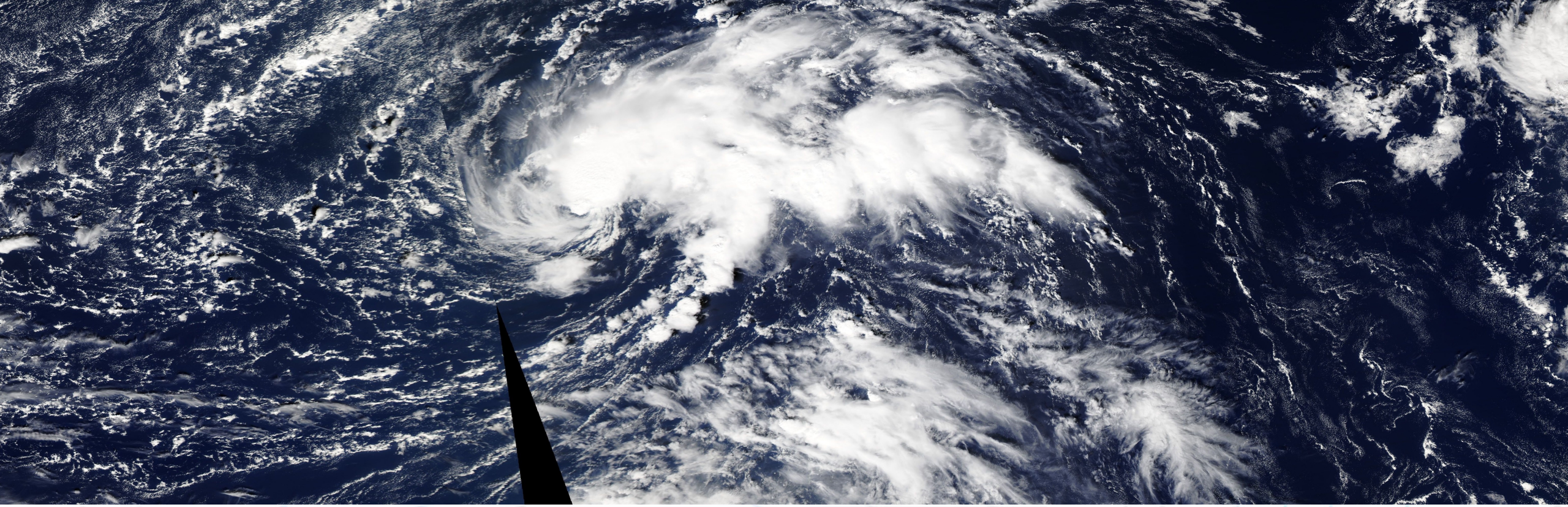
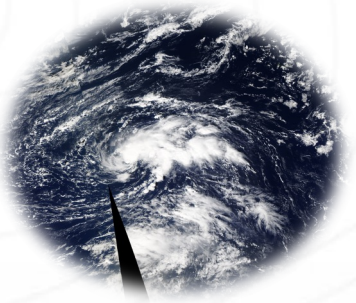


