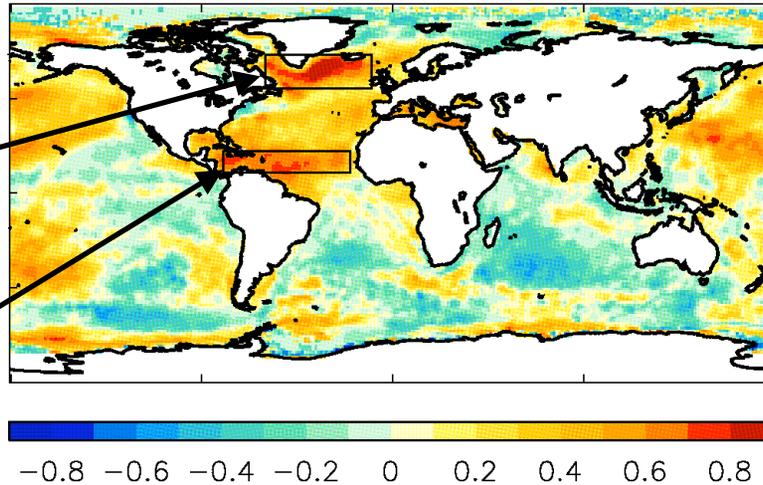




High latitude Atlantic ocean influence on tropical Atlantic atmosphere

Doug Smith, Nick Dunstone, Rosie Eade

Observed relationships: 5 year means

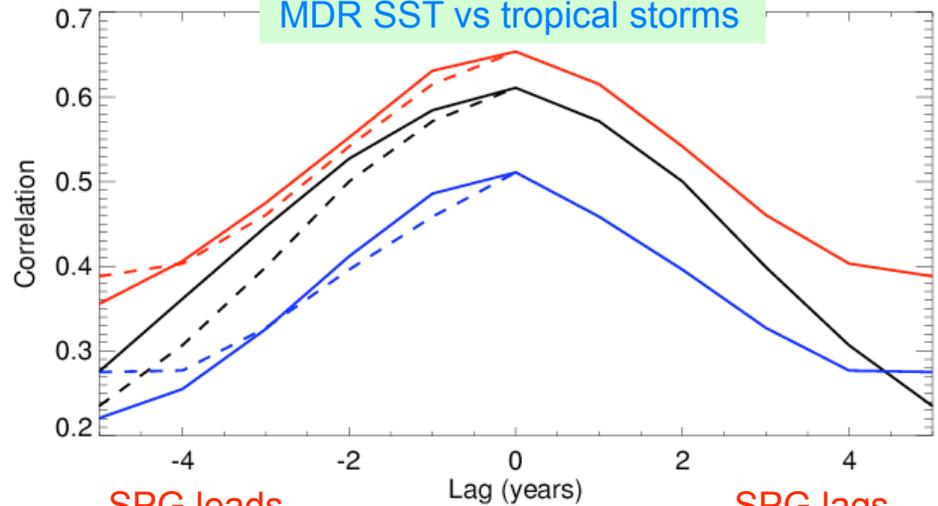
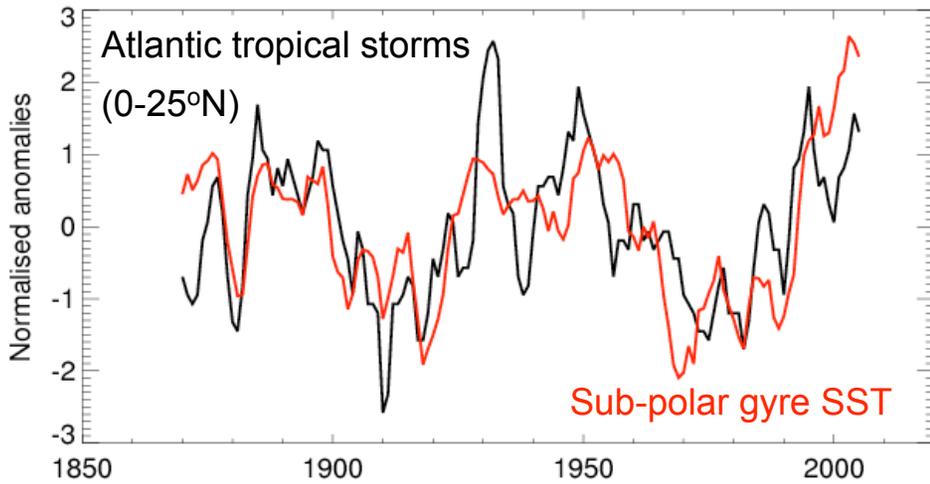


