvin wave (negative = easterly, positive = westerly)

*Kiladis et al. (2009)*