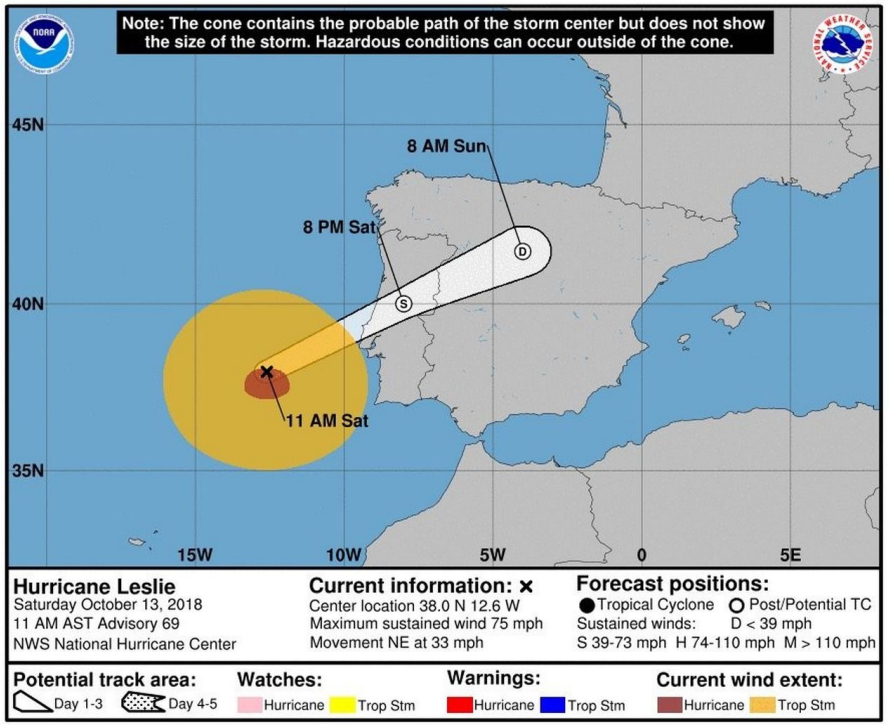
A Climatology of Tropical Transitions in the North Atlantic Ocean

Universidad de Valladolid

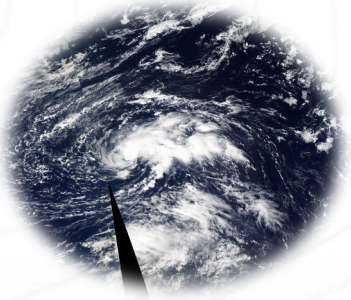
INTRODUCTION



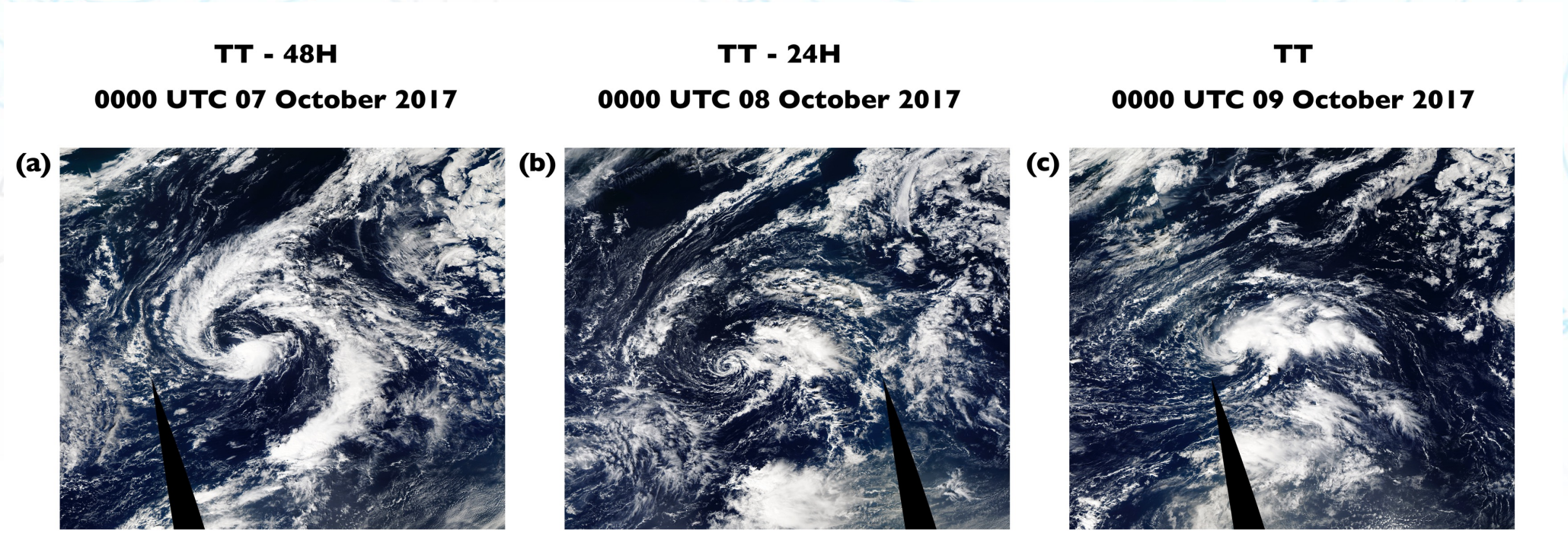
- The number of tropical cyclones (TC) landfall Western Europe increase in the last 20 years.
- Many TCs has their genesis in **TROPICAL TRANSITIONS (TT)**
- Delta, Vince, Ophelia or Leslie were TCs which suffers a TT process