Sub-polar gyre (SPG)

Hurricane main development region (MDR)

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

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



SPG leads

MDR SST leads

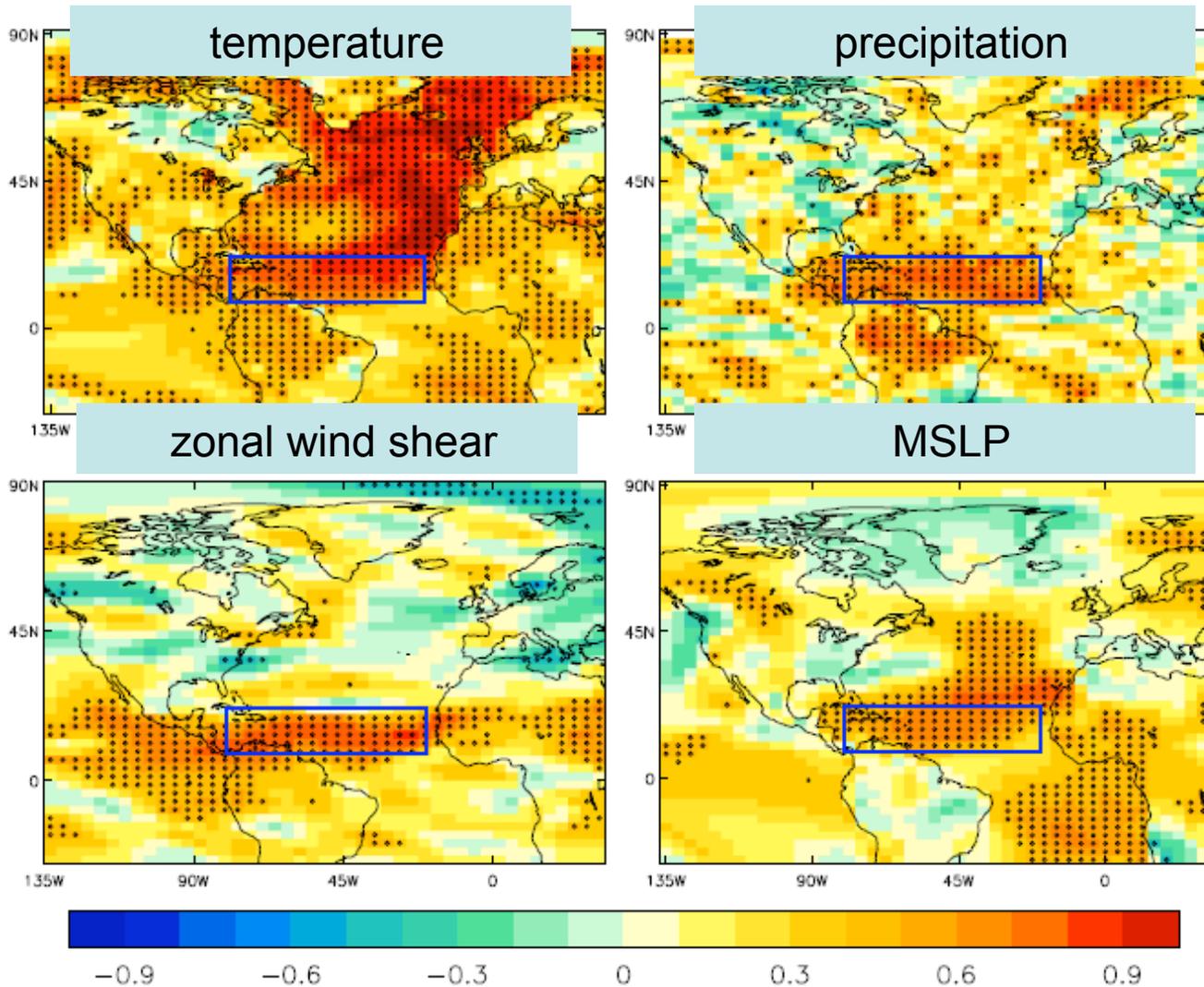
SPG lags

MDR SST lags

Skill in tropical Atlantic atmosphere in idealised experiments

JJASON seasons, Forecast years 2-6:

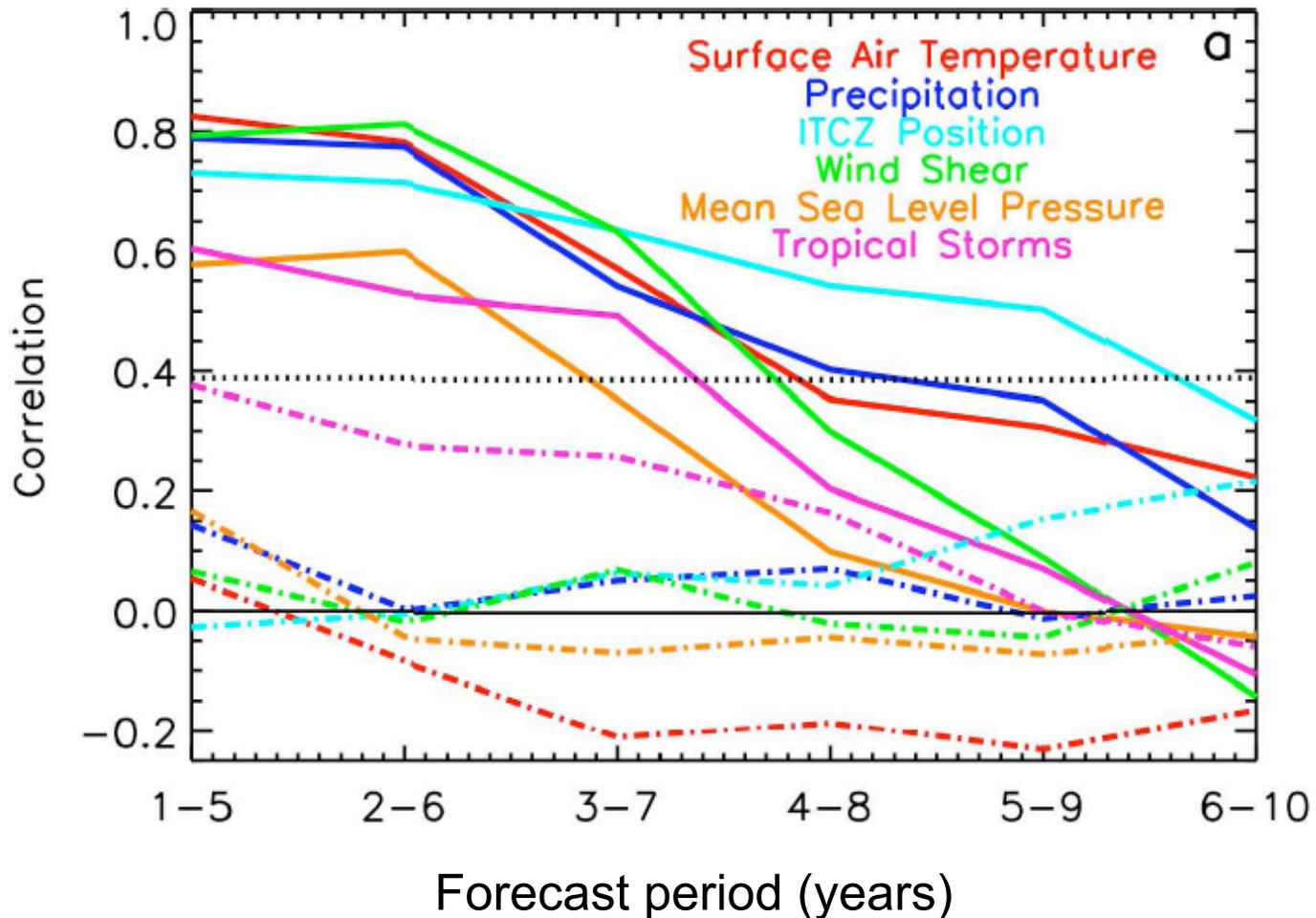
Dunstone et al, 2011, submitted



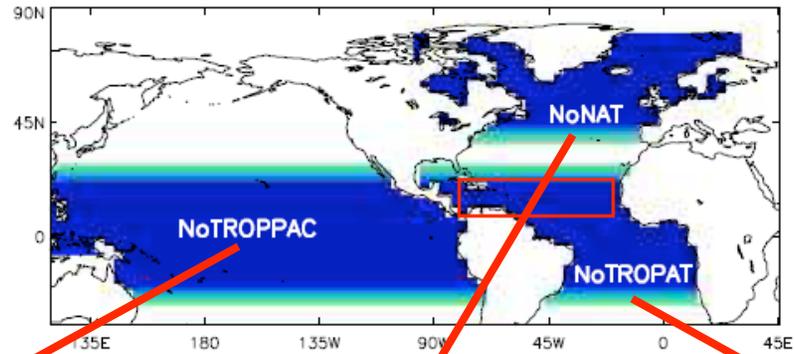
- Large set of idealised model experiments (>25 start dates)
- Monthly mean T & S ocean data is assimilated at all model locations (no atmosphere assimilation)
- Stippled regions are significant at the 5% level
- Blue box shows the main hurricane development region (MDR)

