High latitude Atlantic ocean influence on tropical Atlantic atmosphere

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Observed relationships: 5 year means

Correlation: sub-polar gyre upper 500m temperature and SST

SPG SST vs tropical storms
SPG SST vs MDR SST
MDR SST vs tropical storms

Sub-polar gyre (SPG)
Hurricane main development region (MDR)

Atlantic tropical storms
(0-25°N)

Normalised anomalies

Sub-polar gyre SST

SPG leads
MDR SST leads

SPG lags
MDR SST lags
Skill in tropical Atlantic atmosphere in idealised experiments

JJASON seasons, Forecast years 2-6: Dunstone et al, 2011, submitted

- Large set of idealised model experiments (>25 start dates)
- Monthly mean T & S ocean data is assimilated at all model locations (no atmosphere assimilation)
- Stippled regions are significant at the 5% level
- Blue box shows the main hurricane development region (MDR)
Hurricane main development region

Solid = forecasts
Dotted = persistence

- Surface Air Temperature
- Precipitation
- ITCZ Position
- Wind Shear
- Mean Sea Level Pressure
- Tropical Storms

Forecast period (years)

Dunstone et al, 2011, submitted
Skill originates from sub-polar gyre

Precipitation

Wind shear

Dunstone et al, 2011, submitted
Sub-polar gyre influence on tropical Atlantic

Arrows = warm minus cold sub-polar gyre composite
Colours = skill (correlation) of vertical velocity, years 2-6
AMOC at 26° N

Dunstone et al, 2011, submitted
Remote influences on Atlantic hurricanes

(Smith et al. 2010)