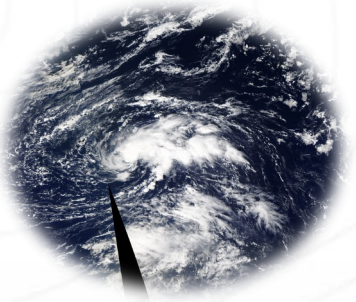
WHAT IS A TROPICAL TRANSITION?



- Is the process whereby a baroclinic, high-to-moderate vertical wind shear, extratropical or subtropical cyclone is transformed into a warm-core, low vertical wind shear, tropical cyclone
- TT is a relatively recently described form of tropical cyclogenesis (Davis and Bosart, 2004)



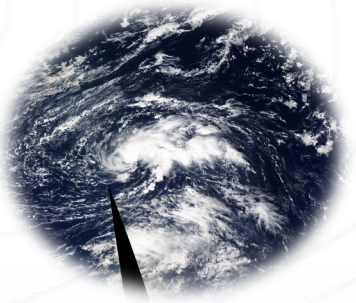
METHODOLOGY



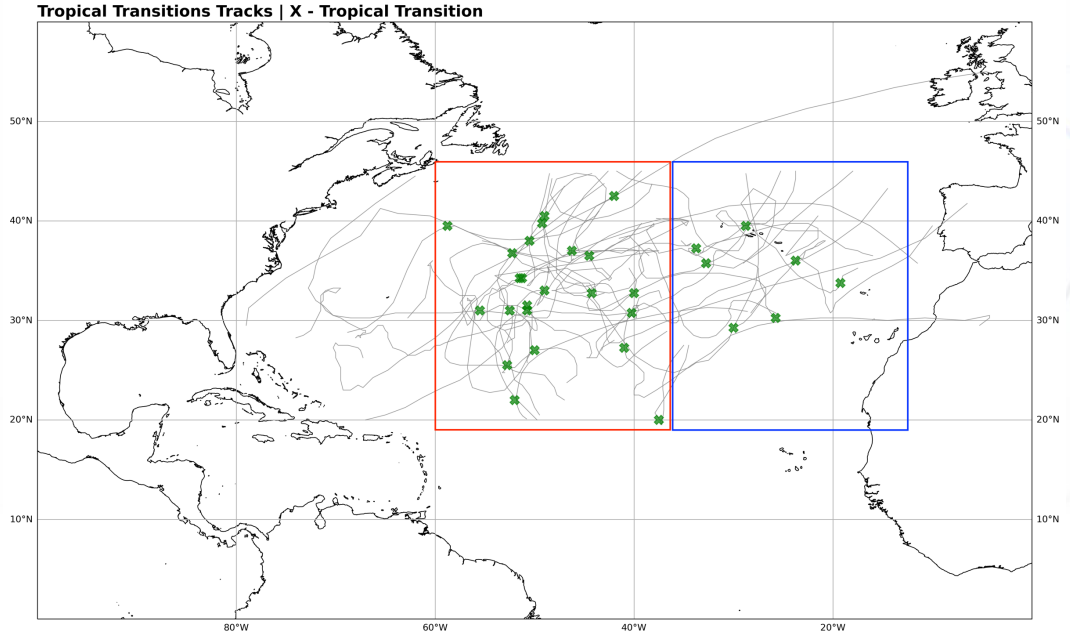
- A list of 30 individual cyclones which suffers TT process during 1979-2019 was compiled from HURDAT (HURricane DATabase from NOAA)
- The area of North Atlantic selected was: > - 60°W of longitude and > 20°N of latitude

