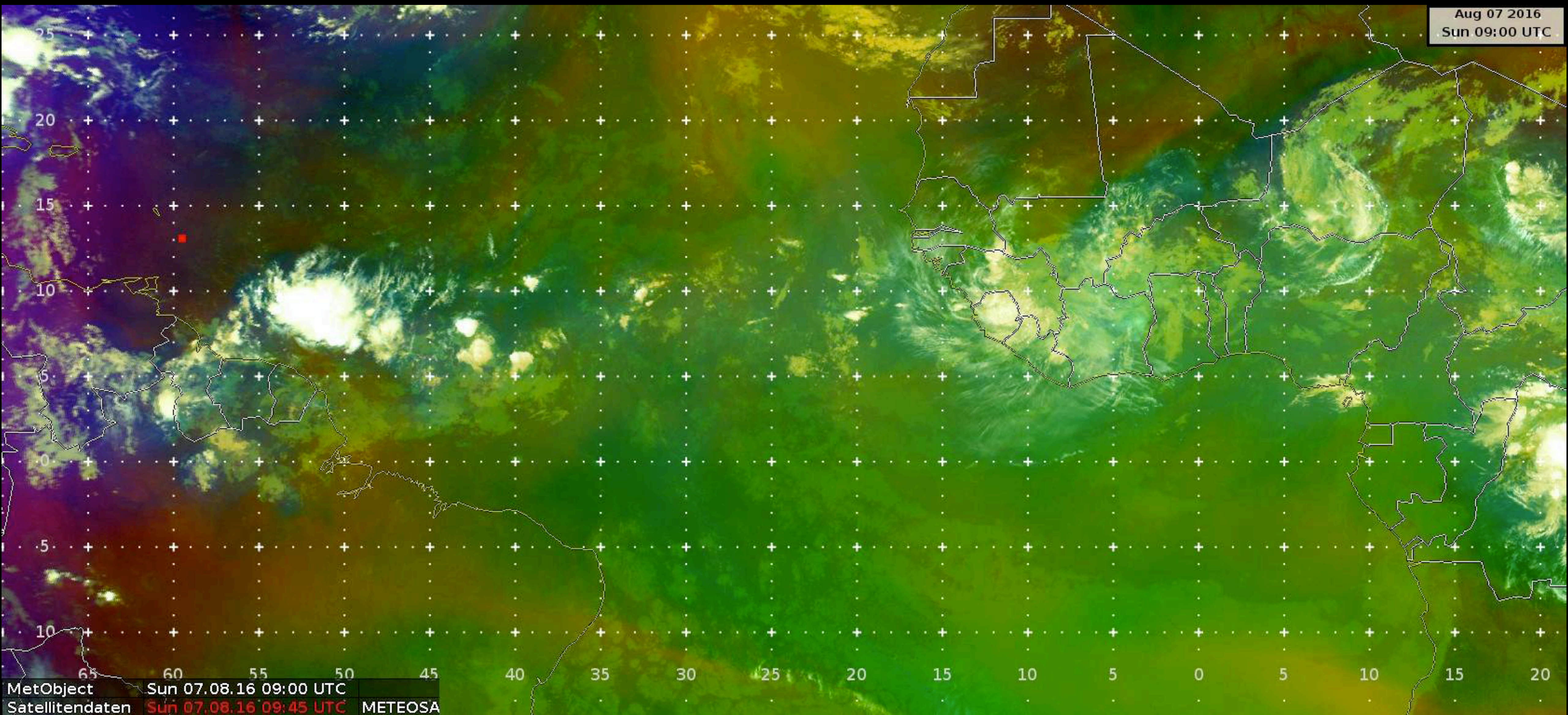
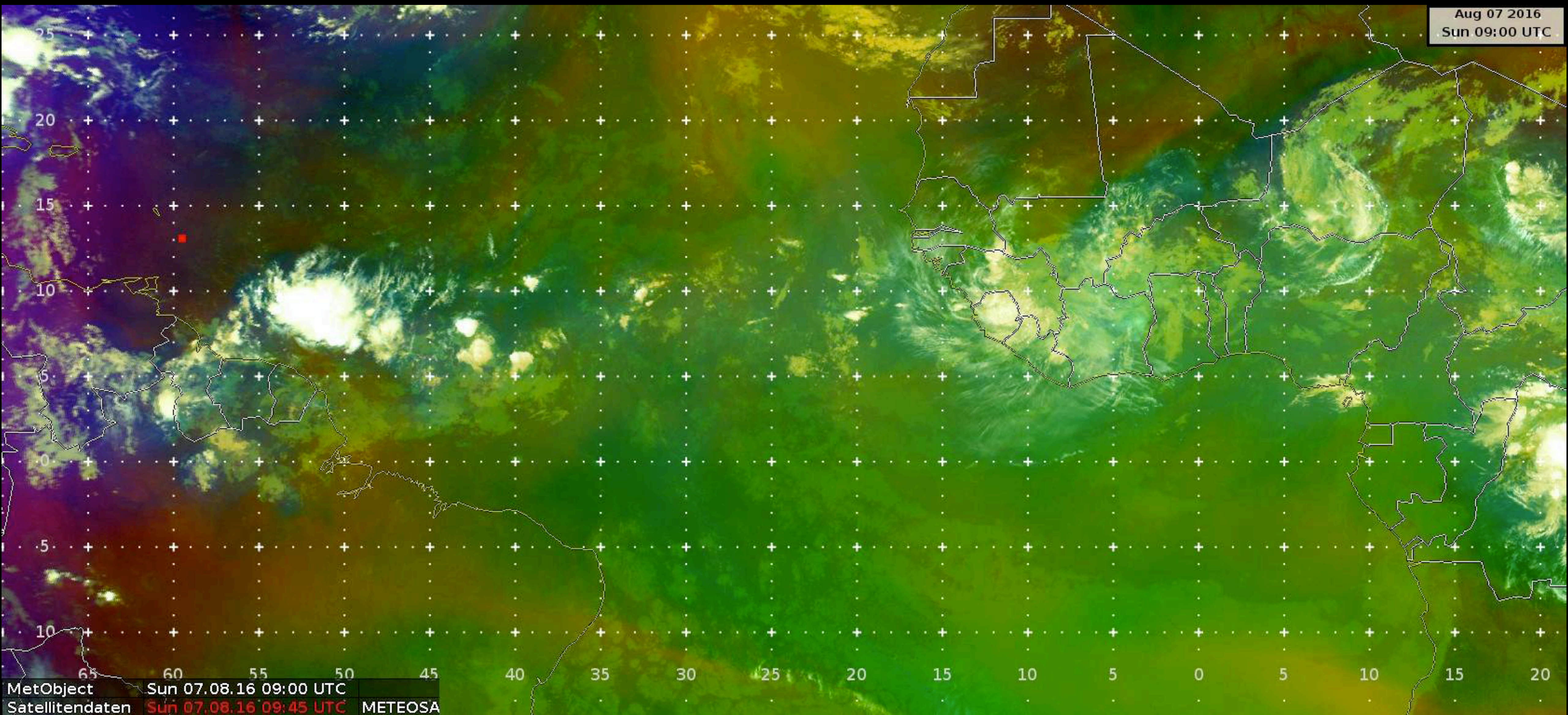


EarthCARE — Tropical Oceans and Organized Convection (EC-TOOC)

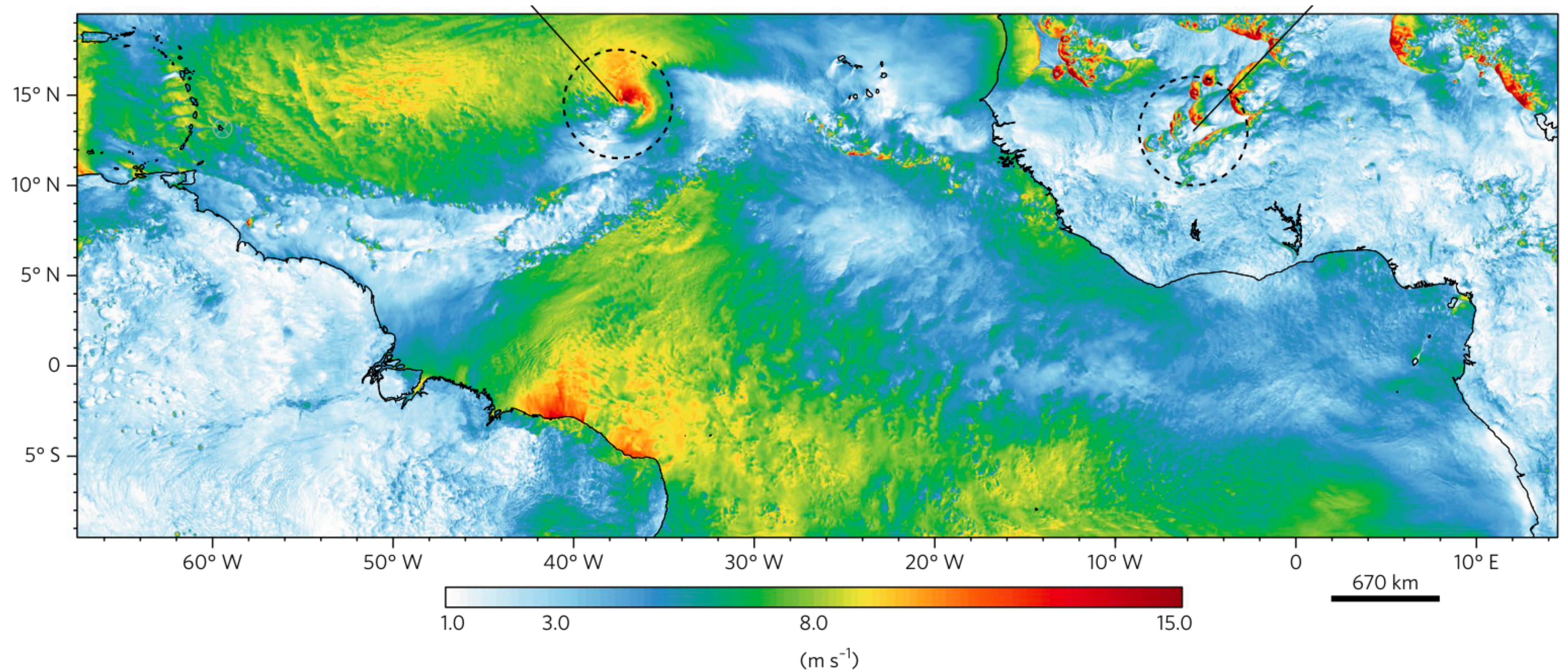
Bjorn Stevens





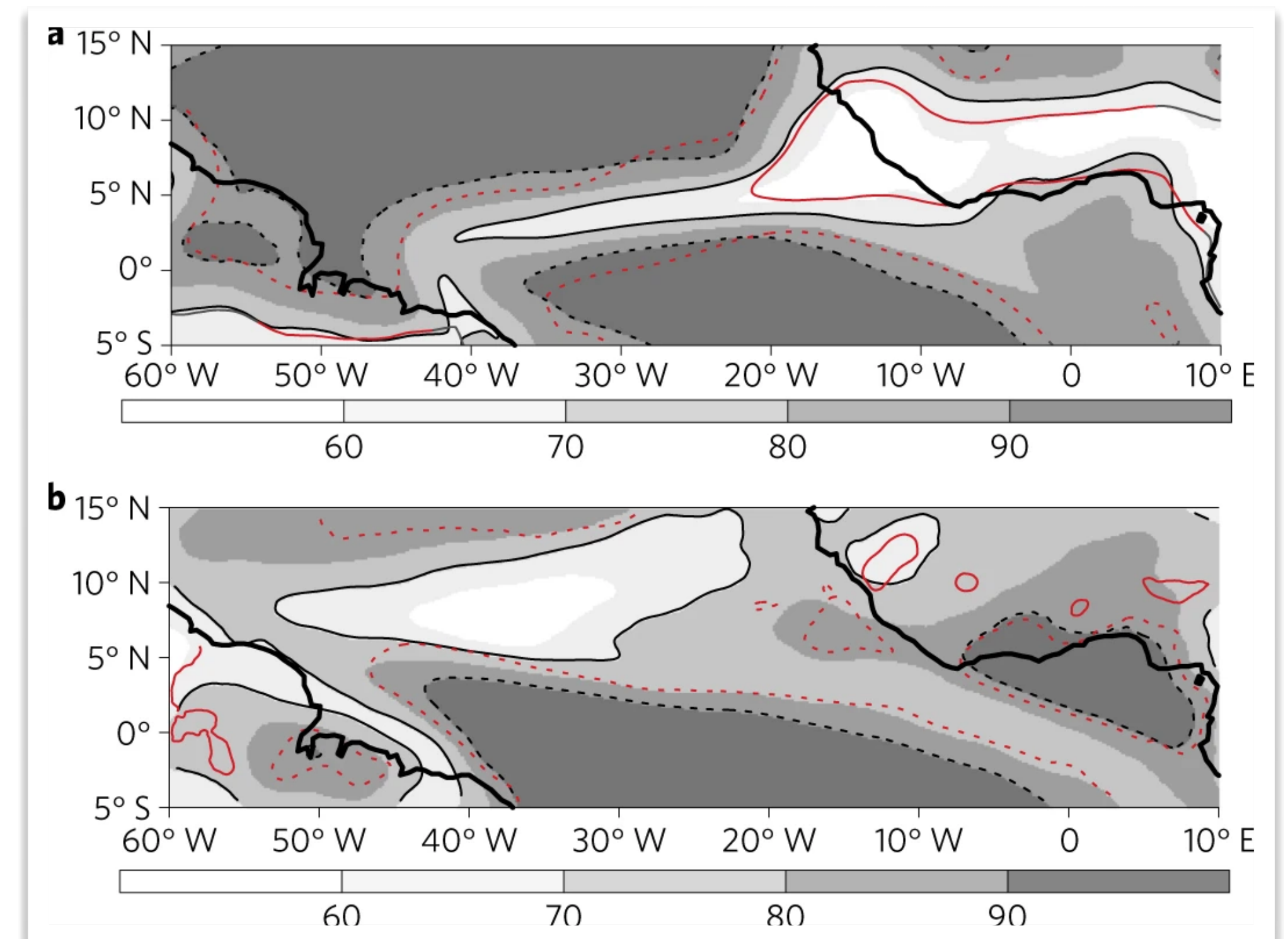
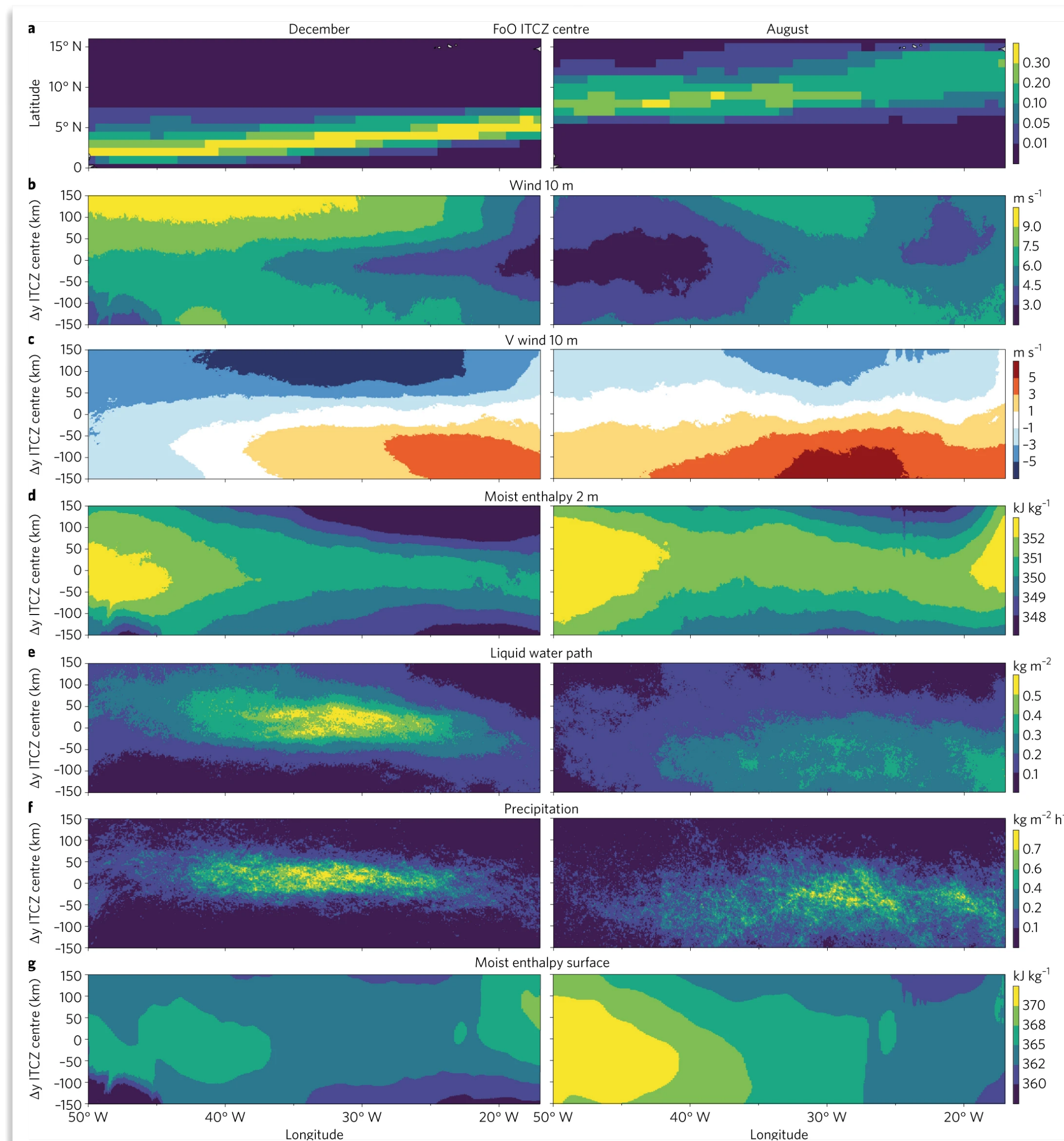


Atlantic ITCZ (Aug 2016)