Hurricane main development region

Solid = forecasts
Dotted = persistence

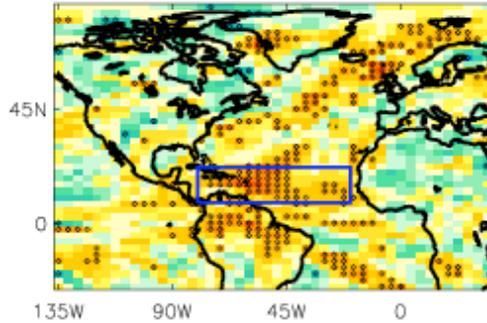


Skill originates from sub-polar gyre

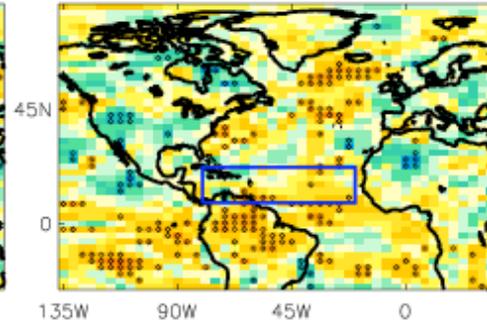


precipitation

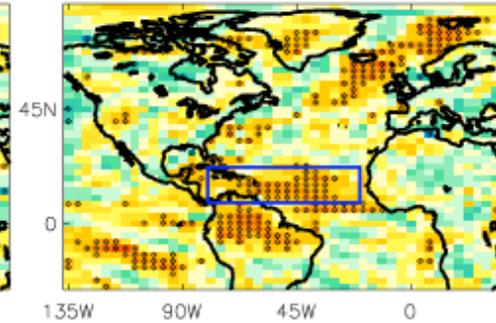
Precip, NoTROPAC



Precip, NoNAT

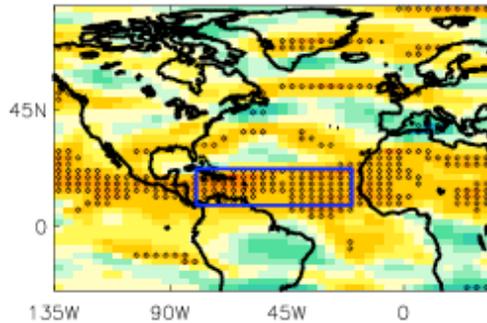


Precip, NoTROPAT

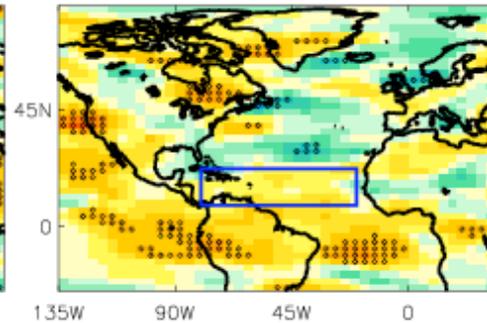