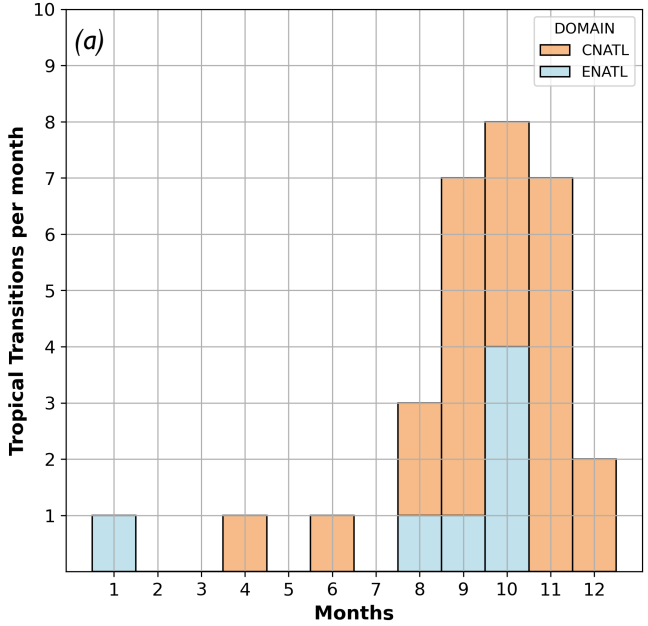
LO → TD, TC or HU
EX → TD, TC or HU
SD → TD, TC or HU
SS → TD, TC or HU

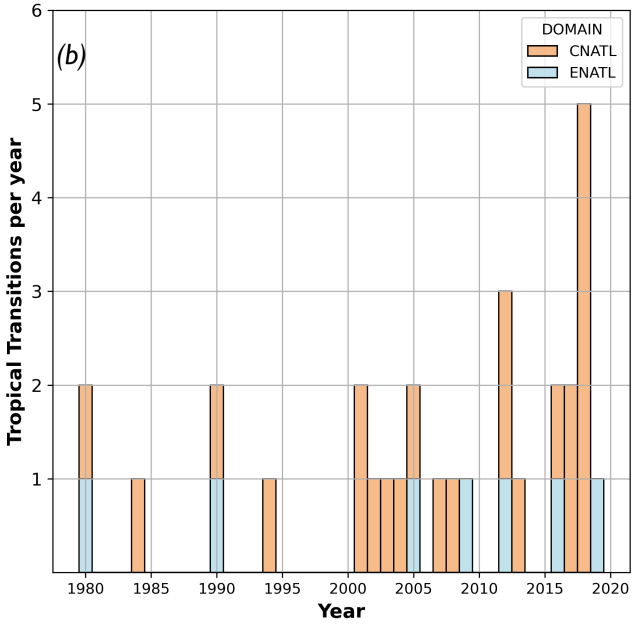
RESULTS



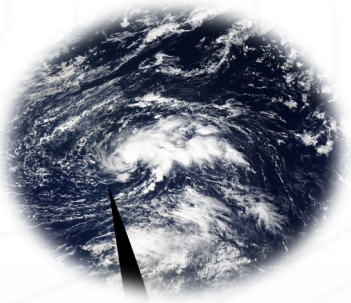
- TTs are more frequent in the Central-Western NATL than Eastern NATL
- The TTs show a favored seasonality covering 70% of total between September and November
- In the last 20 years, is denoted a visual TTs increase trend