ICON 2.5 km regional simulations

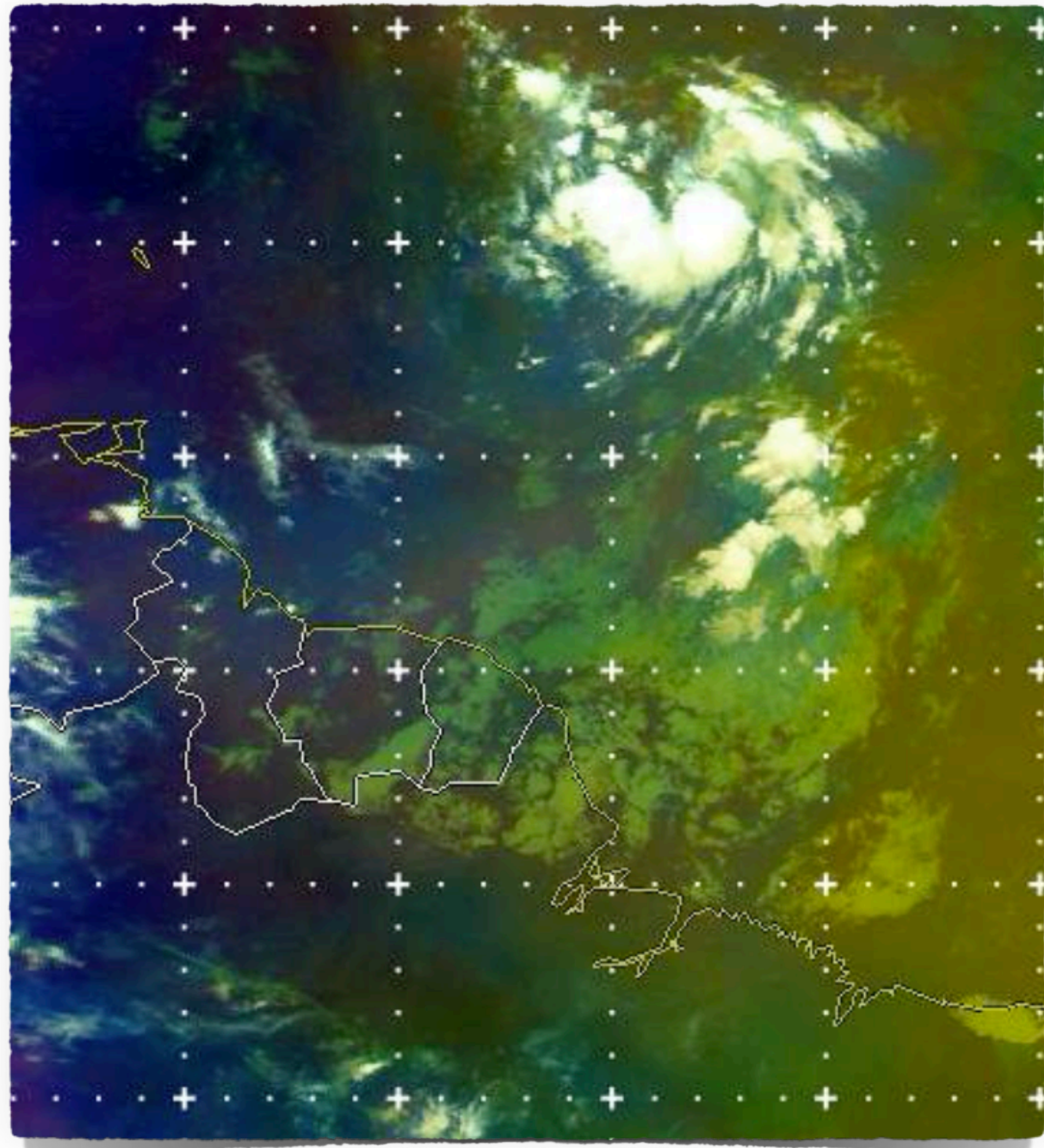
Simulation composites of ITCZ



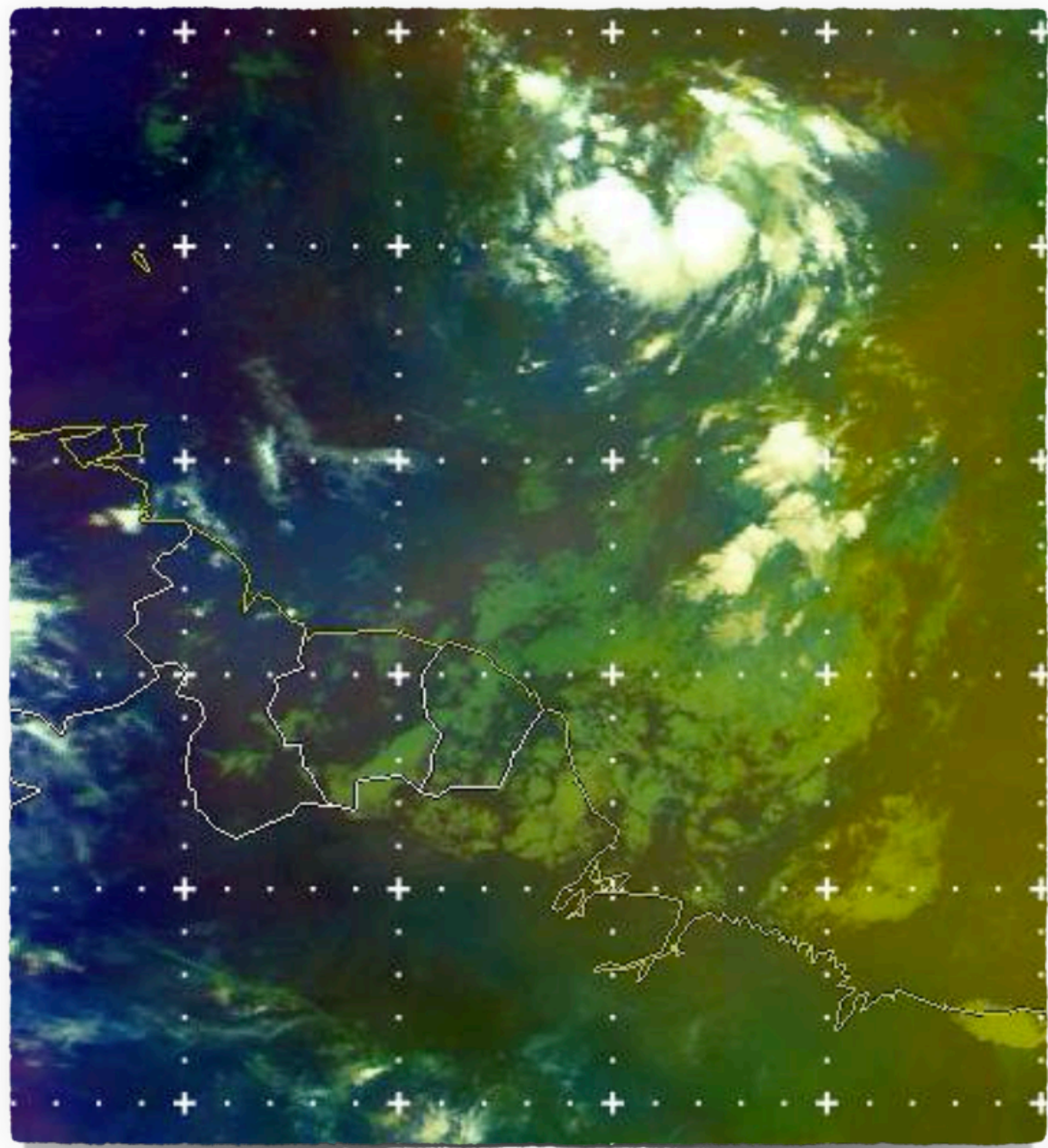
In August

- ITCZ FoO most frequent over $\partial_x \theta_e \Big|_{\max}$ but P most intense over regions of low $\theta_e \Big|_{\text{sfc}}$.
- $|\mathbf{v}_{10\text{m}}|$ most pronounced to the west of 40°W.
- P more pronounced on southern edge: $\delta y = -100$ km

Western Atlantic ITCZ in water vapor imagery



Western Atlantic ITCZ in water vapor imagery



A HIGH-ALTITUDE LONG-RANGE AIRCRAFT CONFIGURED AS A CLOUD OBSERVATORY

The NARVAL Expeditions

BJORN STEVENS, FELIX AMENT, SANDRINE BONY, SUSANNE CREWELL, FLORIAN EWALD, SILKE GROSS, AKIO HANSEN, LUTZ HIRSCH, MAREK JACOB, TOBIAS KÖLLING, HEIKE KONOW, BERNHARD MAYER, MANFRED WENDISCH, MARTIN WIRTH, KEVIN WOLF, STEPHAN BAKAN, MATTHIAS BAUER-PFUNDSTEIN, MATTHIAS BRUECK, JULIEN DELANOË, ANDRÉ EHRLICH, DAVID FARRELL, MARVIN FORDE, FELIX GÖDDE, HANS GROB, MARTIN HAGEN, EVELYN JÄKEL, FRIEDHELM JANSEN, CHRISTIAN KLEPP, MARCUS KLINGEBIEL, MARIO MECH, GERHARD PETERS, MARKUS RAPP, ALLISON A. WING, AND TOBIAS ZINNER



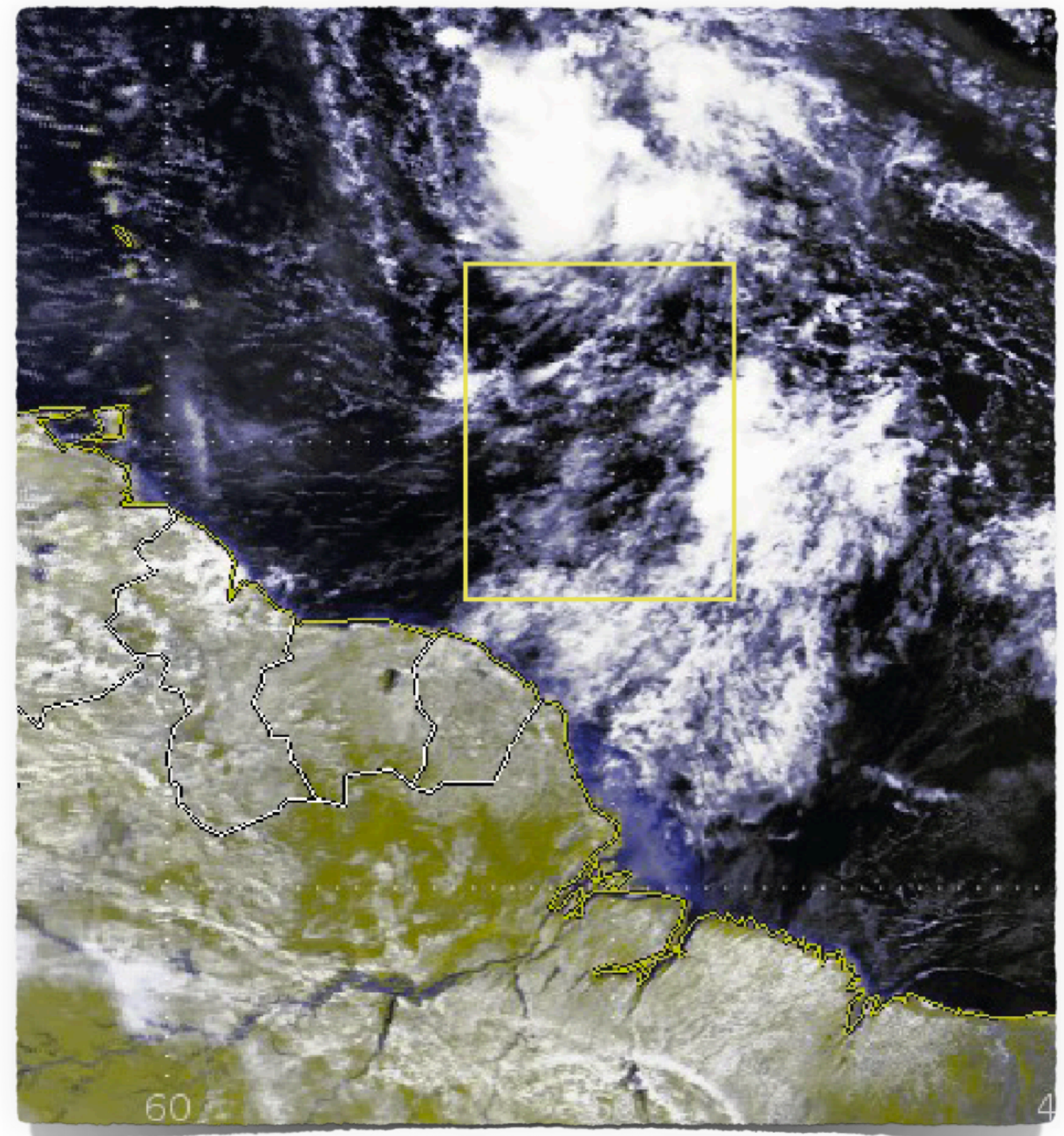
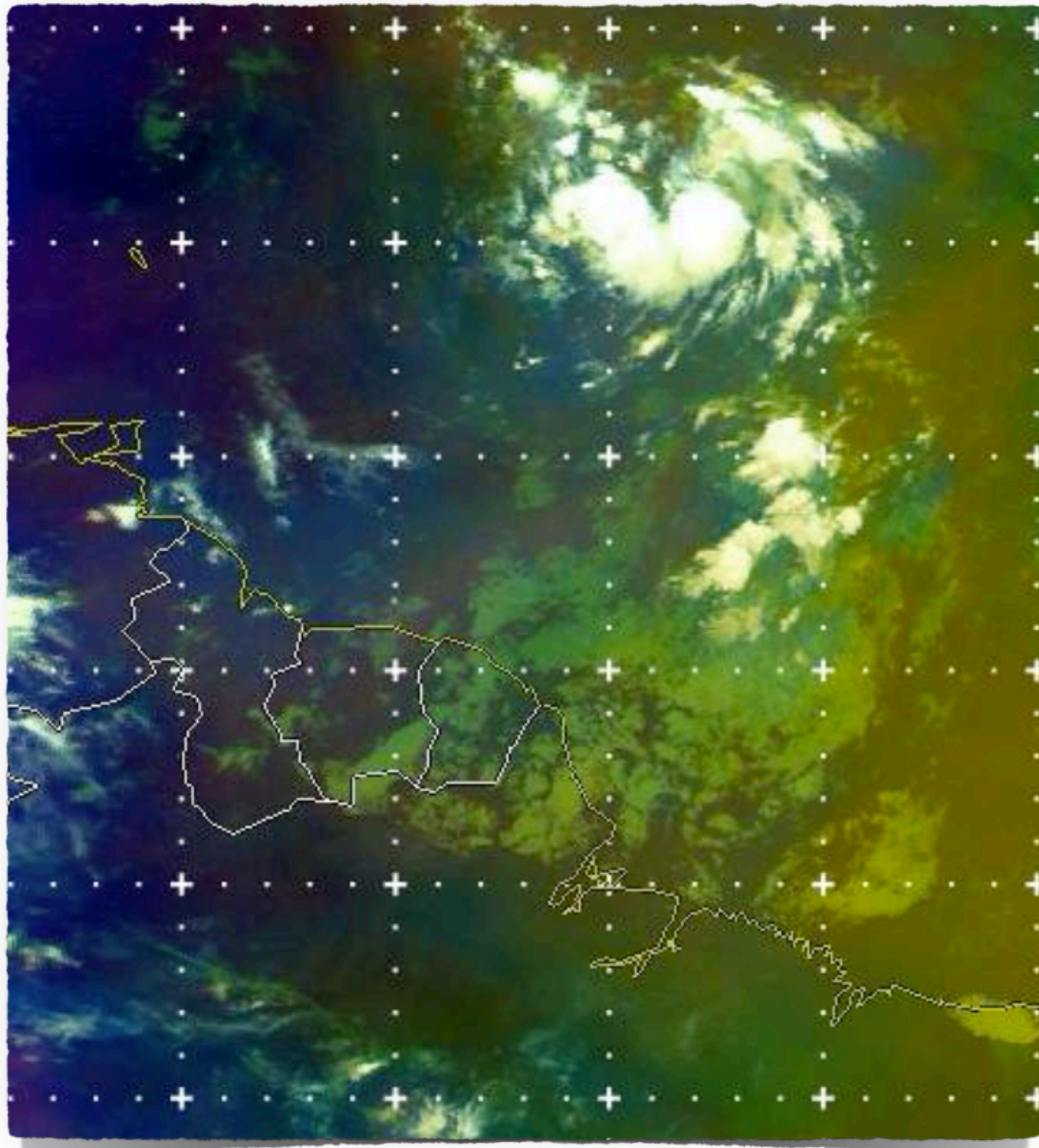
Belly Pod Section

- a. Radiometer Bank
- b. Water Vapour DIAL (WALES)
- c. Cloud and Precipitation Radar
- d. Thermal Imager
- e. SMART

