



# Aerosol mass distributions present in the marine boundary layer over the tropical Atlantic Ocean



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## Introduction

This study seeks to improve the understanding and predicting capabilities for aerosol processes during intercontinental transport, their impacts on the regional atmosphere and their downstream effects on human and environmental health. This knowledge will be particularly useful in providing critical validation of air-transport models such as NEMS GFS Aerosol component (NGAC) and Navy Aerosol Analysis and Prediction System (NAAPS). The AERosol and Ocean Scientific Expeditions (AEROSE) study the air masses originating from West Africa that often contain dust and smoke, and how aerosols in these air masses affect the climate, health, and environment in the Western Hemisphere.

During the AEROSE VIII, aerosol mass concentration measurements were performed in-situ, specifically dust, which was compared with the predicted values from Navy Aerosol Analysis and Prediction System (NAAPS) Model. This work presents the preliminary results from a research project, the purpose of which is to perform a comparative analysis of aerosol forecast model results to in-situ mass concentration measurements in the marine boundary layer (MBL) over the tropical Atlantic Ocean.

## References

[http://www.nrlmry.navy.mil/aerosol-bin/aerosol/display\\_directory\\_all\\_t.cgi?DIR=/web/aerosol/public\\_html/globalops\\_01/carib/201301&TYPE=](http://www.nrlmry.navy.mil/aerosol-bin/aerosol/display_directory_all_t.cgi?DIR=/web/aerosol/public_html/globalops_01/carib/201301&TYPE=)