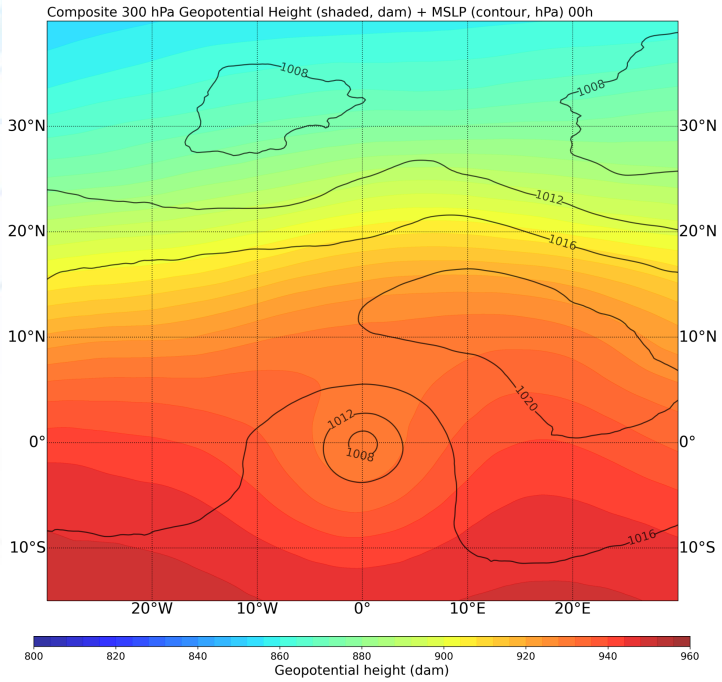


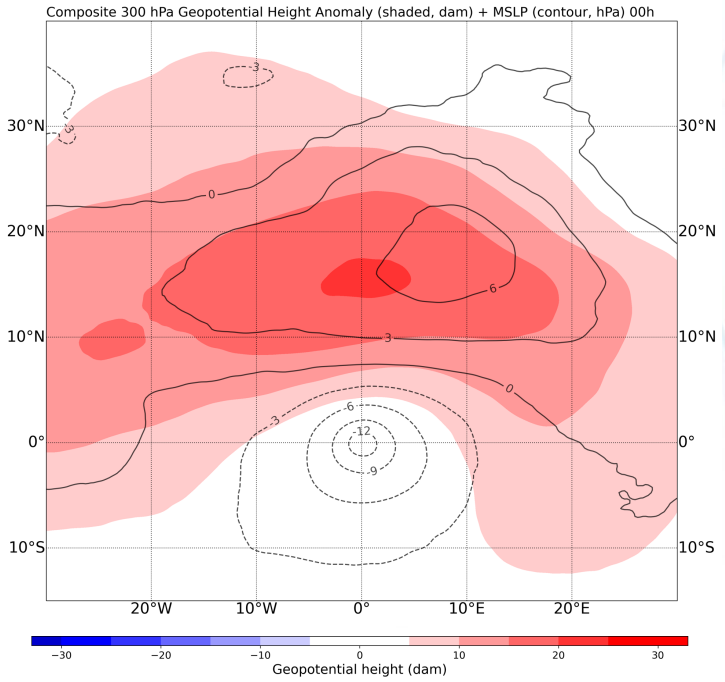


RESULTS

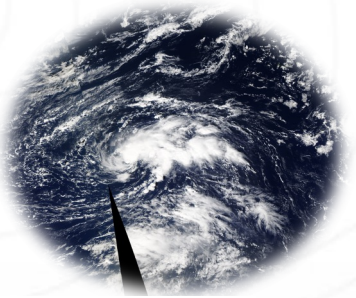


- A strong anticyclone northern to the surface cyclone and the trough at GEO300, which provides moisture to the cyclone by the enhanced surface latent heat fluxes.
- A previous westerlies meridional trough with quasigeostrophic forcing acts as precursor.