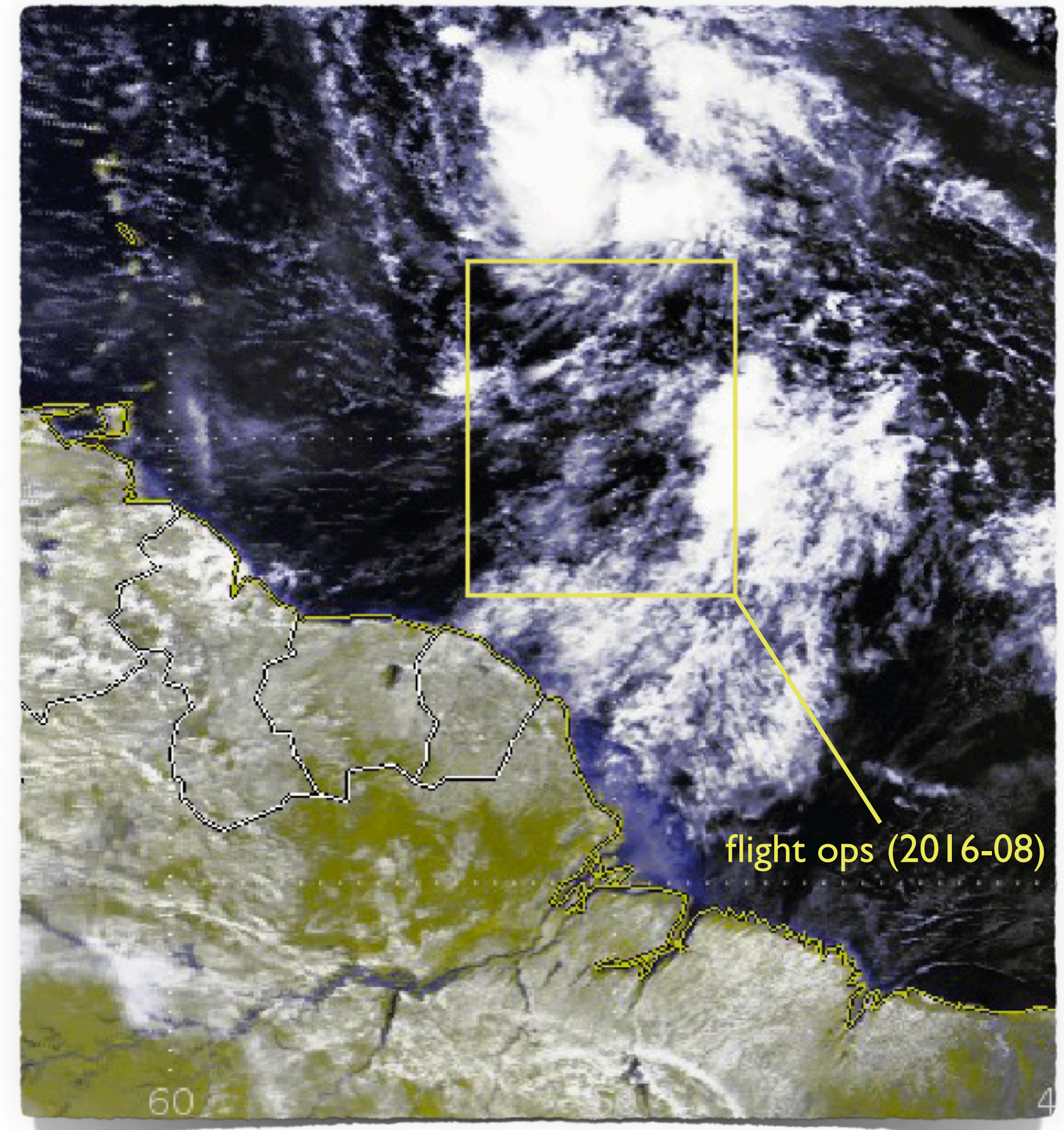
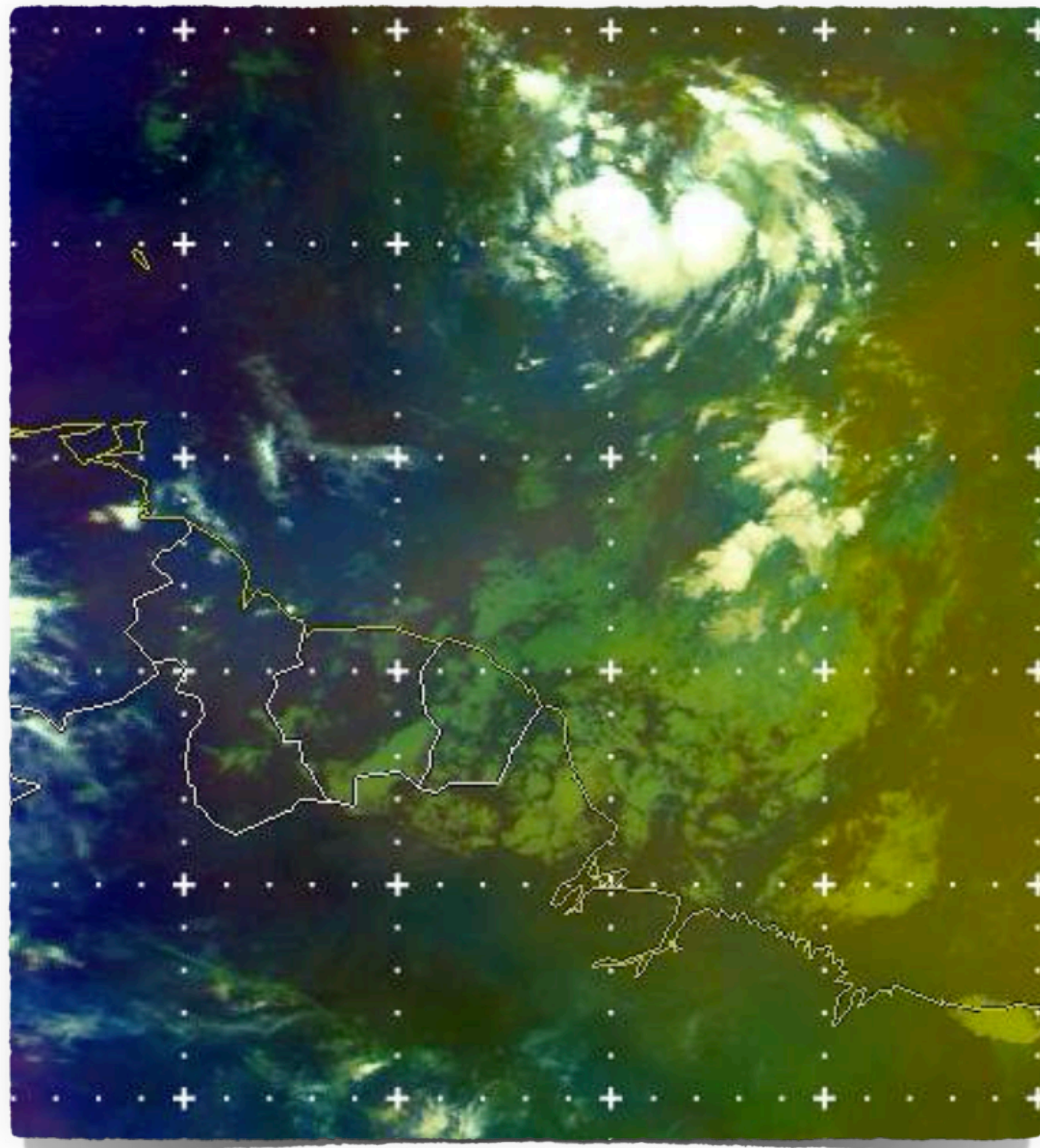
Tail Section

- f. SMART
- g. specMACS
- h. Dropsondes

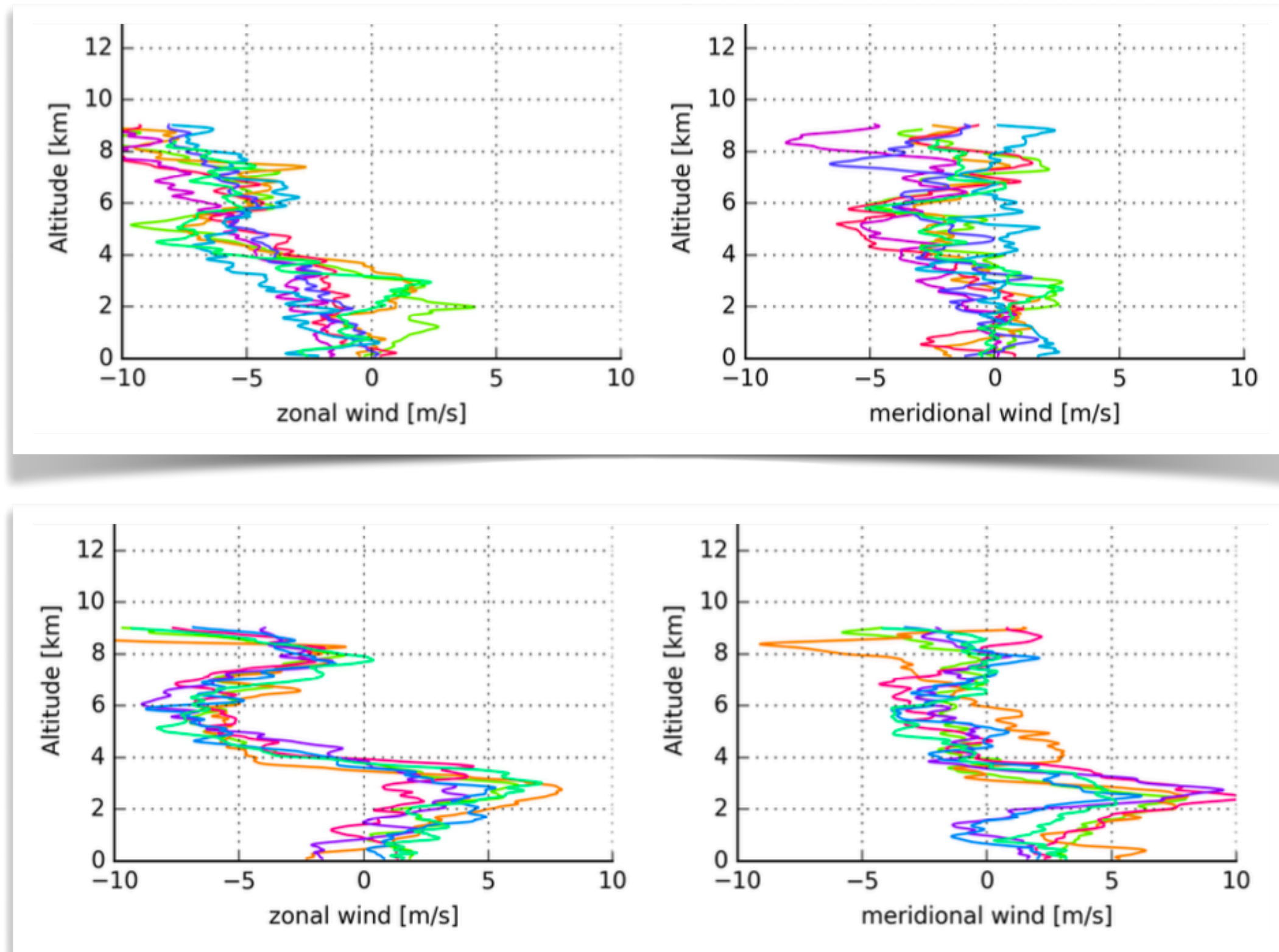
Western Atlantic ITCZ in water vapor and visible imagery



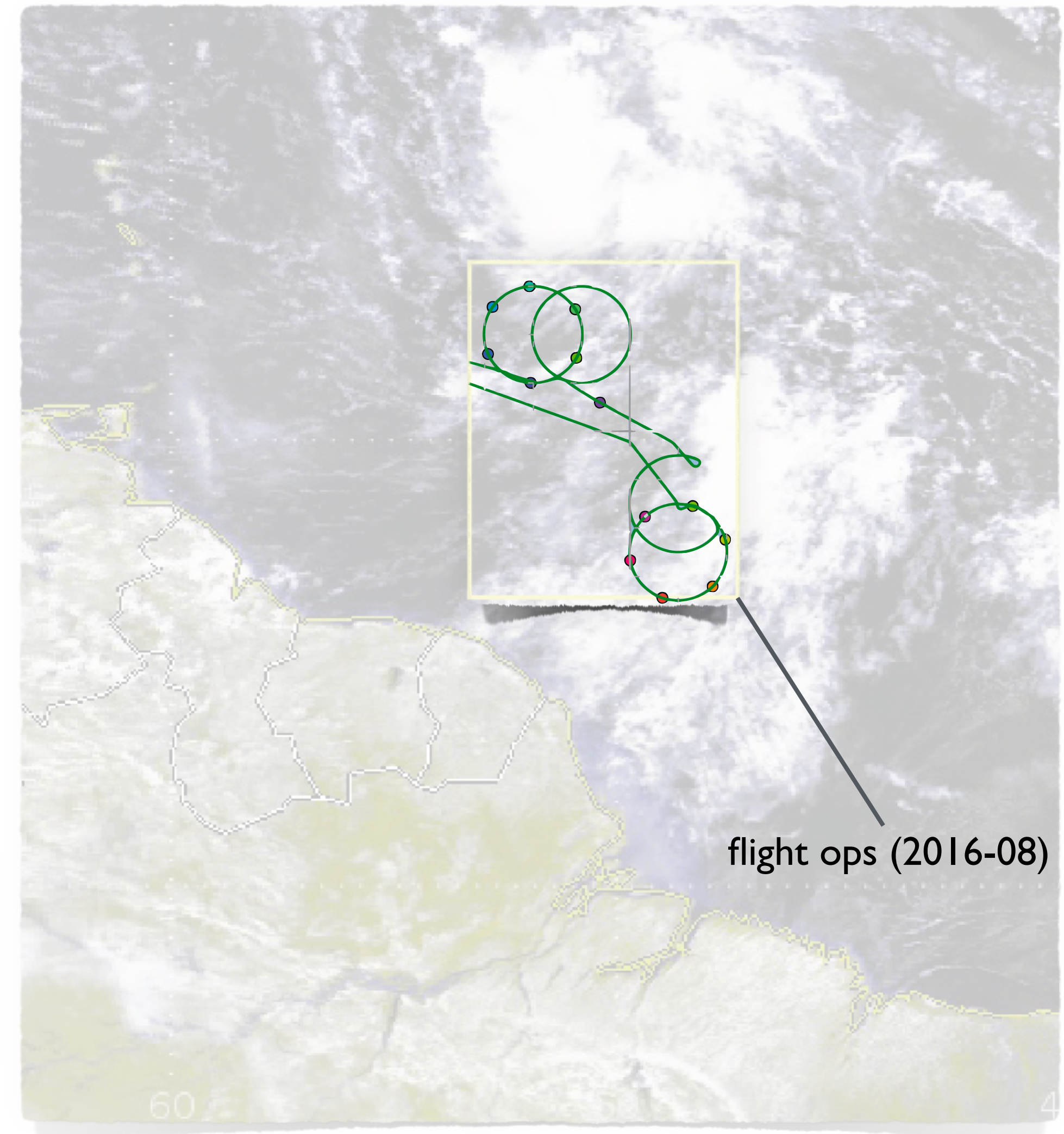
Western Atlantic ITCZ in water vapor and visible imagery



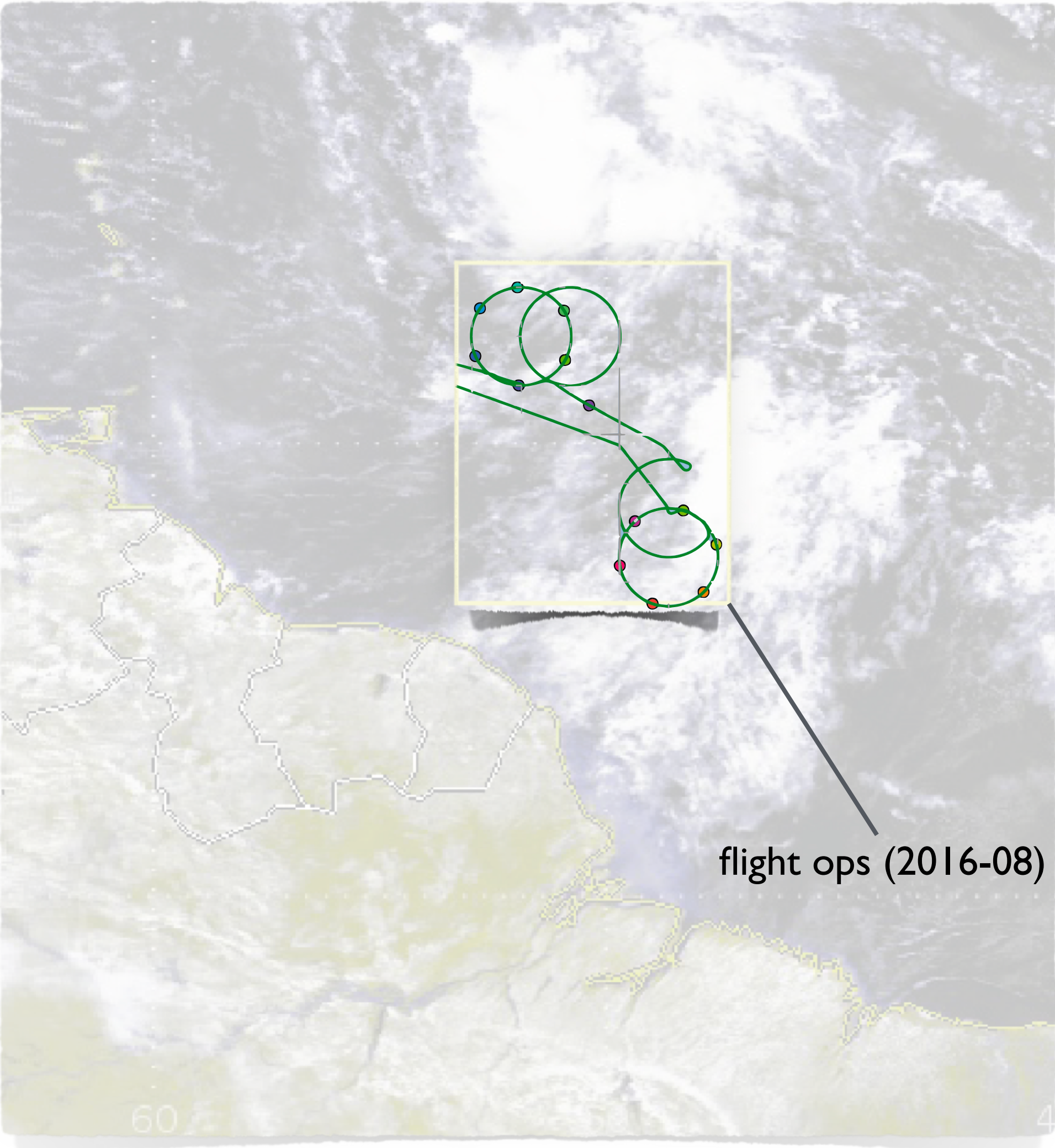
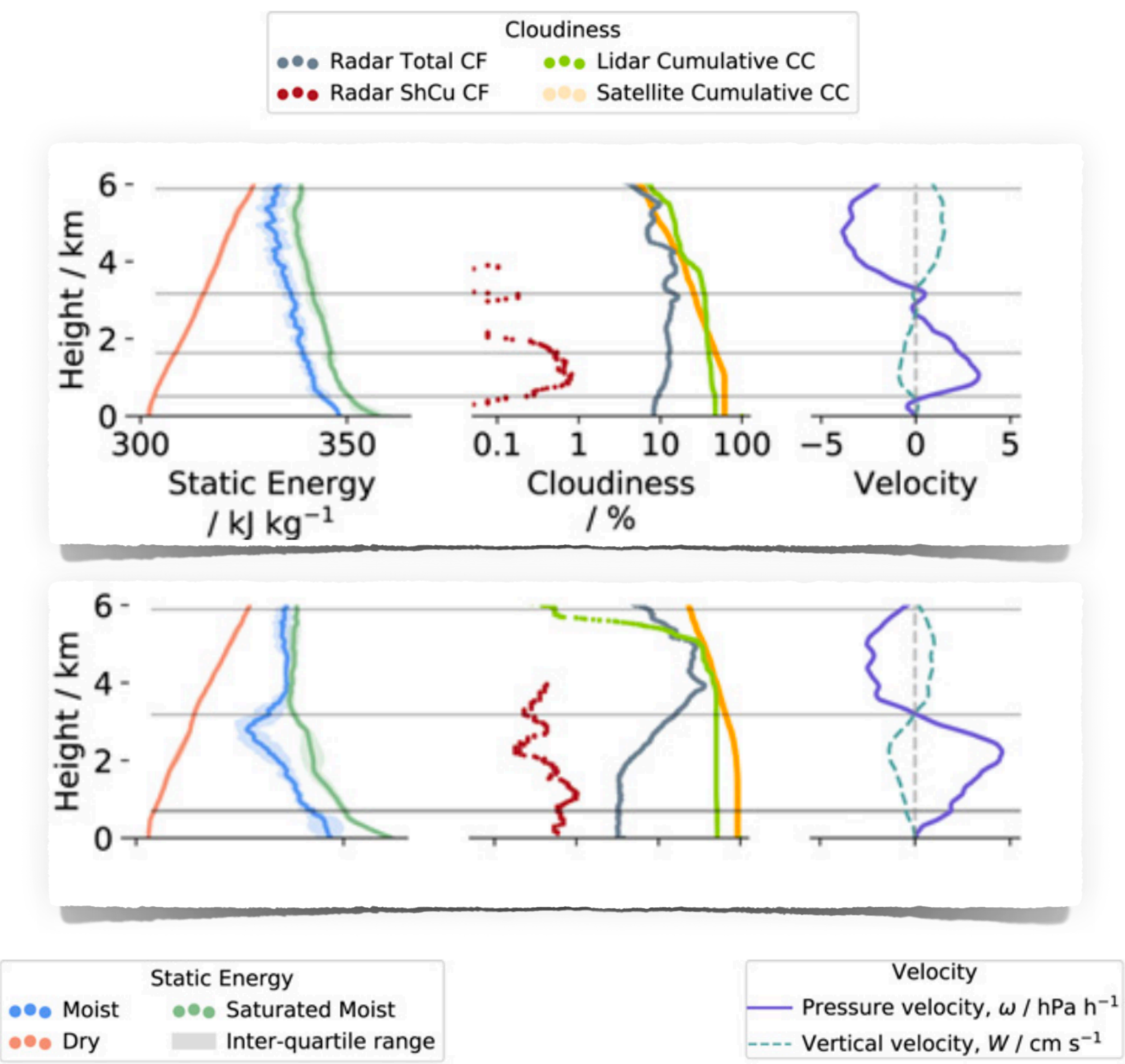
Southern circle near the ITCZ edge, northern in the doldrums



