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Virginia Union University
Christopher Thompson, Virginia Union university / Howard University
Jordan Porter, Virginia Union University / Howard University
Vernon Morris, Arizona State University
Poster
Virginia Union University has participated in the PIRATA Northeast Extension (PNE)/AEROSE research campaign on the NOAA Ronald H. Brown research ship this spring 2021. The first cruise occurred in 2004, and subsequent cruises have been conducted nearly every year since 2006. Virginia Union University has participated in the cruise since 2019 with VUU Professor, Dr. Francis Mensah and VUU student, Christopher Thompson. Dr. Mensah participated in the original AEROSE cruise in 2004 while he was a graduate student at Howard University in the Department of Physics and Astronomy. This year, VUU is participating in the AEROSE 2021 for the second time with Dr. Mensah leading three VUU students, Arianna Burford, Jordan Porter and Christopher Thompson to research onboard. Arianna is in the VUU Dual Physics and Engineering degree program with VCU. Jordan Porter and Christopher Thompson are in the VUU Dual Physics and Engineering degree program with Howard University. The scope of the mission was reduced to a smaller payload due to COVID-19 travel restrictions with a focus on trace gas monitoring within the Saharan dust events.

The instruments deployed in the 2021 payload were the Microtops II, a ThermoEnvironmental 49C ozone monitor, a ThermoEnvironmental 43C carbon monoxide monitor, and a ThermoEnvironmental 48C sulfur dioxide photometer. Data was collected throughout the cruise. Dust samples were also collected from buoys in the PIRATA moored array and air filters on the ship.

The Microtops II helps to measure Aerosol Optical depth or thickness (AOT) which is the measure of the extinction of the sun radiation by dust or haze or other particulates. AOT values were high as we were close to the West African Coast. Microtops II data was taken almost every 30 minutes with 30 scans every time from January 15th 2021 to February 21st, 2021. Data was therefore taken every day from Latitude 26o18.969’N and Longitude 79o14.361’W. We crossed the Equator on February 7th and return back to Latitude 24'52.7859N and Longitude 72'06.7169W.

A preliminary analysis shows an increase in the AOT on February 3rd 4th and 5th. The maximum values of sulfur dioxide, SO2 occurred on February 11th, 2021 at 5:09 PM UTC around the position 04’ 37.4744N 29’ 34.0664W and was 1.06 µg/m3. At this point, carbon monoxide, CO was 1.533ppm. However, the highest values of SO2 were obtained at the departure near US coast guard in Miami at 25’ 29.7975N and 75’ 39.8088W and was 1.12µg/m3. The maximum value of CO was detected near USA and was 2.83ppm. We noticed a decrease in CO until we got close to the Cape Verdean Island. As for ozone, a lot of variations were seen. High values of ozone were obtained between January 18th, 2021 at 23’ 16.732N and 68'41.635W and February, 2nd, 2021 at 11’ 43.1632N and 23’00.0019W.
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PIRATA-24/TAV Meeting
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