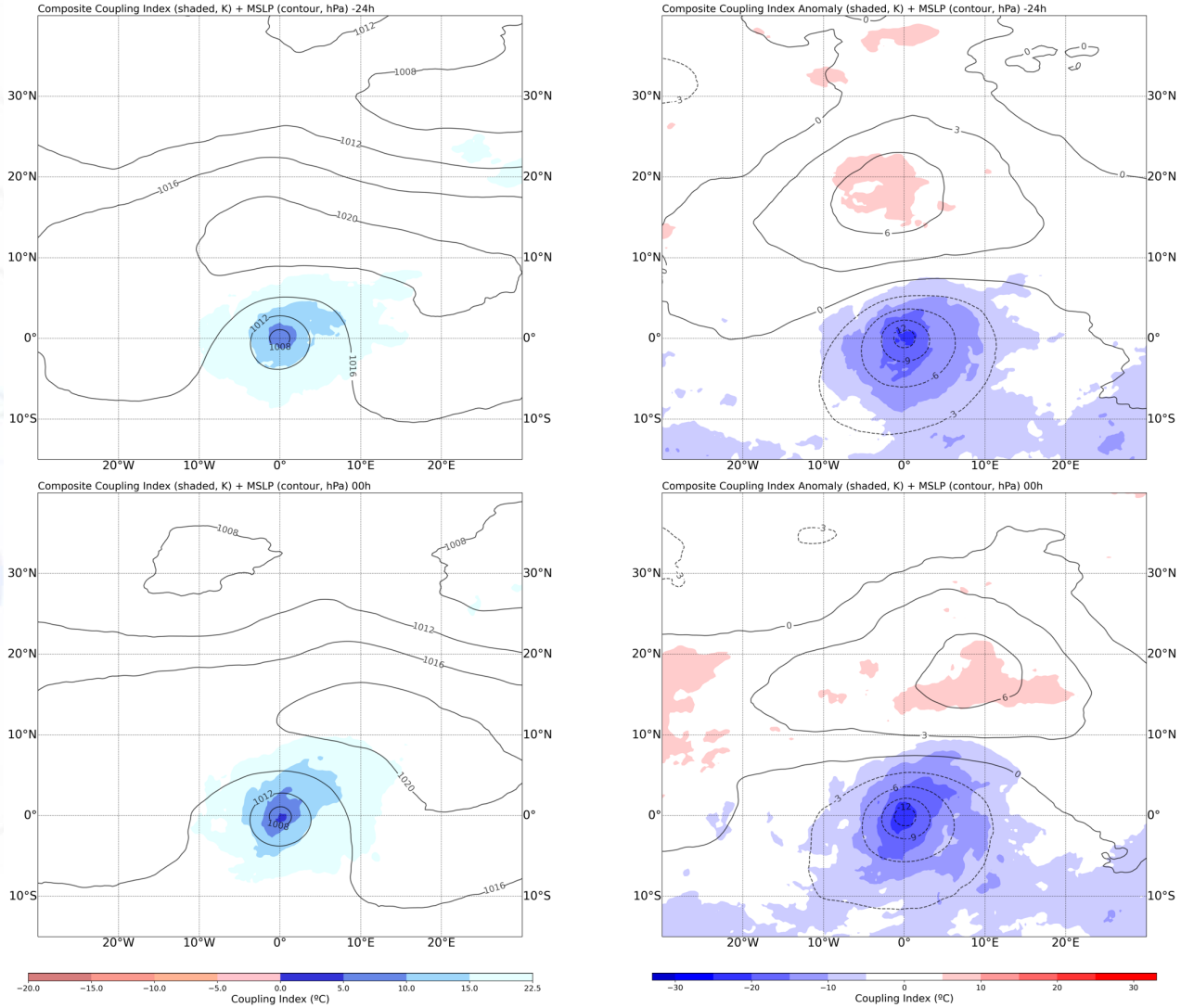




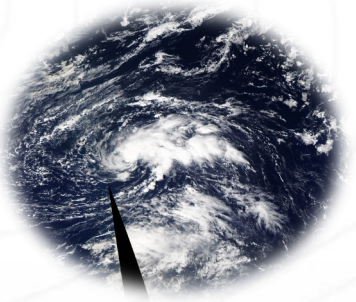
RESULTS



- Enough environmental instability for TT
- Facilitates the development of deep convection
- Upper-tropospheric disturbance influences more than the low-levels moisture advection



SUMMARY



- TTs in NATL are characterized by a strong anticyclone and a trough at 300 hPa, which evolves into a warm core through an increase in the geopotential height
- Tropospheric stability reduction indicates enough thermal instability for TT and facilitates of deep convection
- Deep convection favors latent heat release which promotes PV vertical redistribution

Thank you for your attention

More information in the next months:
An Environmental Synoptic Analysis of Tropical Transitions in the Central and Eastern North Atlantic – Atmospheric Research – *Under Review*

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