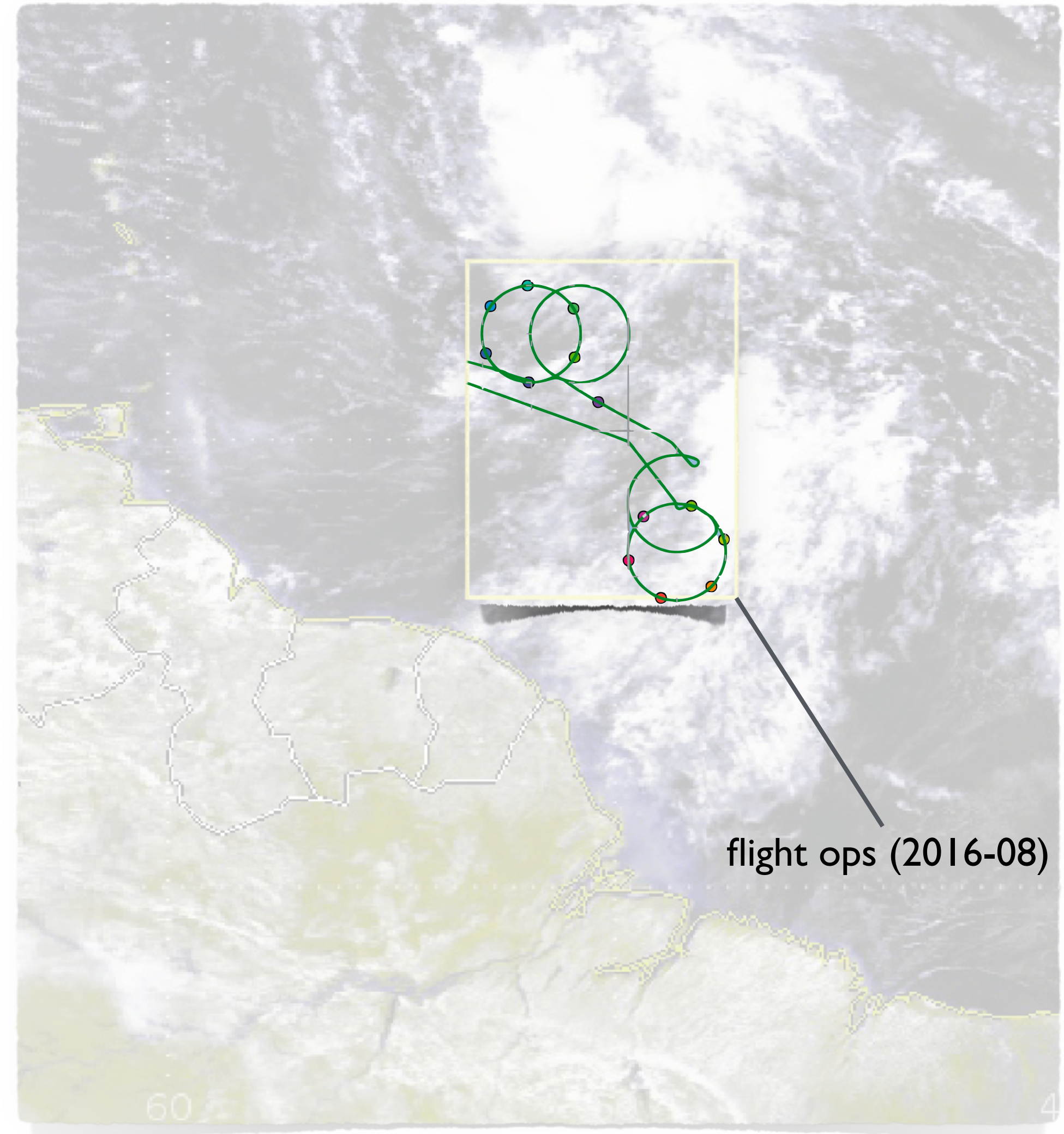
Low level south westerly jet at 3km in southern circle



Seemingly free convection in northern circle



Clouds in the doldrums

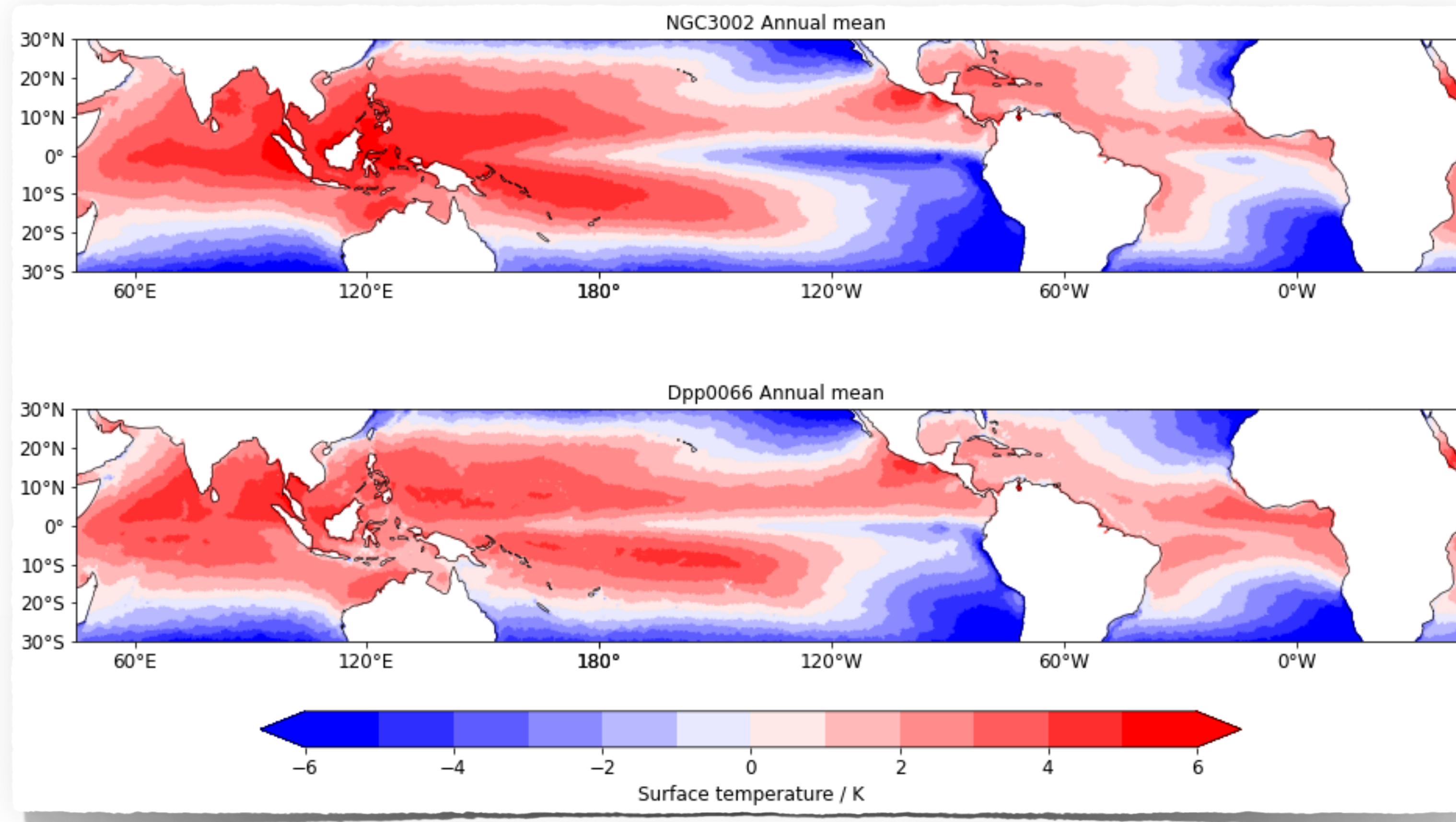


That's about all that we know about clouds & convection in the Atlantic doldrums

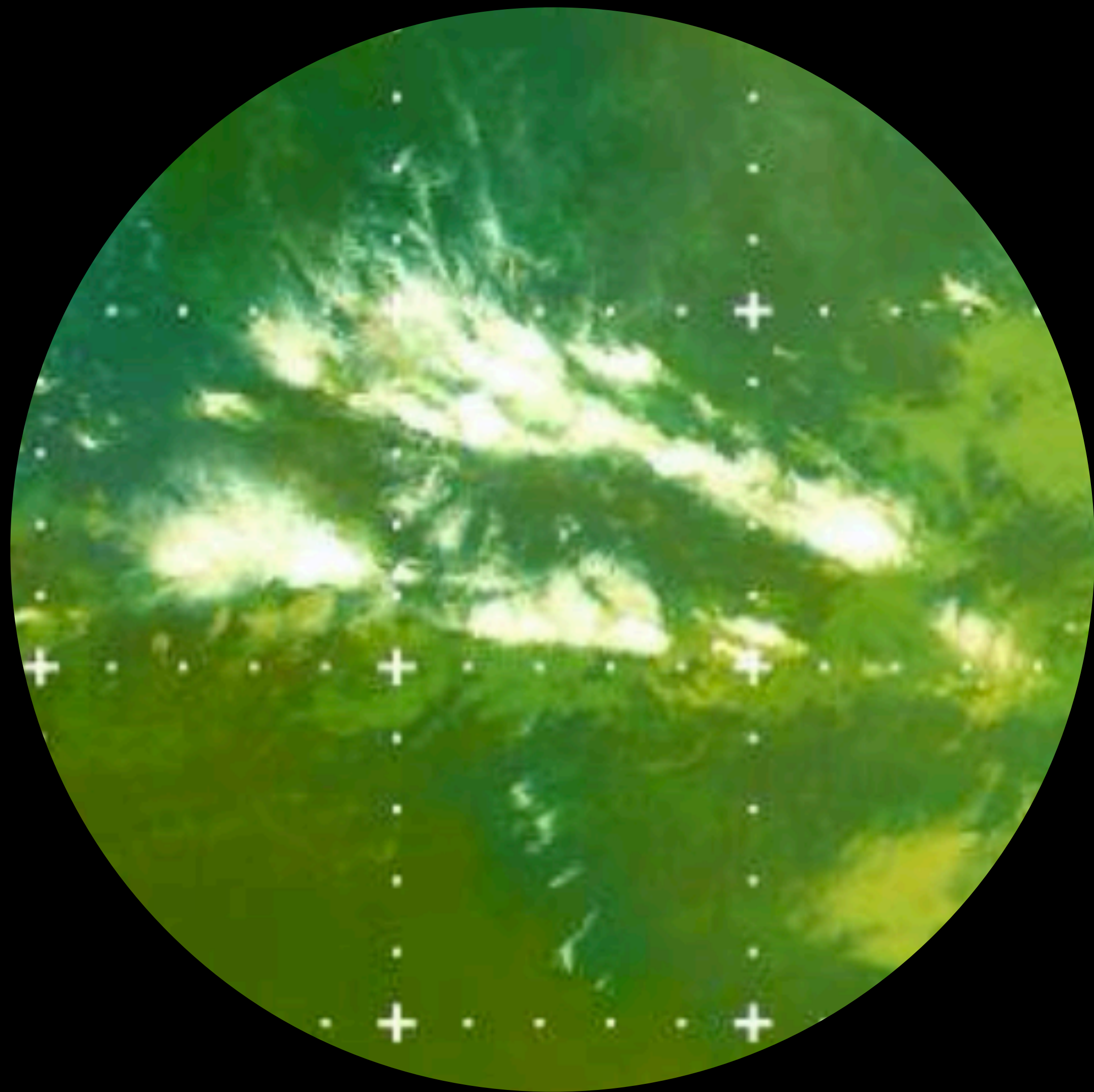
That's about all that we know about clouds & convection in the Atlantic doldrums