wind shear

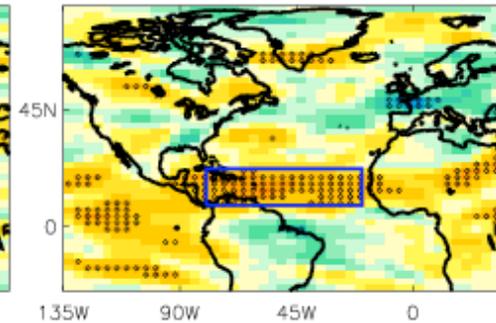
Wind Shear, NoTROPAC



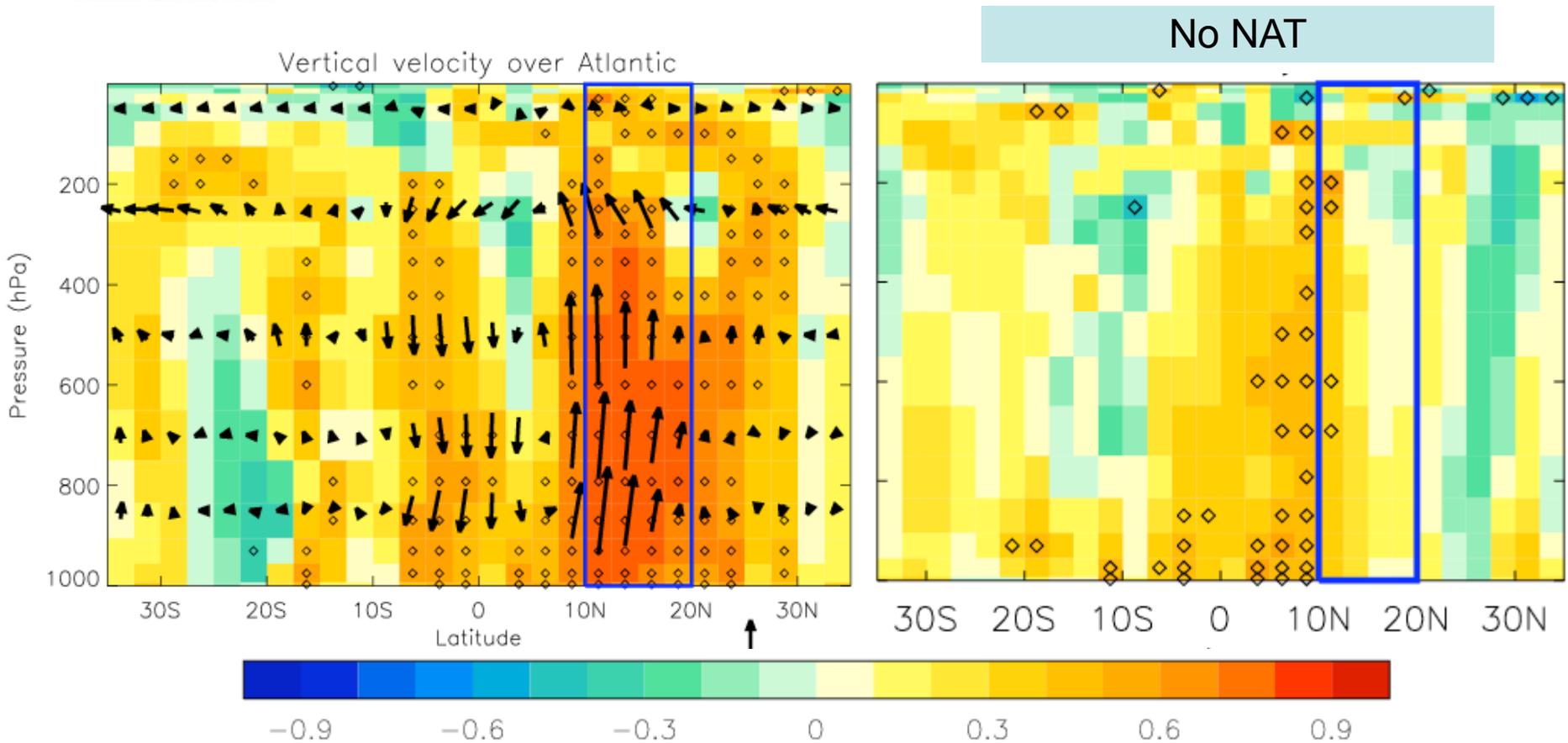
Wind Shear, NoNAT



Wind Shear, NoTROPAT

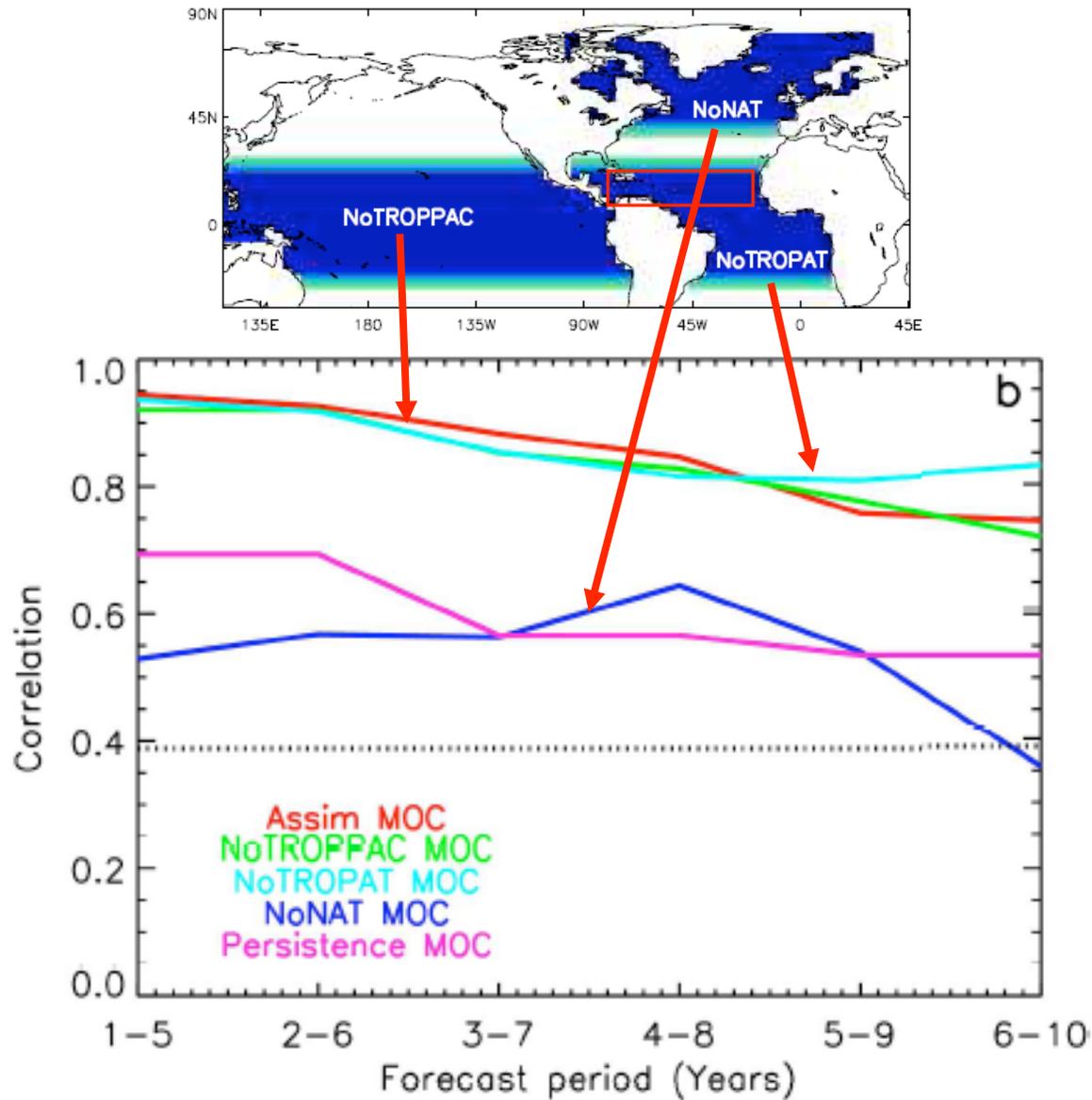


