Observing and Understanding Upper-Ocean Processes and Shallow Atmospheric Convection in the Tropical Atlantic Ocean
Fairall, Brewer, and de Boer

- Using in situ sensors, unmanned aircraft (UAS), and vertically-pointing Doppler remote sensing, we will measure and characterize mesoscale and synoptic variability in the surface fluxes, ABL and cloud turbulence as convective systems pass over the ship. The large-scale forcing will be determined by a combination of ship-launched balloon soundings and aircraft dropsondes associated with the larger ATOMIC/EUREC4A programs.

Instrument	measurement	sampling frequency	spatial range
microwave radiometer	column water vapor and liquid	20 seconds	10 km profile
Doppler W-band radar	clouds, precipitation, vertical velocity	3 Hz	7 km profile
Doppler Lidar (VSHRDL)	Vertical velocity turbulence and aerosol backscatter intensity	3 Hz	8 km profile through ABL
ceilometer	cloud base height, cloud fraction	20 seconds	8 km
surface m meteorology	air temperature, humidity, pressure, SST, wind	1 minute	in situ
solar and IR radiometers	surface downwelling radiative fluxes	1 minute	in situ
surface turbulent fluxes	surface sensible heat flux, evaporation, wind stress vector	10 minutes	in situ
surface wave spectrum	surface wave altimeter time series	10 minutes	in situ
NOAA HQ-55 UAS with *miniFlux* sensor package	Ta, qa, U, fluxes momentum and heat, SST, IR sky temperature	800 Hz	3 km profile, 10 km horizontally
rawinsondes (de Szoeke)	atm. pressure, temperature, humidity, and wind	3 hour (8 per day)	20 km profile
Hyperspectral IR (Zuidema)	SST, profiles Ta and qa	10 minutes	5 km profile