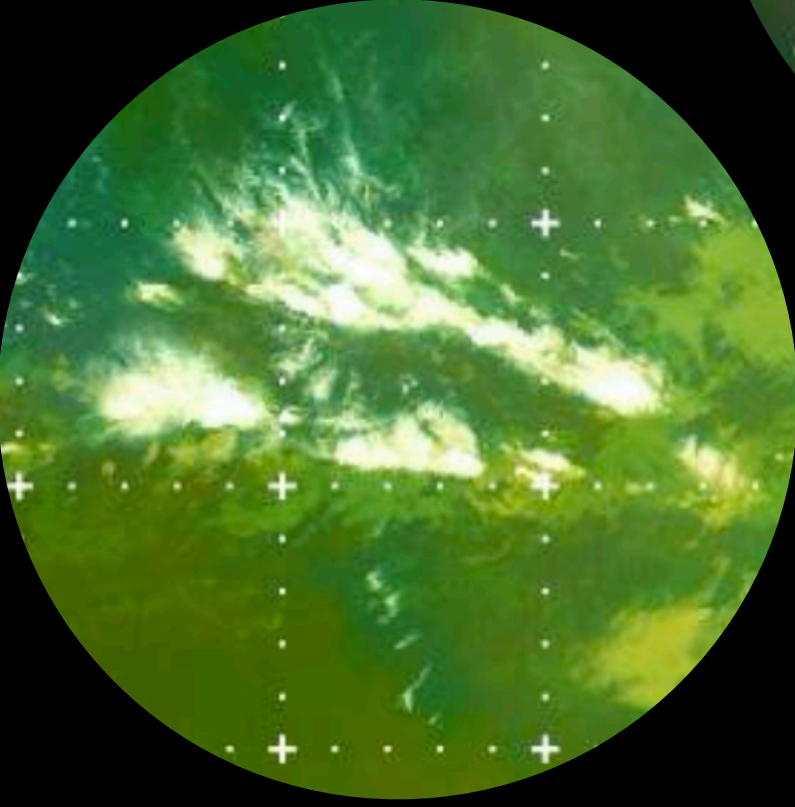
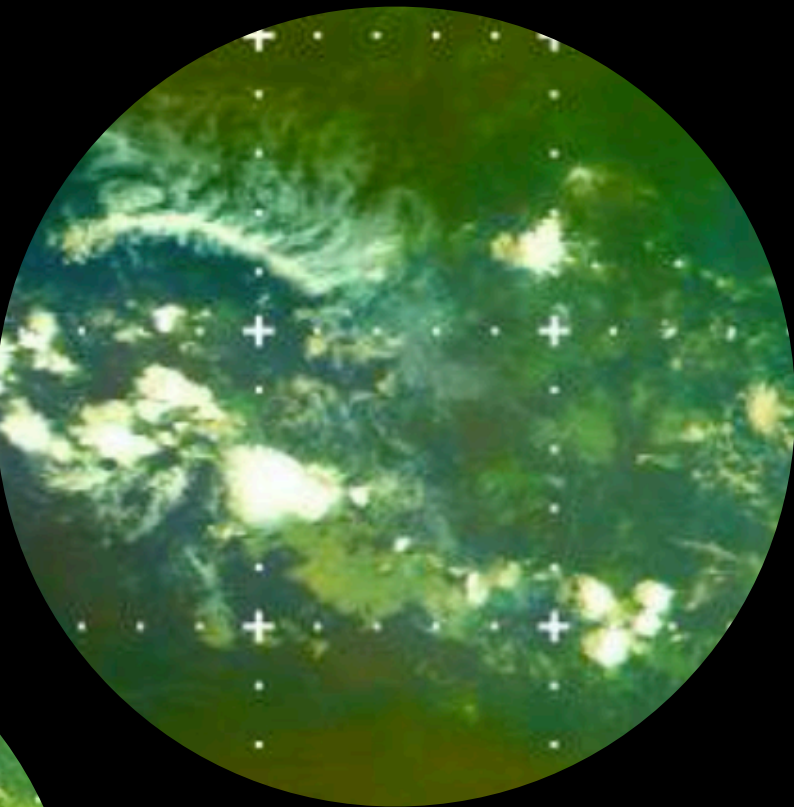
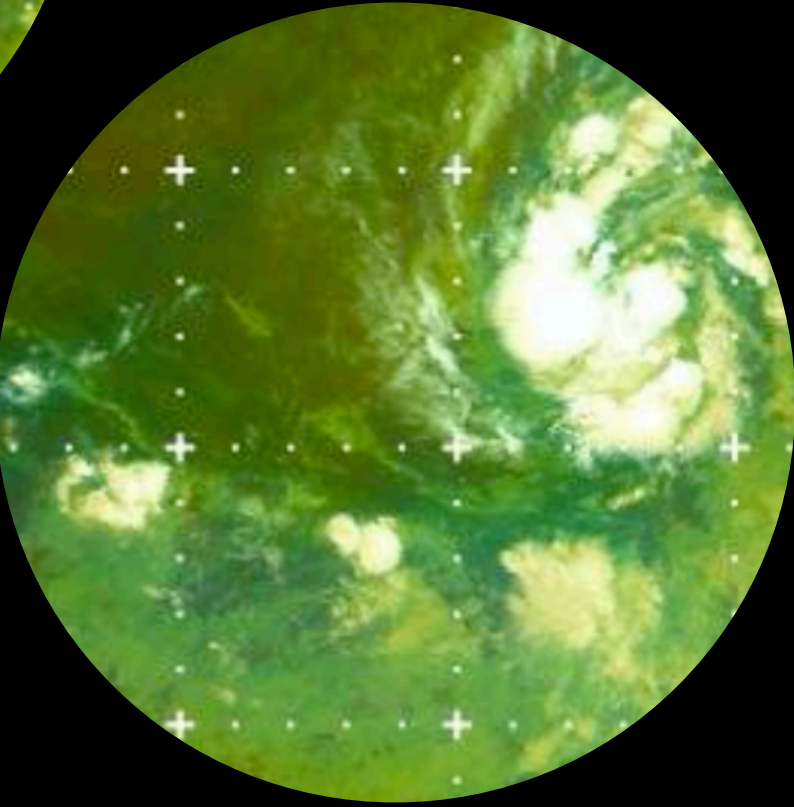
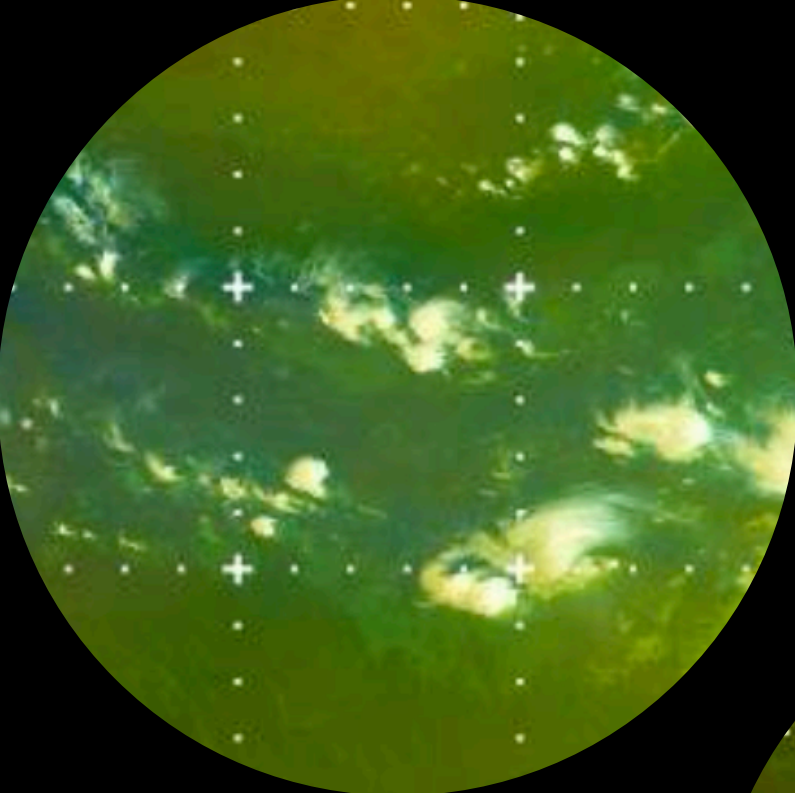
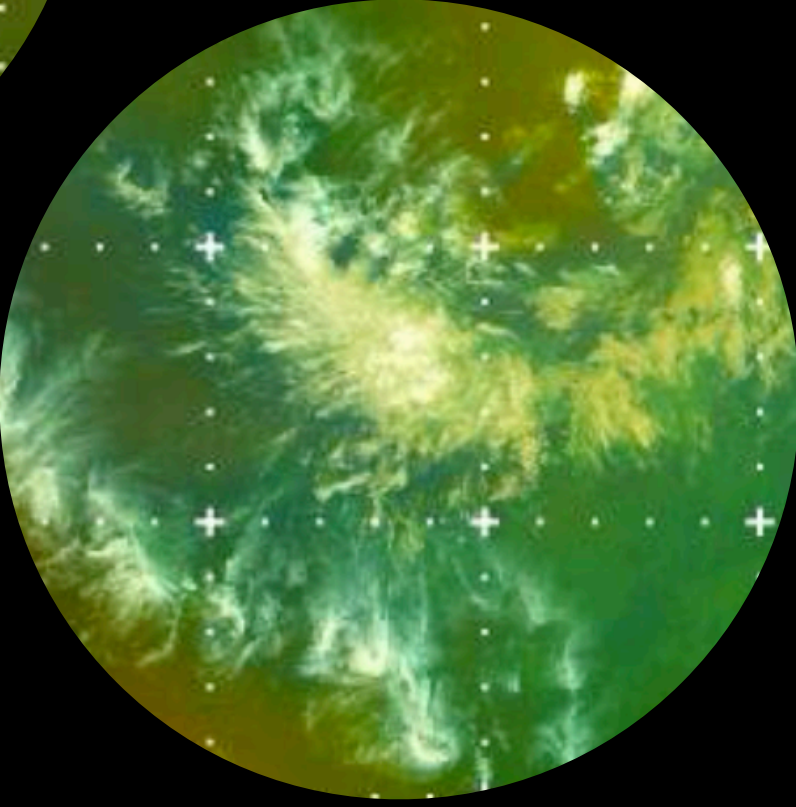
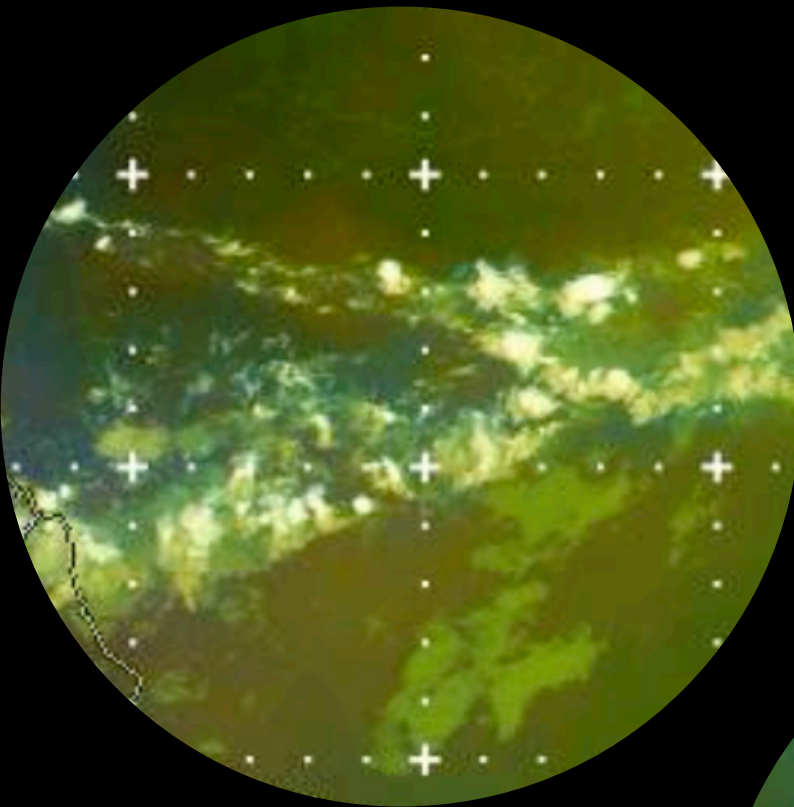
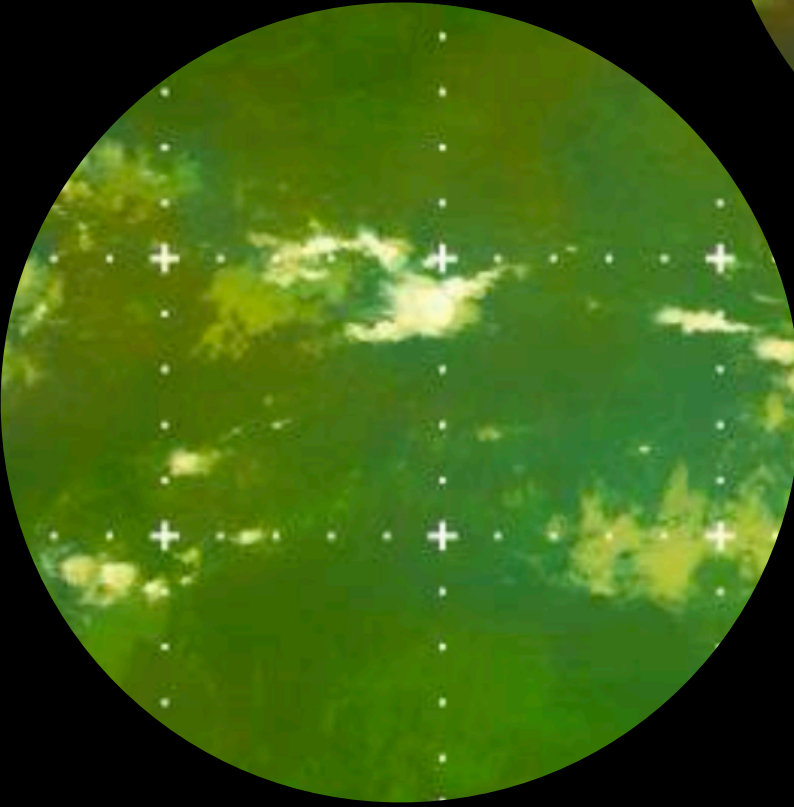
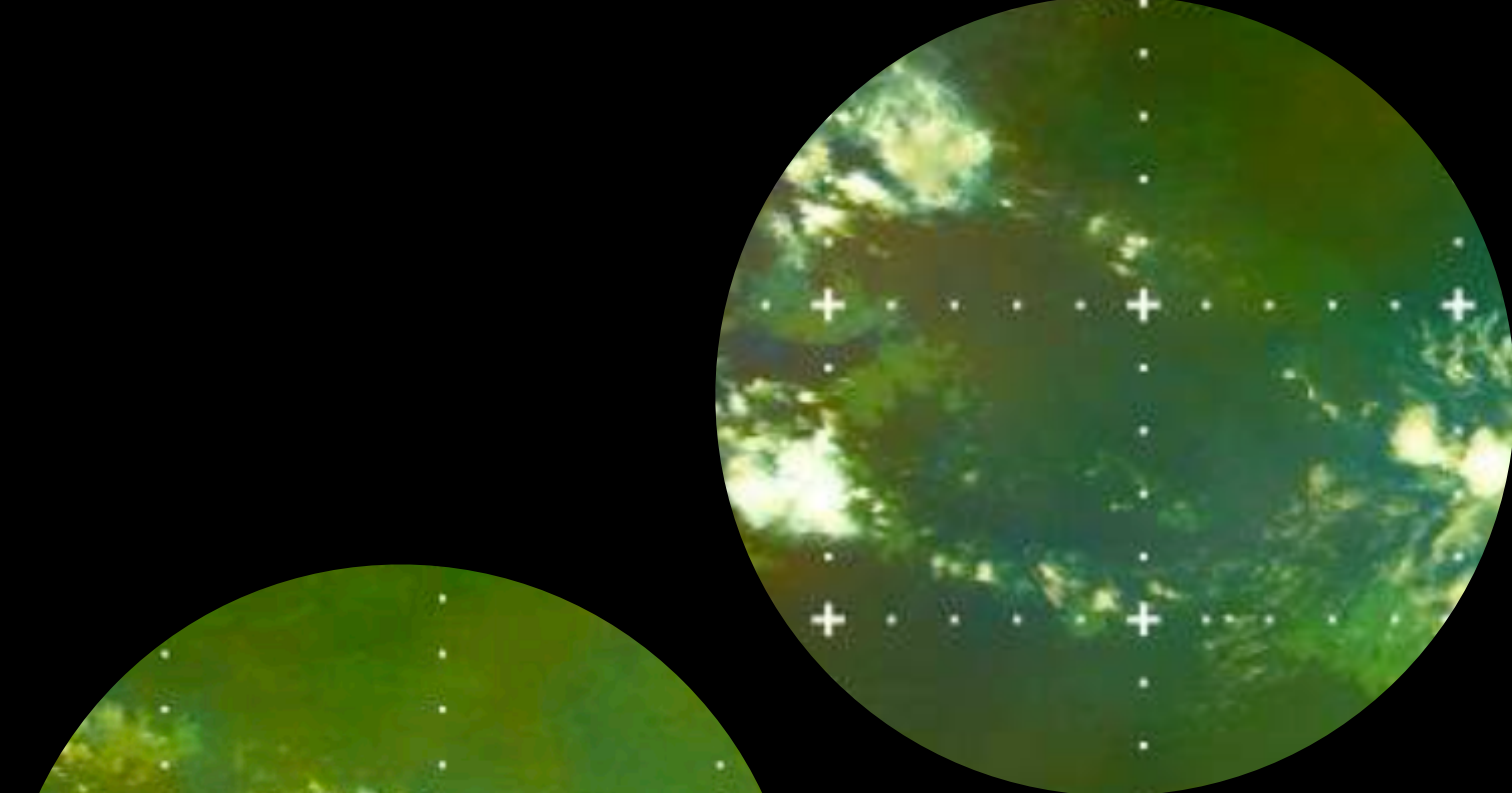
... but there is more to the ITCZ than just the doldrums.