Sub-polar gyre influence on tropical Atlantic

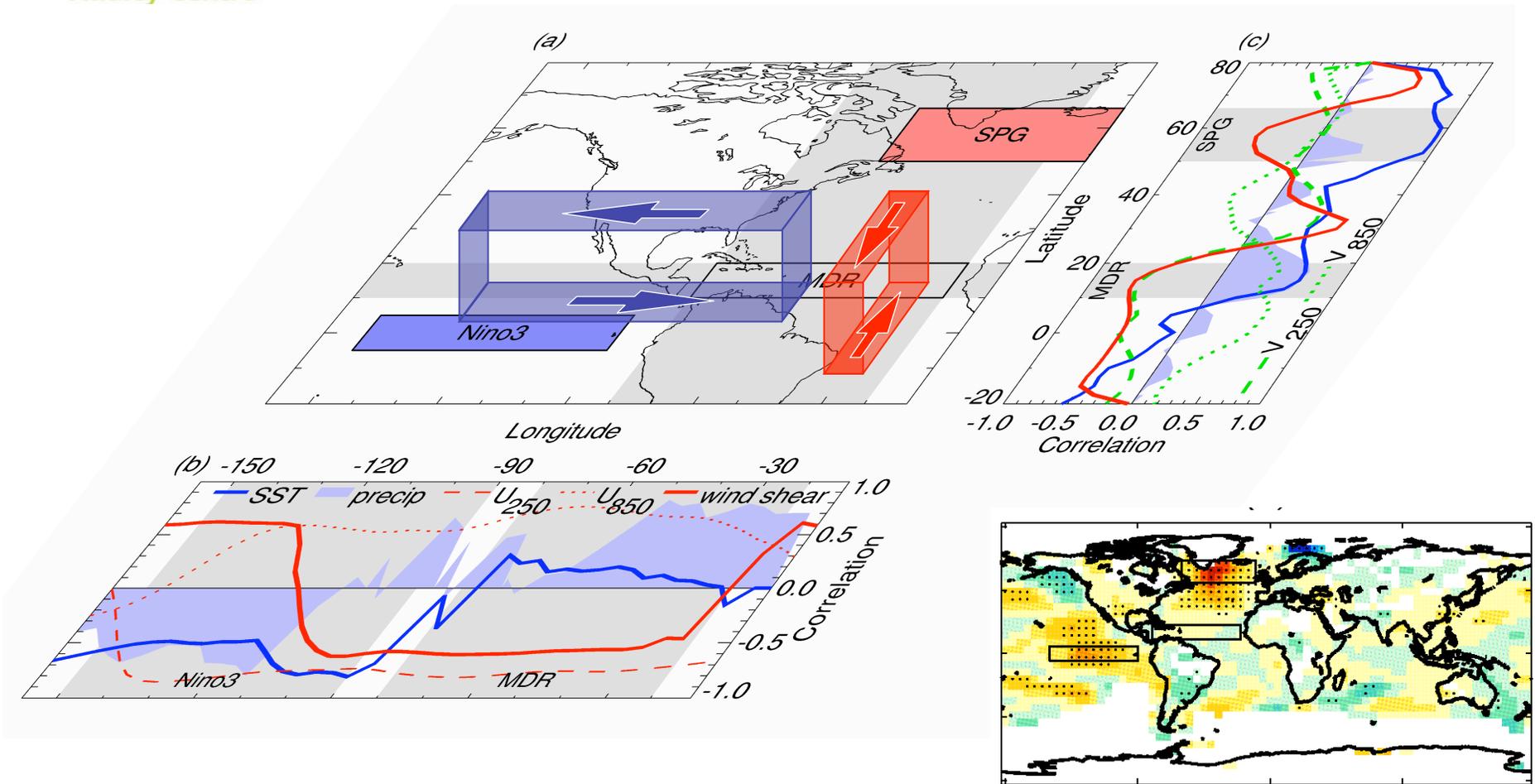




AMOC at 26° N



Remote influences on Atlantic hurricanes



(Smith et al. 2010)