Tropical oceans very sensitive to mixing

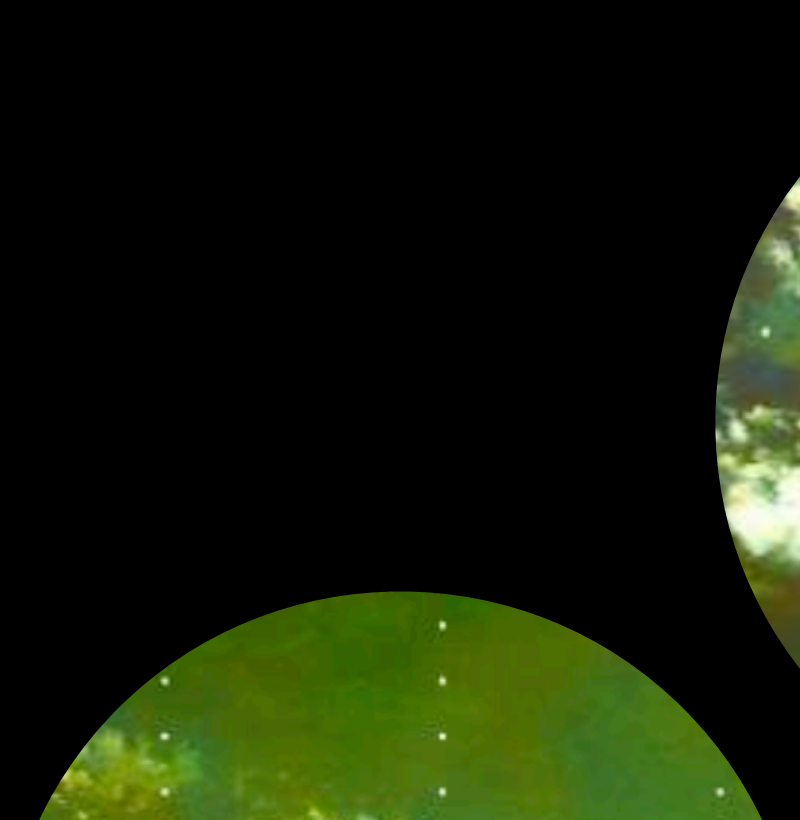
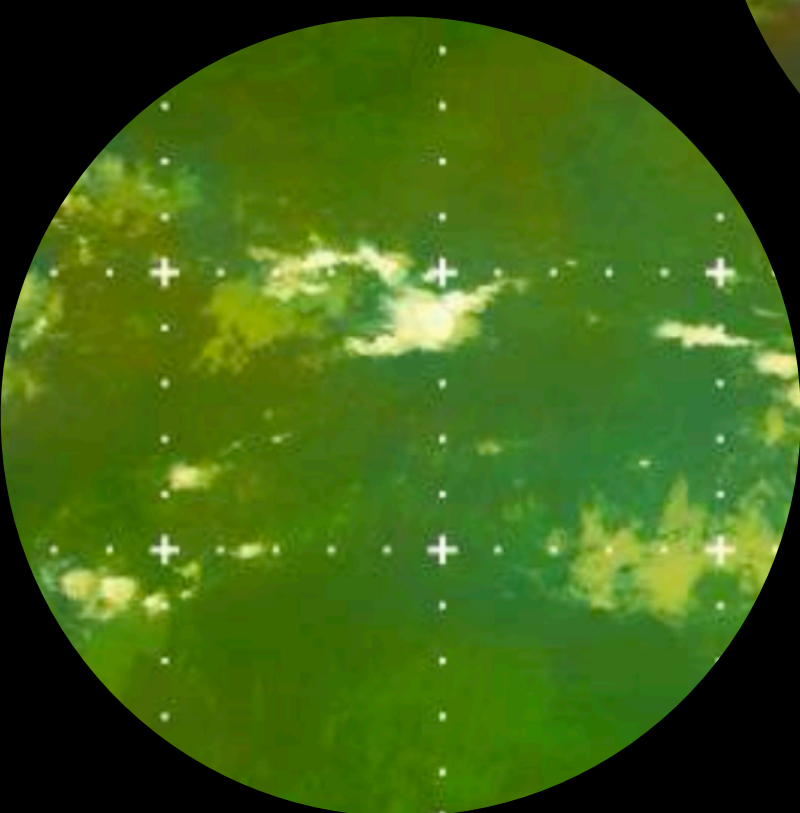
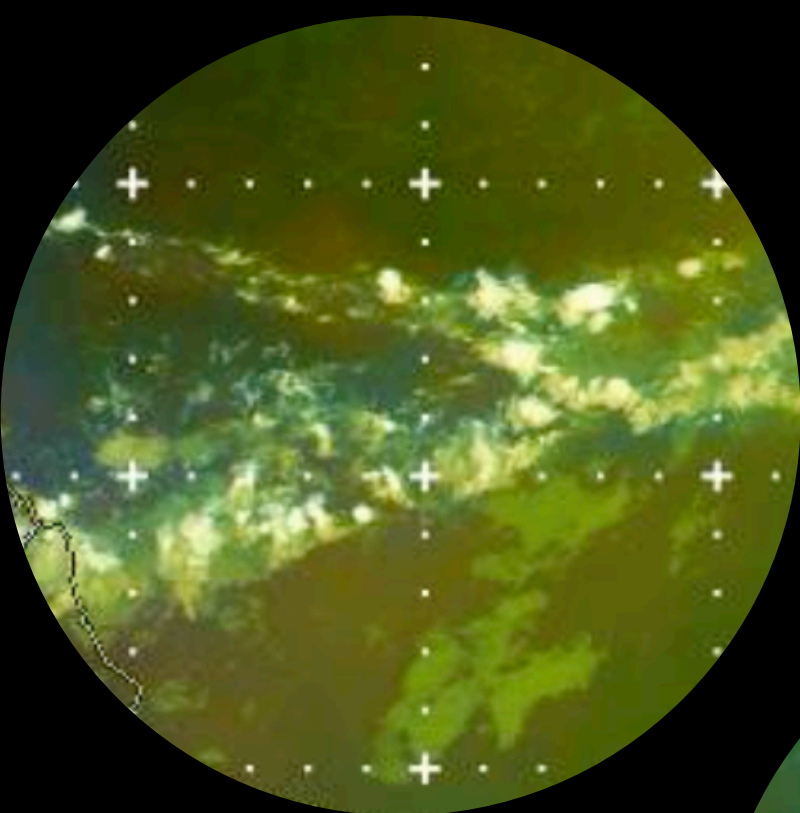
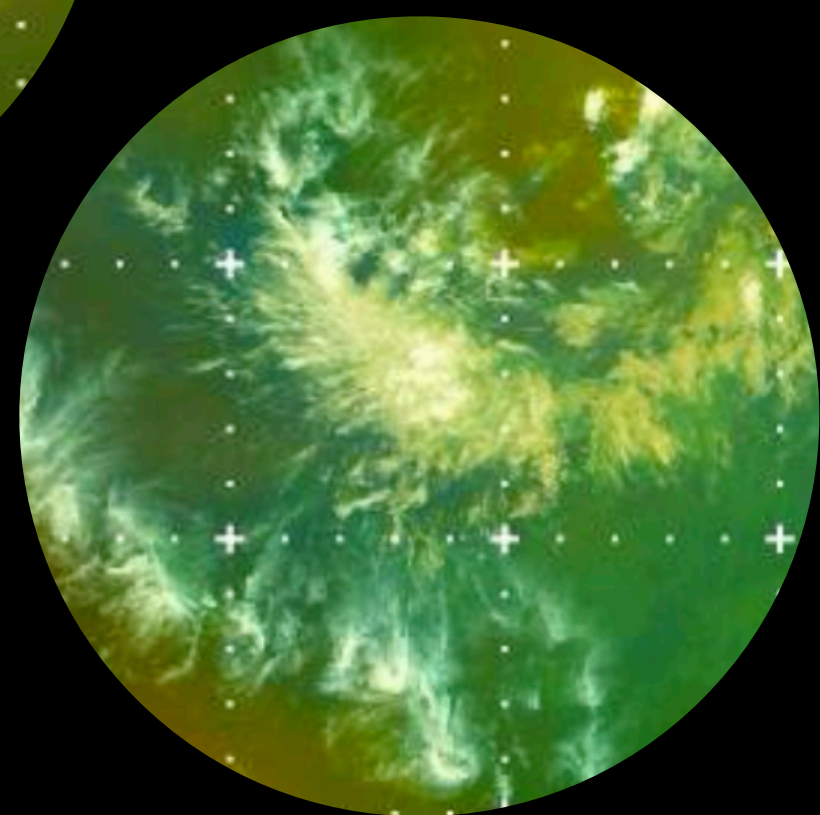
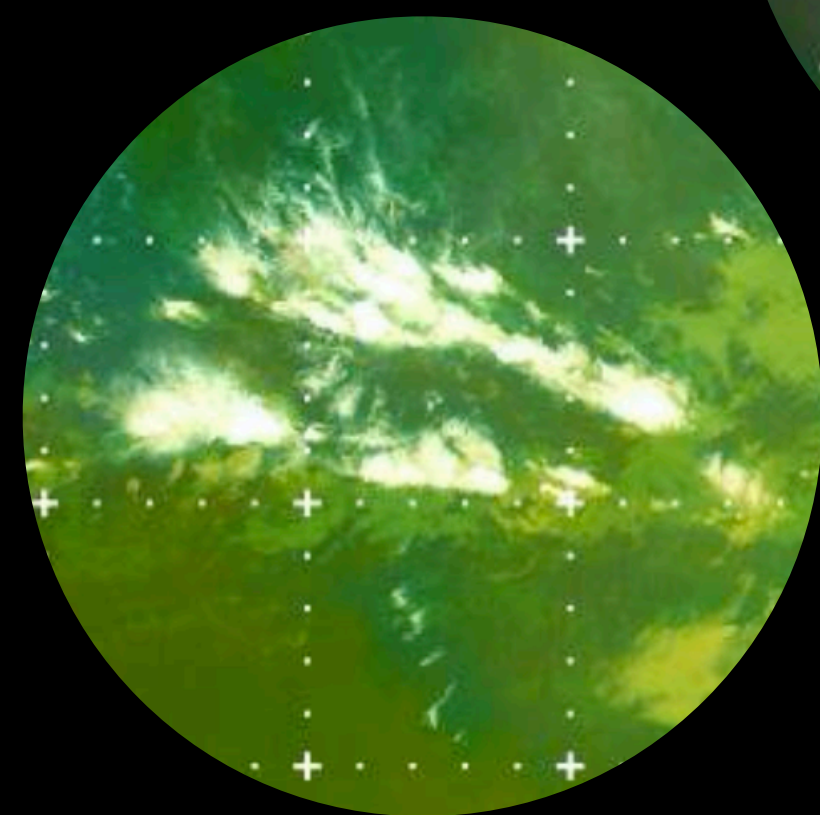
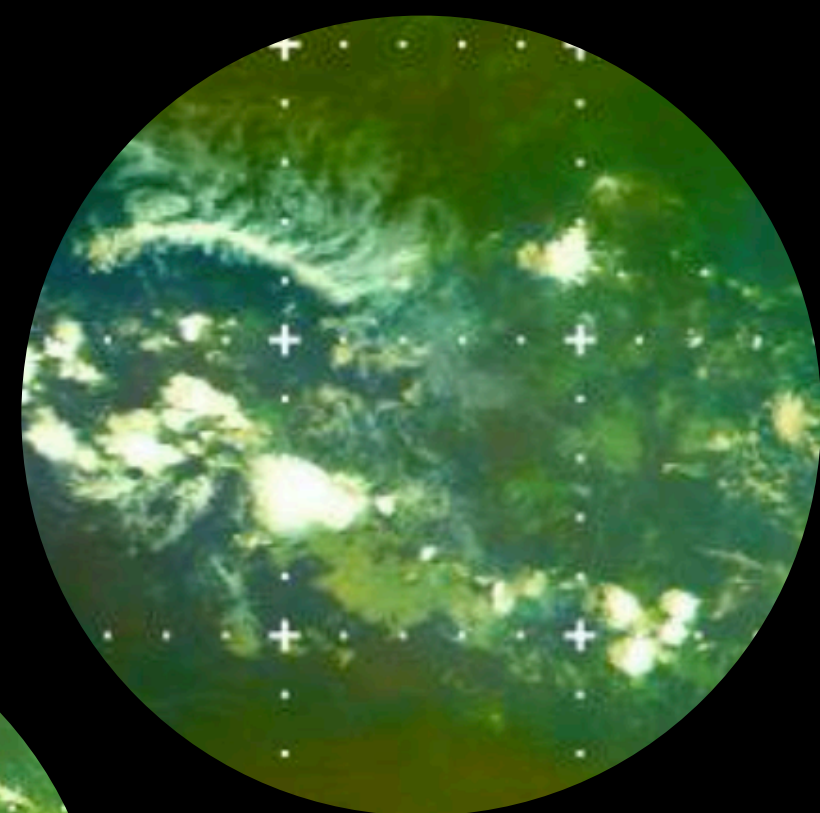
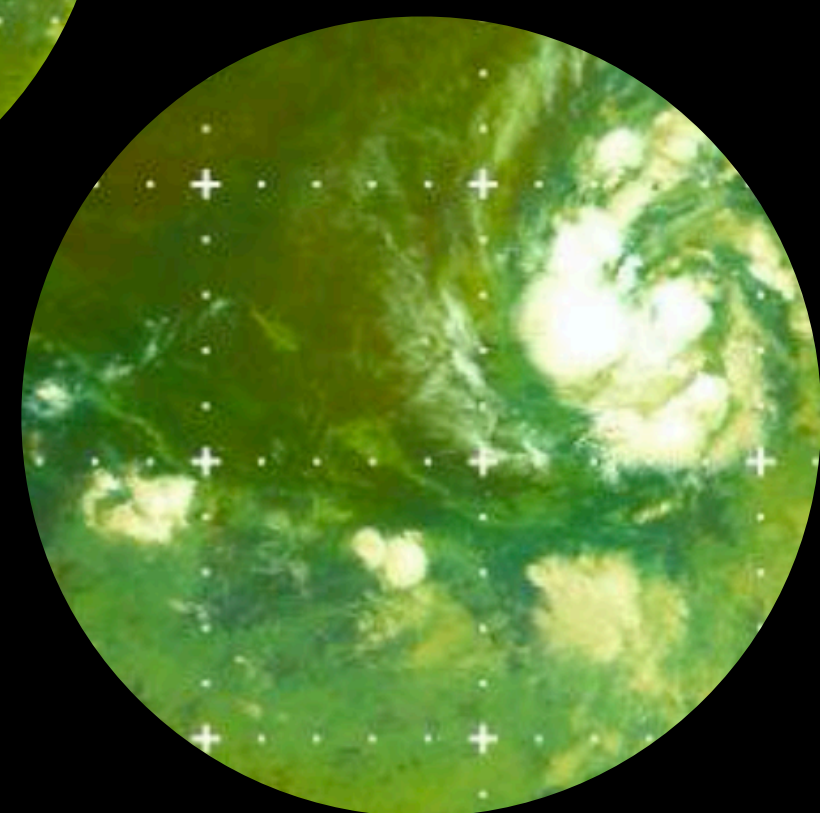
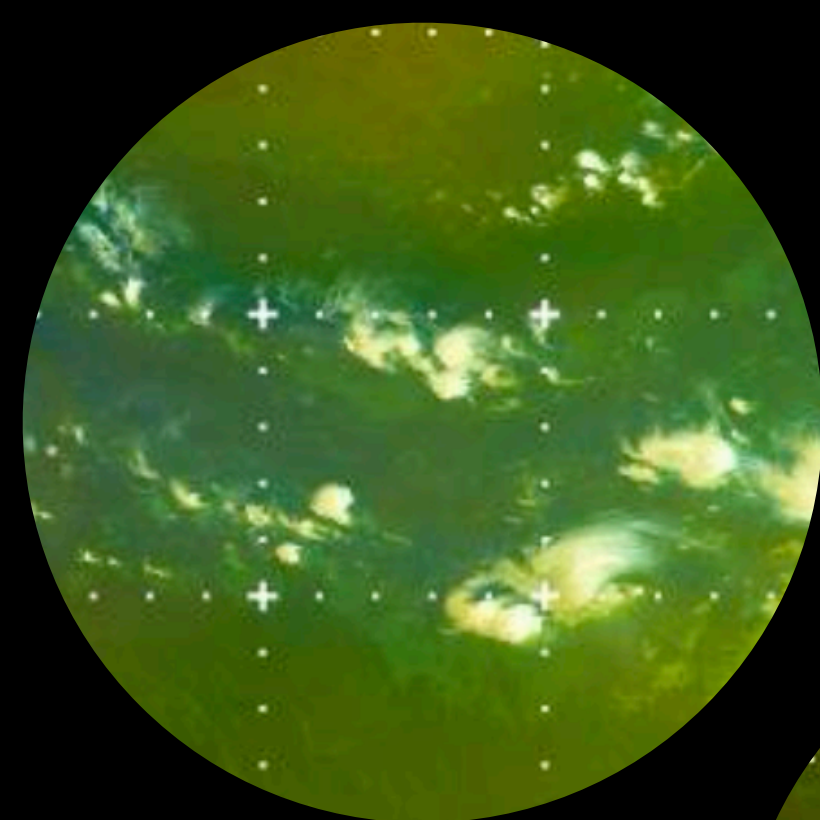
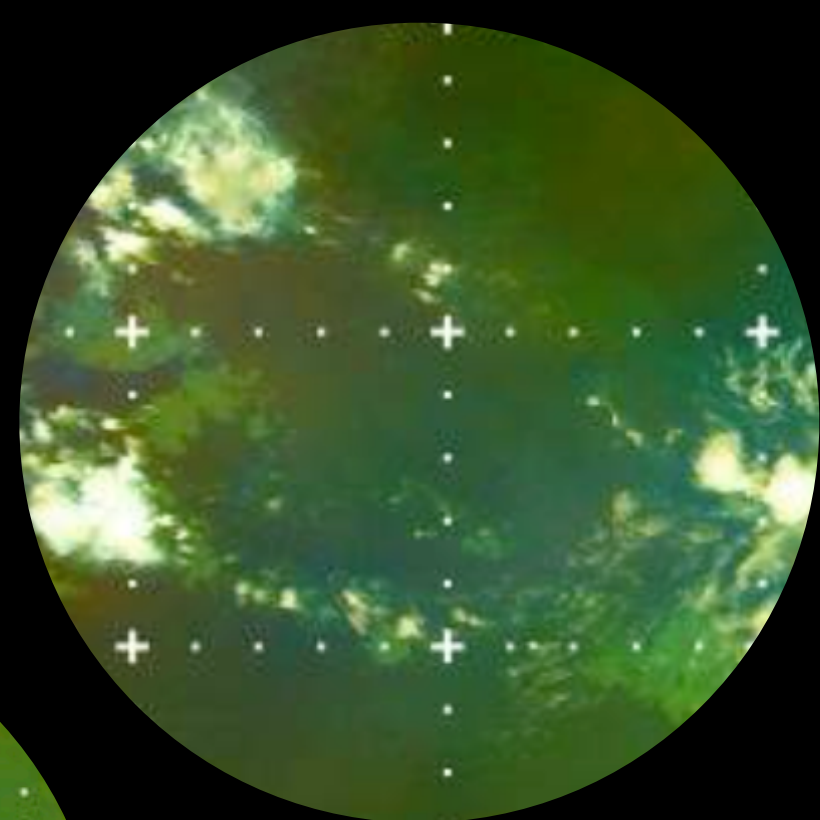
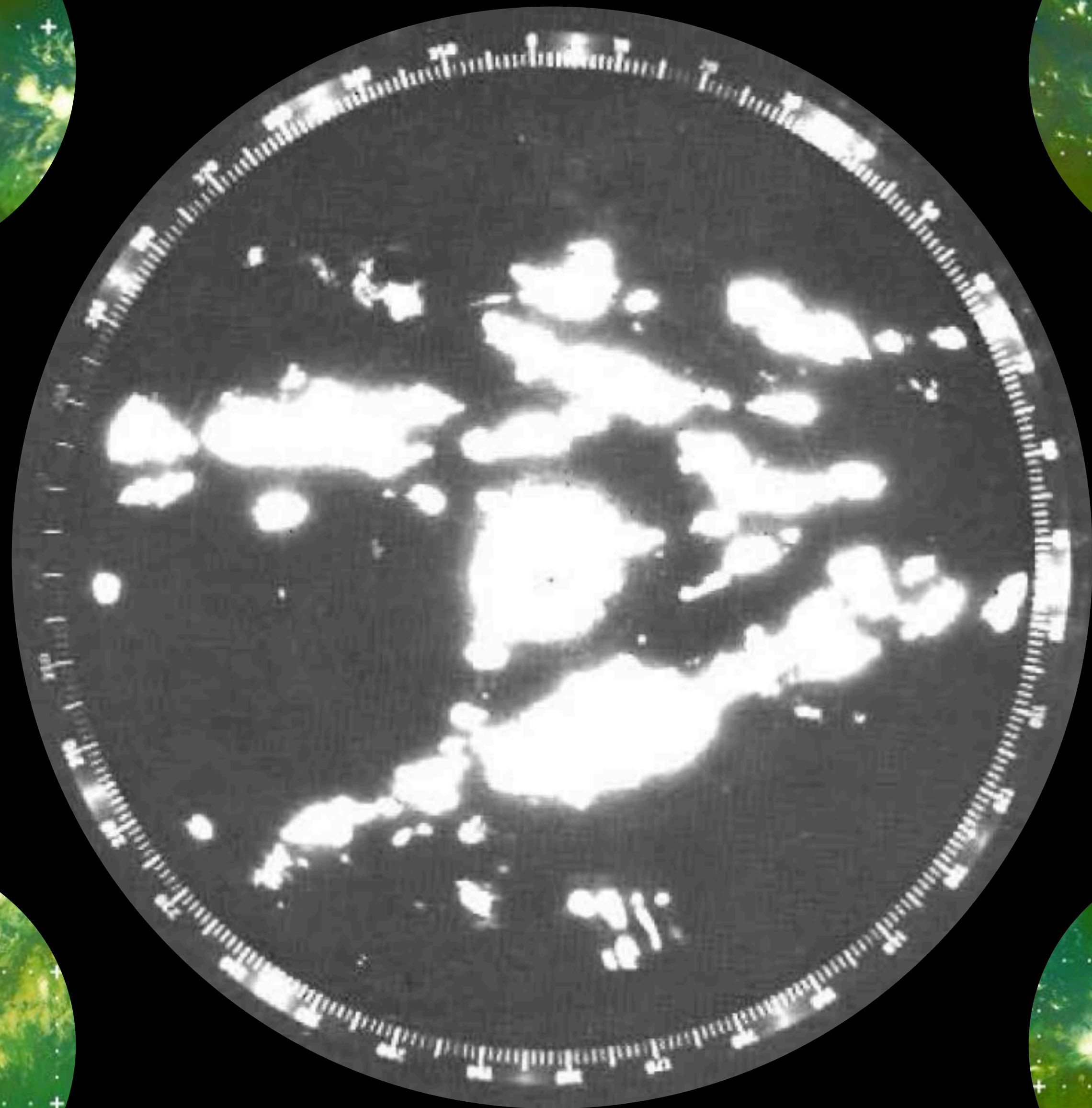


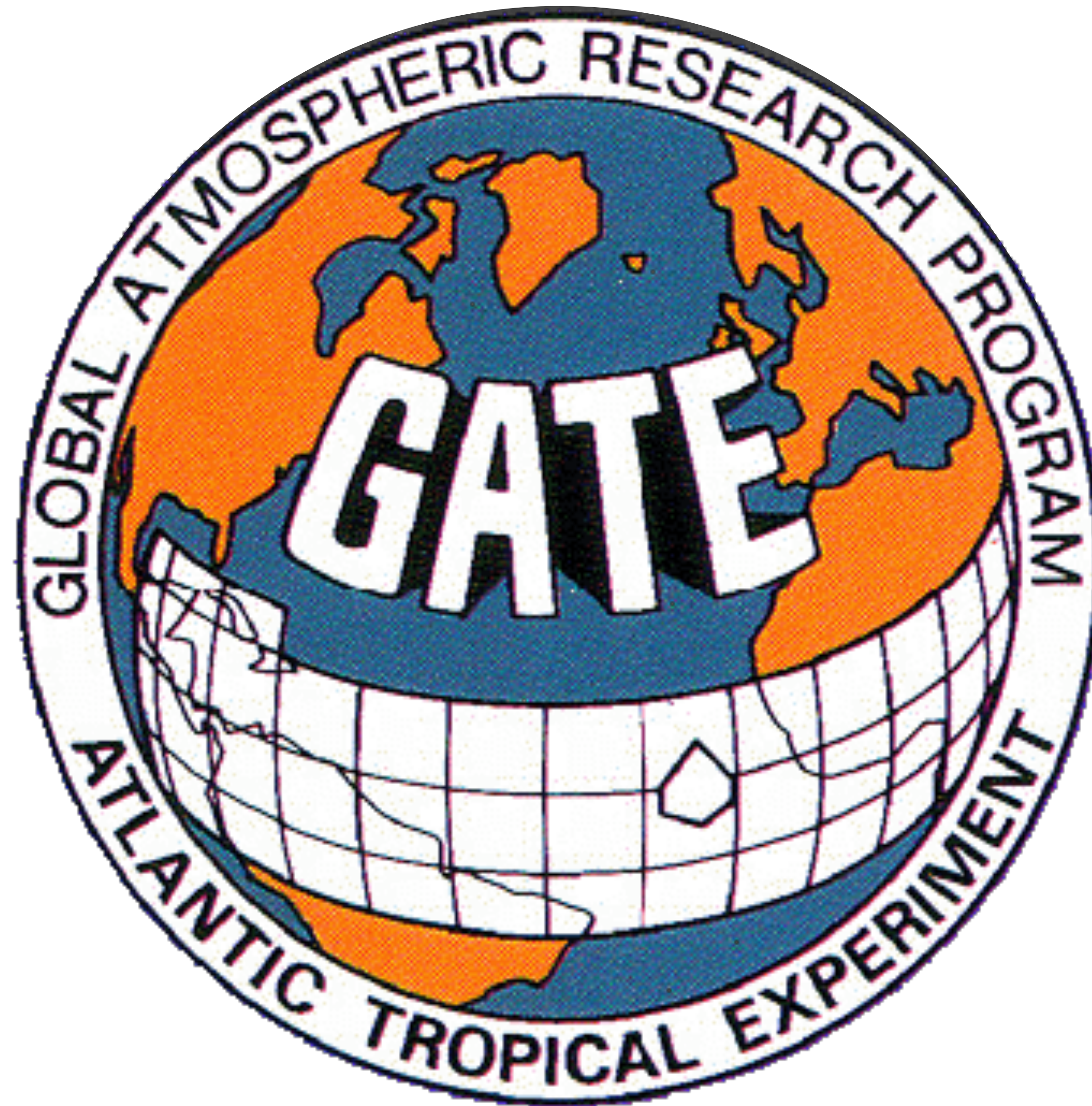
... there is a bit of a puzzle as to how the tropical oceans gets rid of its accumulated heat





convective bands, manifest as the edge intensified ITCZ seem to be common — but poorly studies





28 June - 18 September (1974)

GATE turns fifty

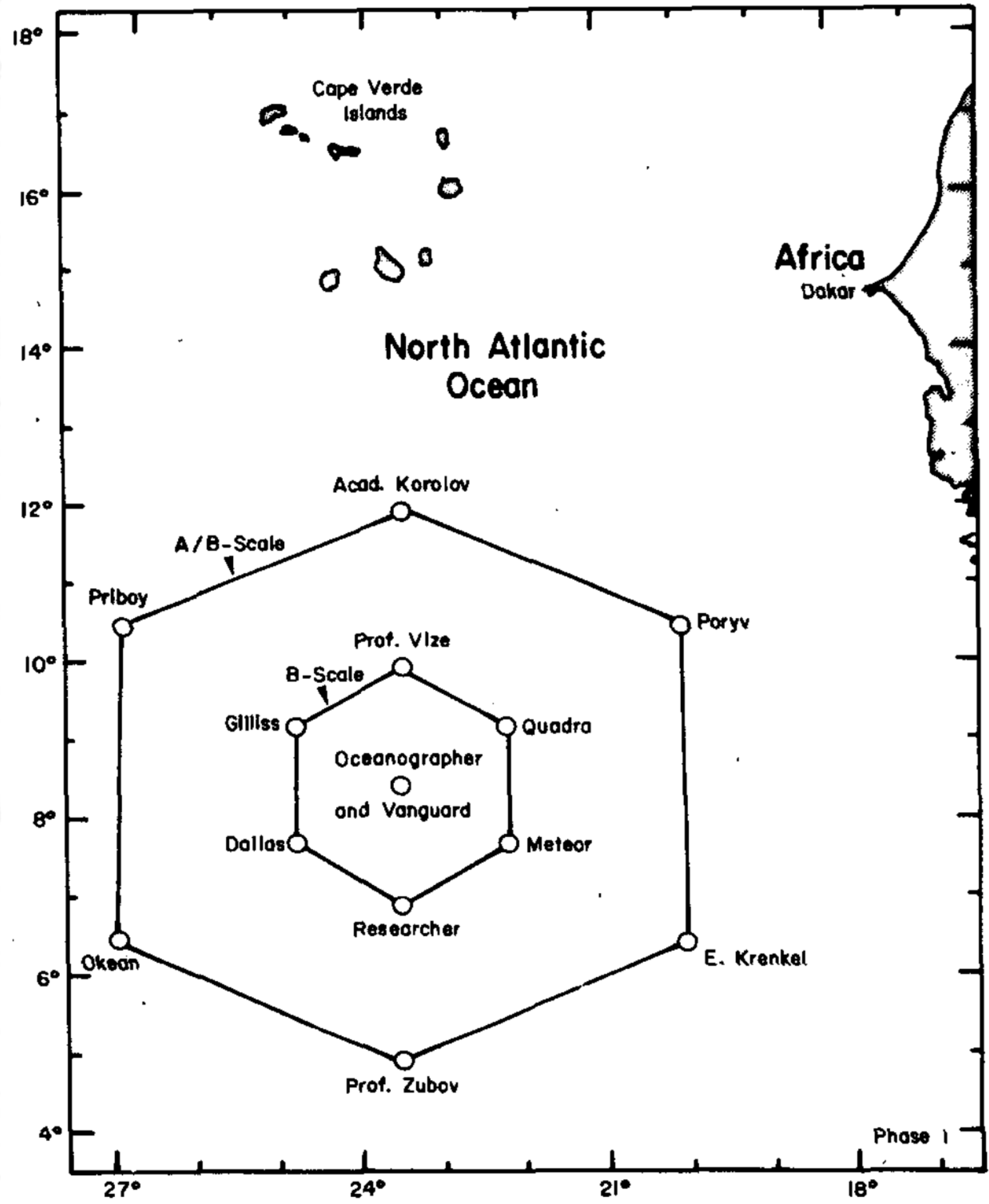
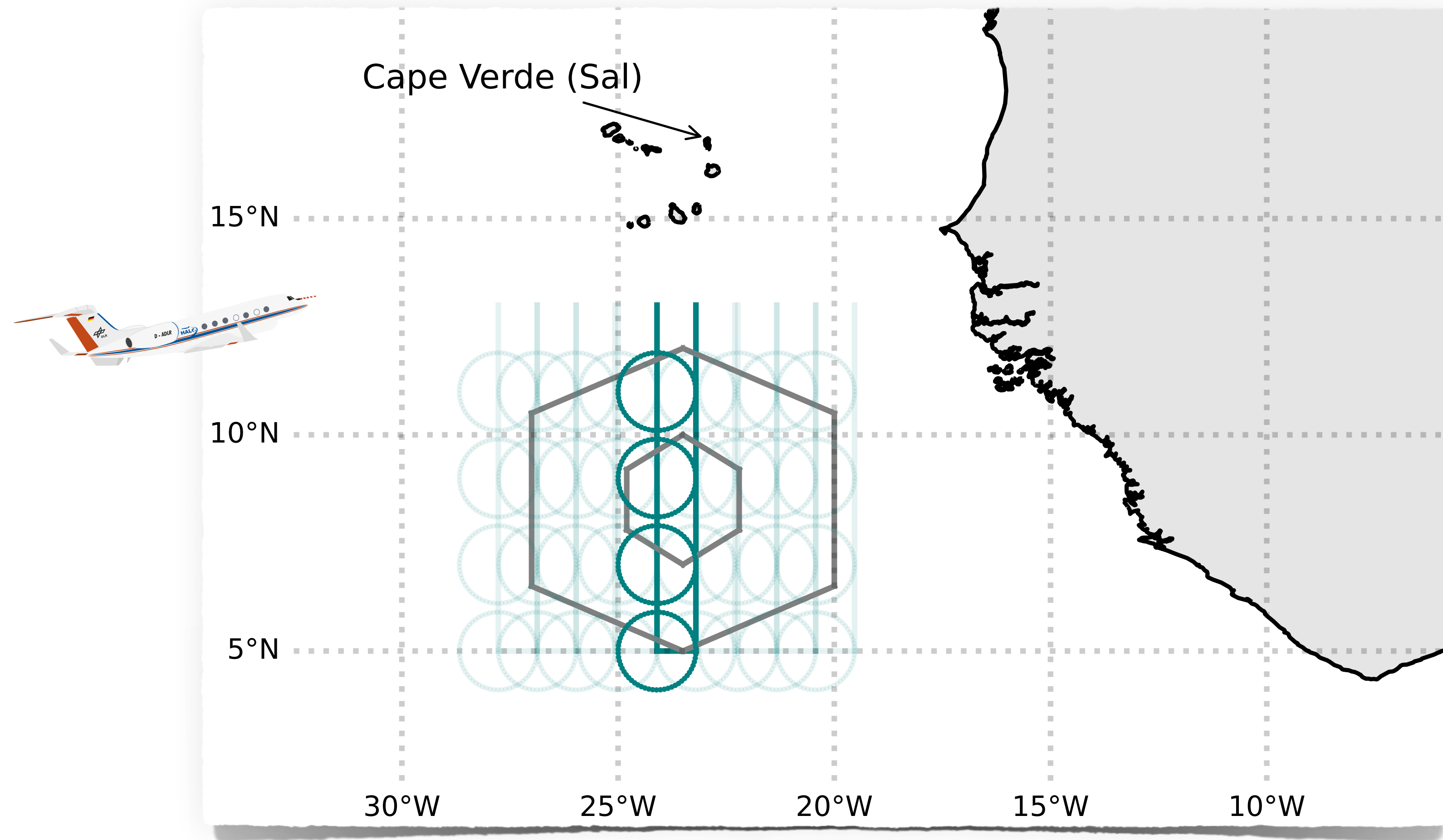


FIG. 1. GATE B and A/B ship arrays during phase 1.

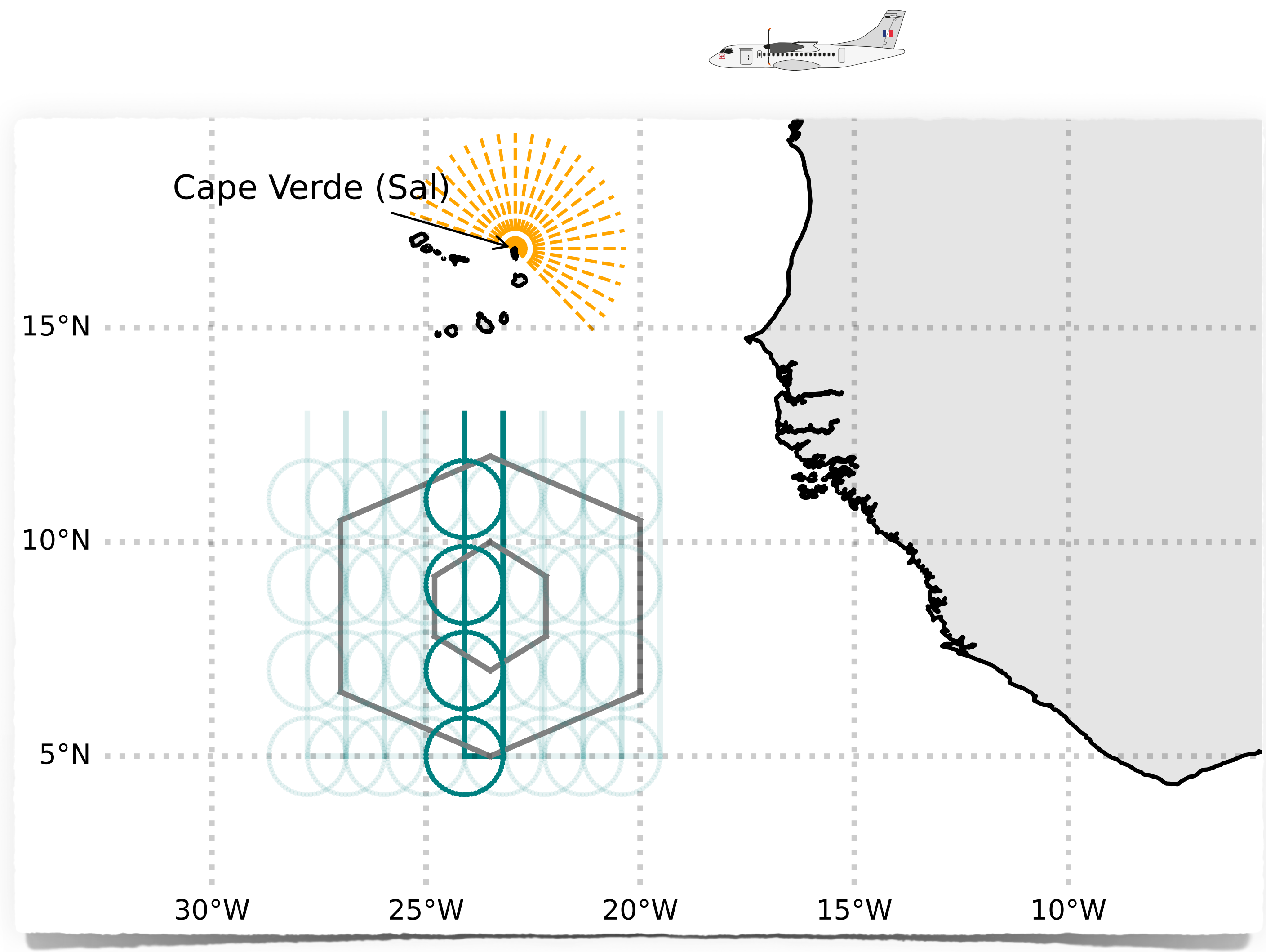
Time to return to where it all began?

Revisiting GATE — TOOC (Aug 15-Sept7)



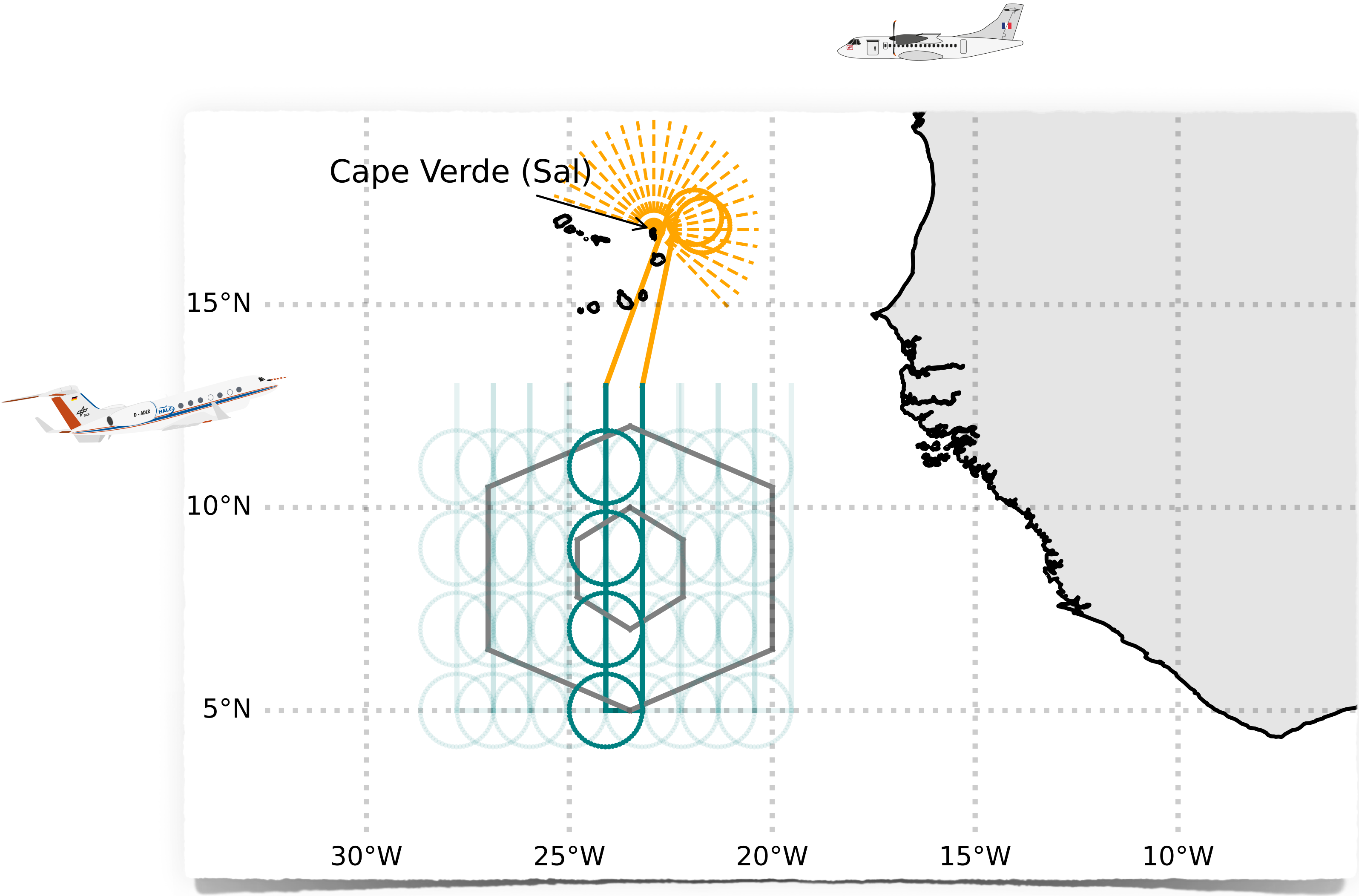
Using the advanced remote sensing capabilities of GATE

TOOC + MAESTRO (Aug 15-Sept7)



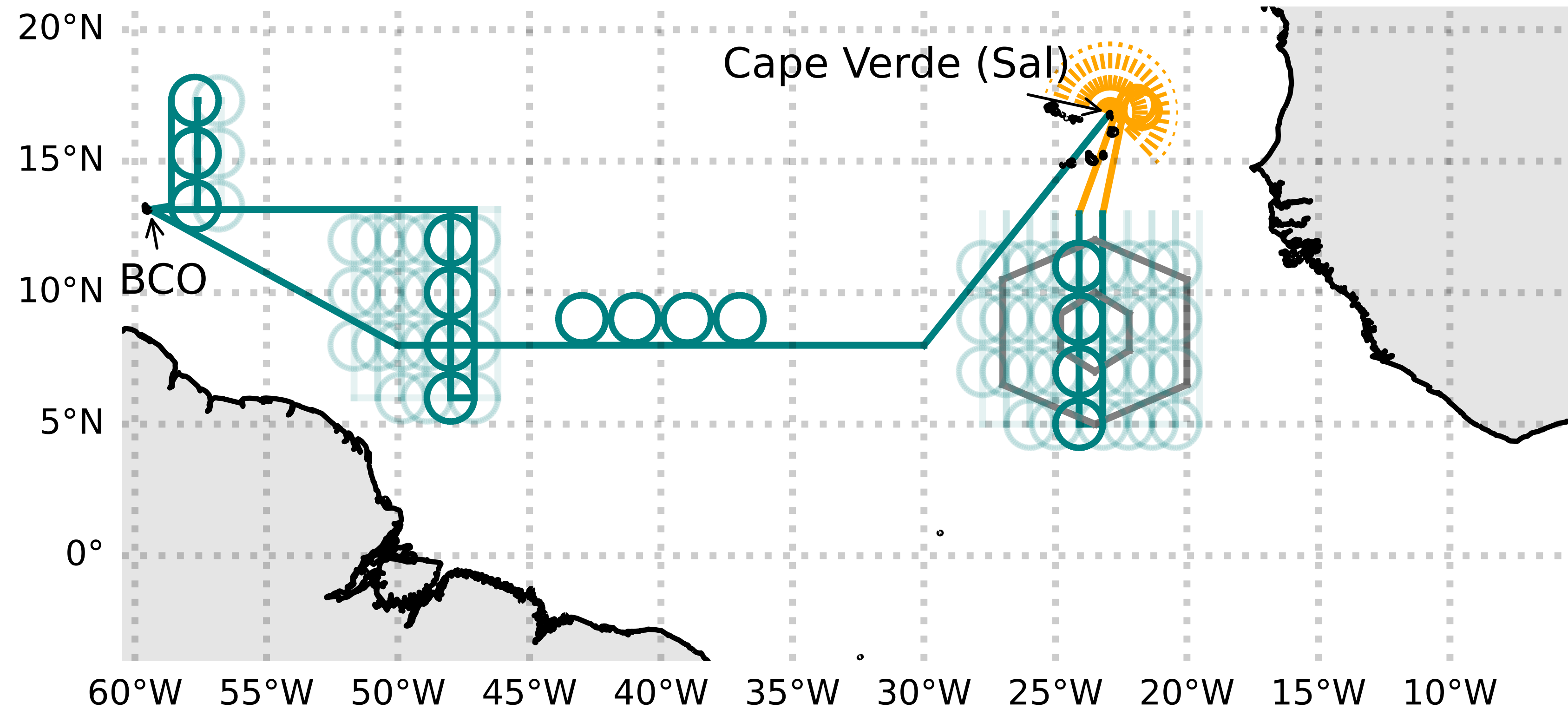
MAESTRO, ERC funded addition with ATR-42, 80-120 flight hours

TOOC + MAESTRO (Aug 15-Sept7)



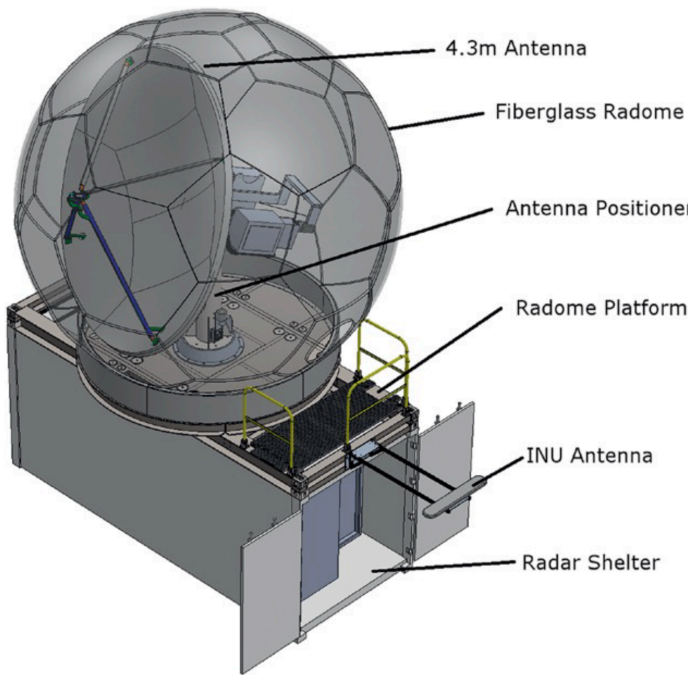
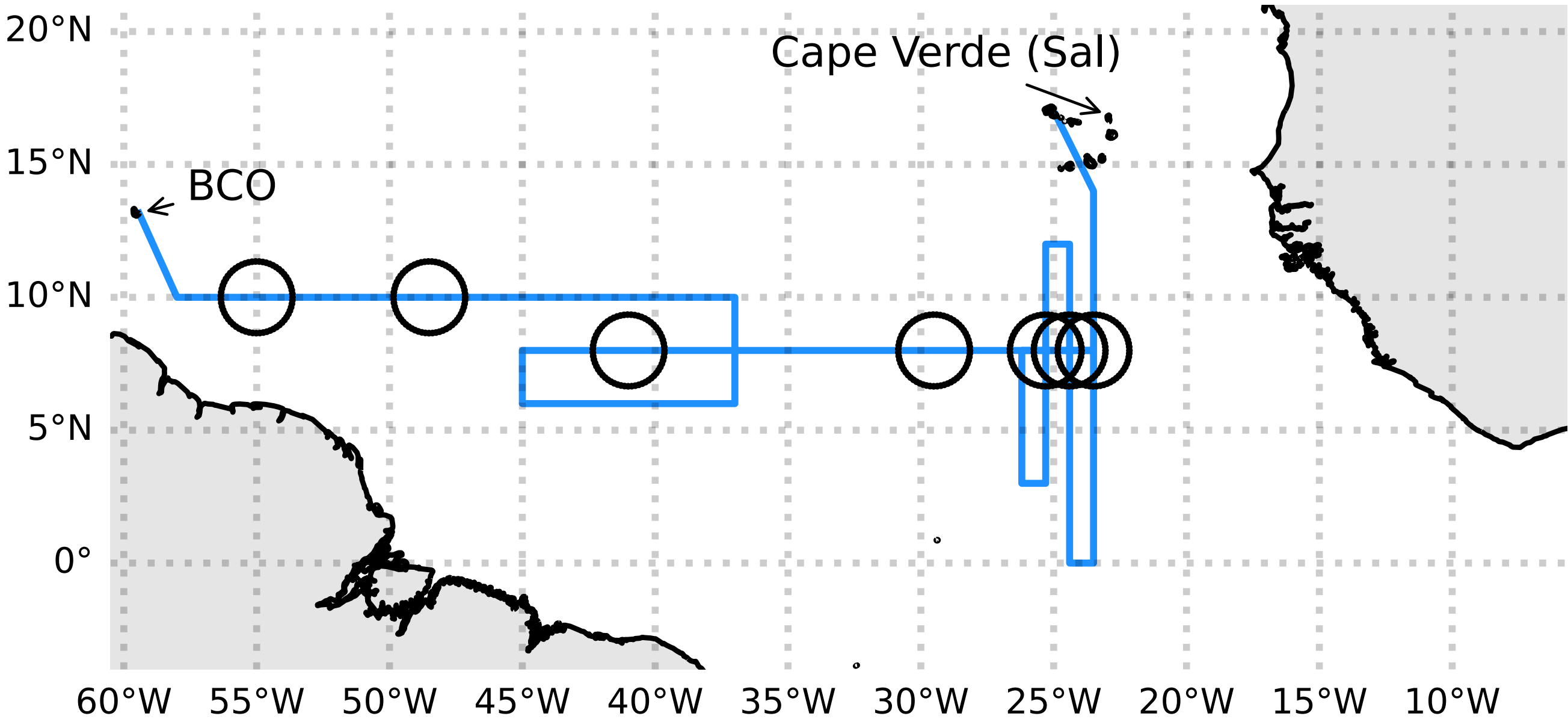
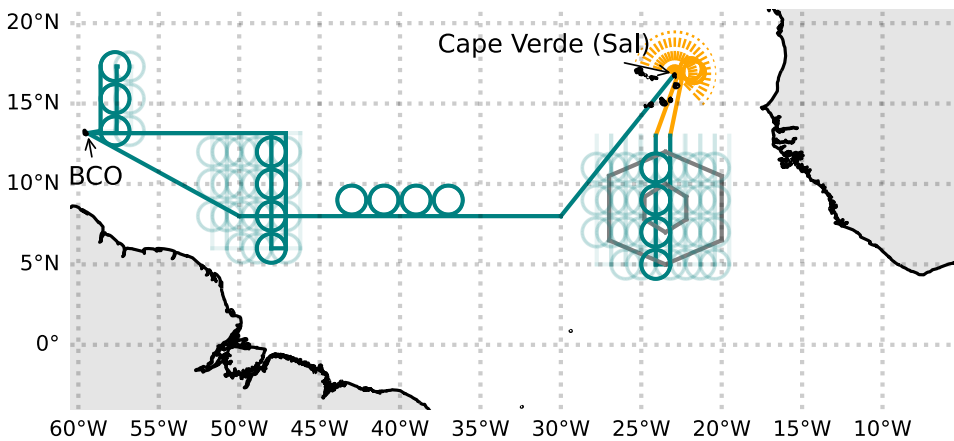
HALO will provide support for the ATR-42

TOOC — *Spanning the Atlantic*



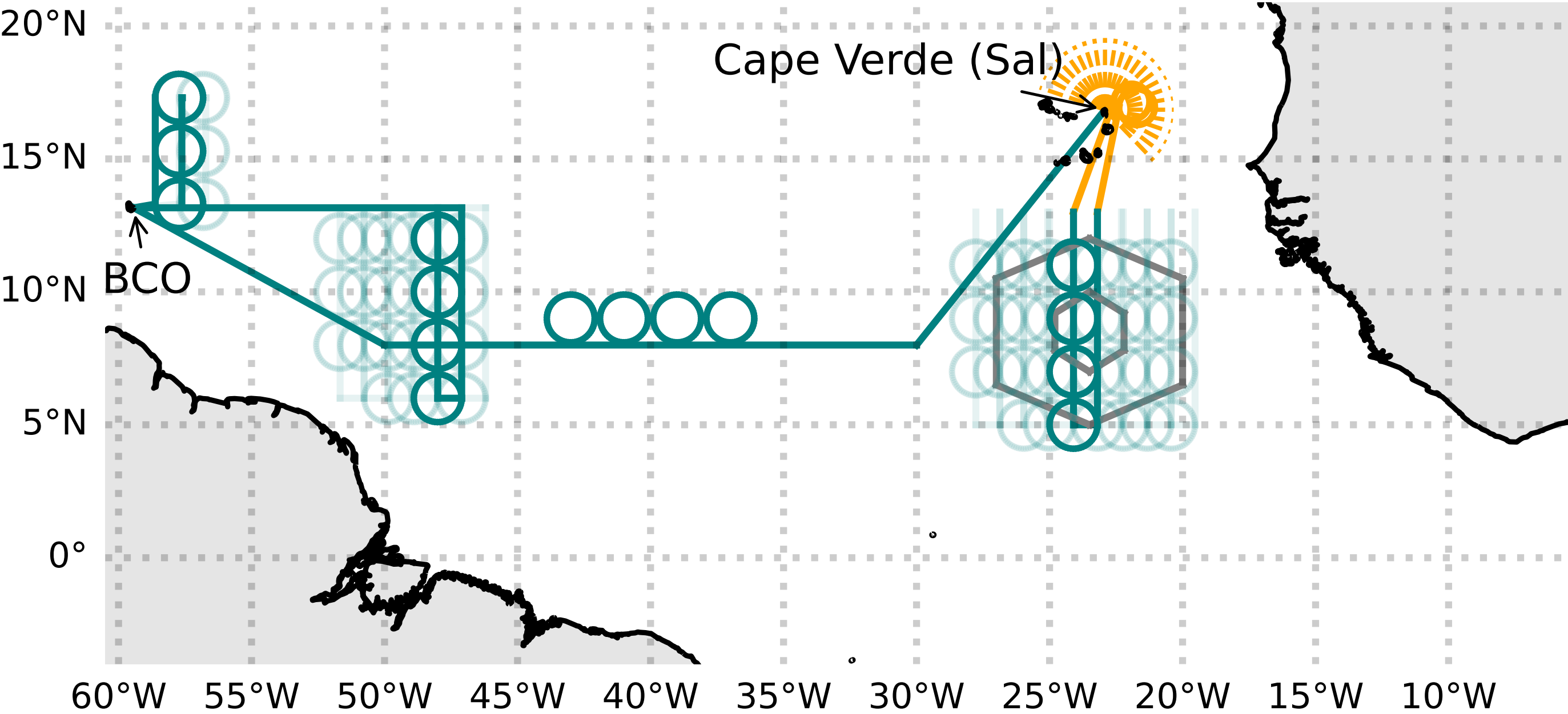
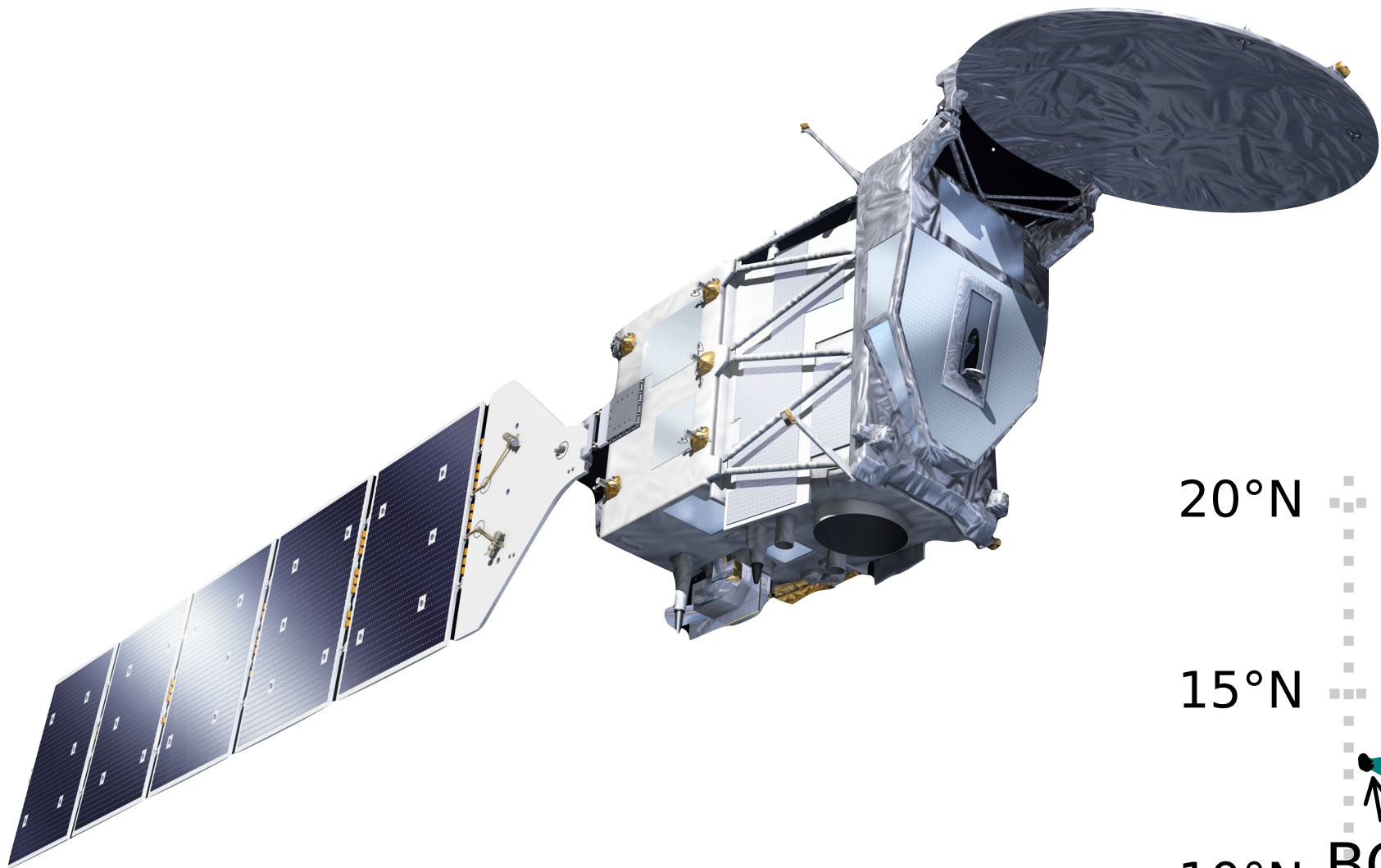
180 HALO flight hours, 19 flights; 1000 dropsondes

TOOC — Return of the Meteor



... with the addition of the CSU Sea-Pol Radar (hopefully) — PICCOLO

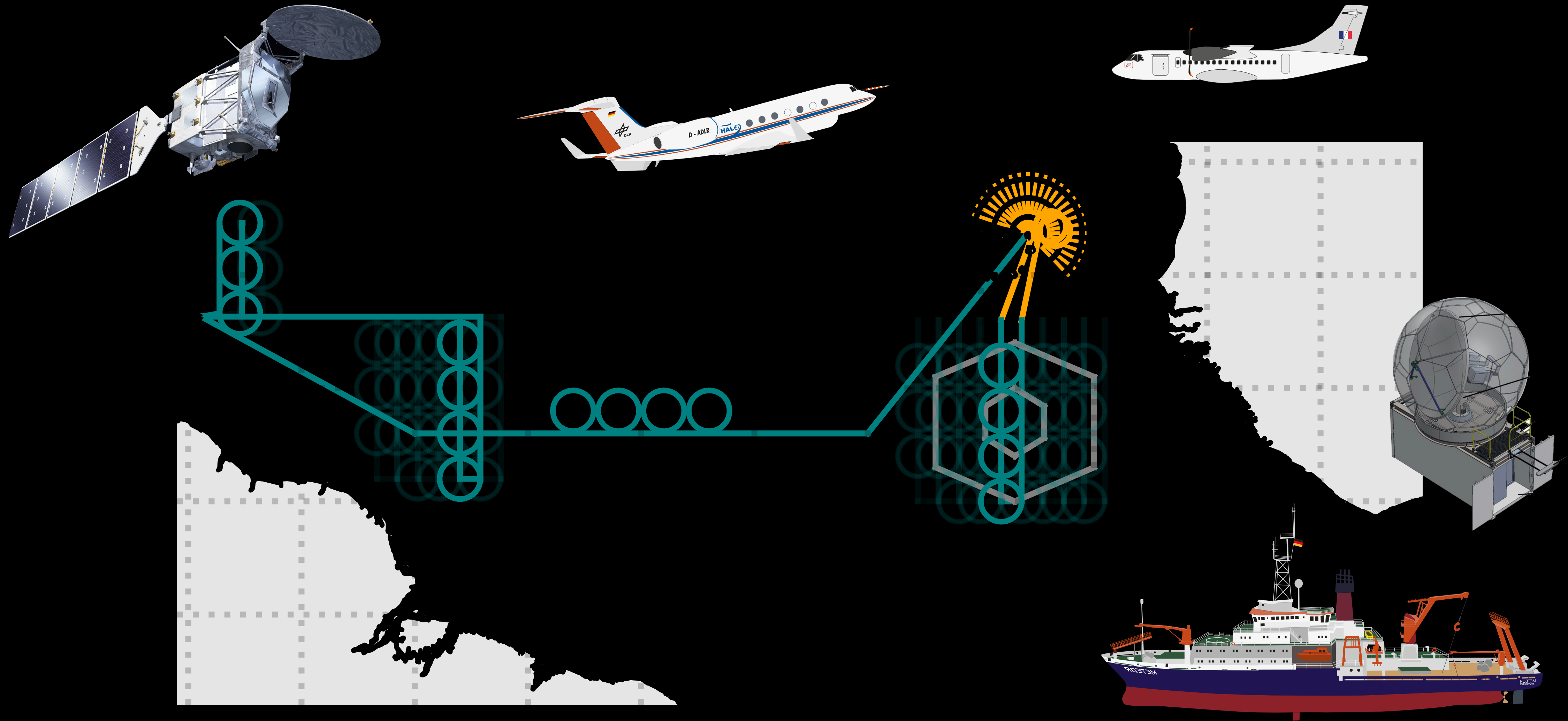
EC - TOOC — (but hard to say)



... all ORCESTRAED by Earth Care

“EC-TOOC but hard to say”, credit Julia Windmiller (2023) .. EC PI Silke Groß (DLR)

ORCESTRA – Aug 15 - Sept 30, 2024



Sea-Pol and EarthCARE still uncertain.