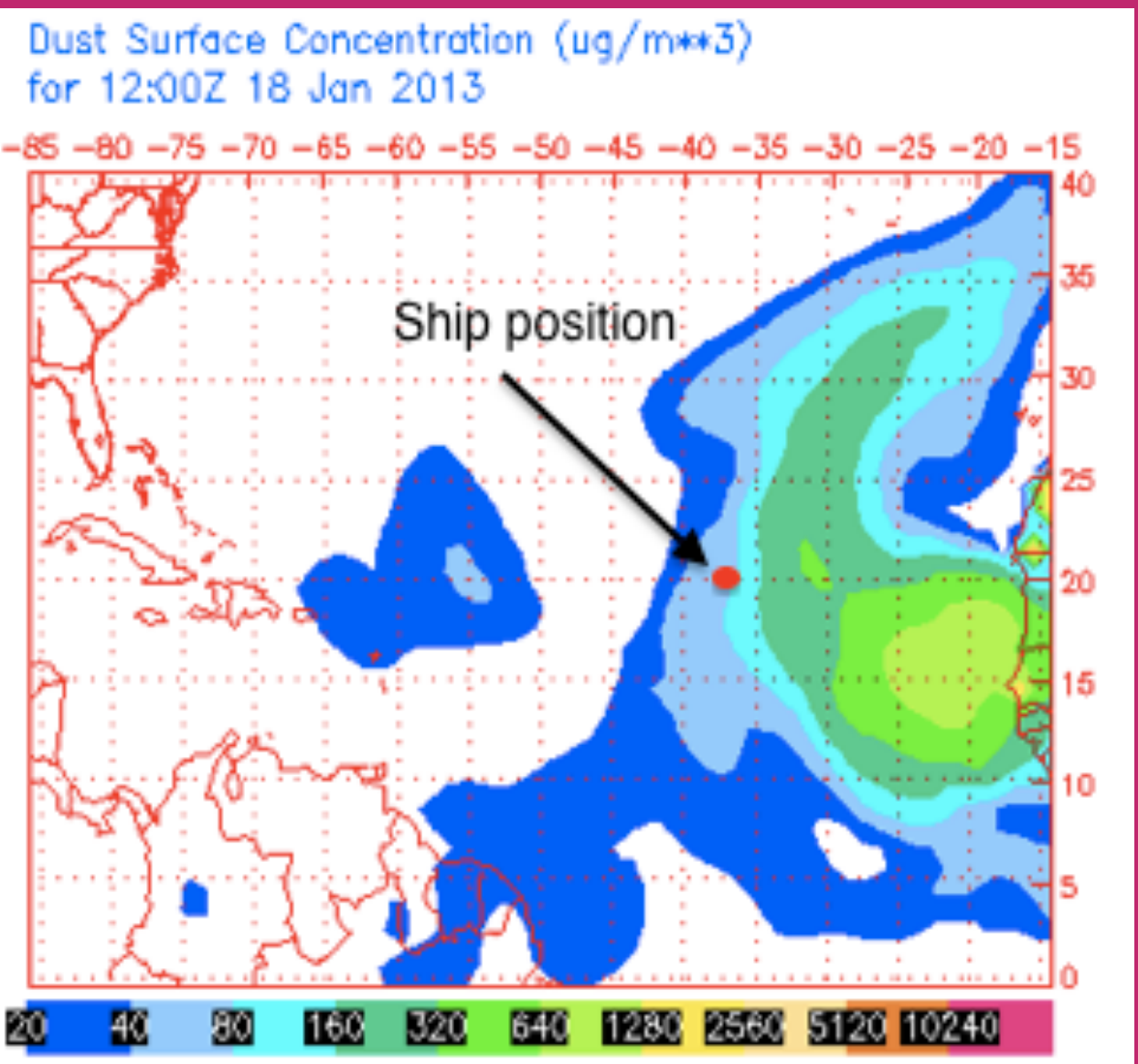
## Methodology

AEROSE VIII was conducted from January 8<sup>th</sup> through February 13<sup>th</sup>, 2013. The cruise began in Charleston, South Carolina, and concluded in San Juan, Puerto Rico. The measurements of size segregated aerosol mass-concentrations were performed using a Quartz Crystal Microbalance (QCM) cascade impactor. This model measures at particle diameters: 0.05, 0.1, 0.2, 0.4, 0.8, 1.6, 3.2, 6.4, 12.5, and 25  $\mu\text{m}$ . The QCM was operated daily during the daytime.



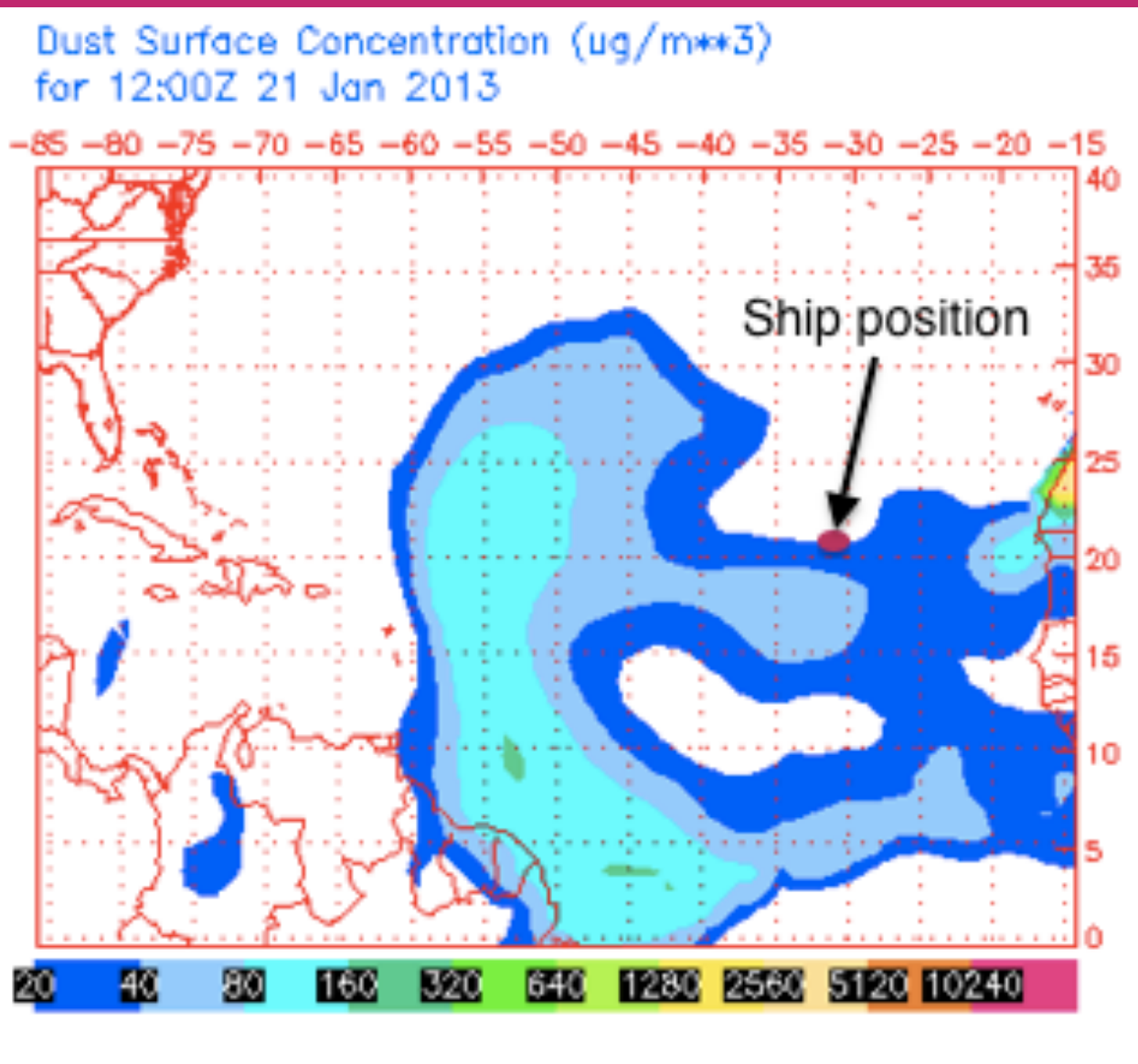
## Acknowledgements

The author wishes to express her gratitude to NOAA Educational Partnership Program for Minority Serving Institutions (EPP/MSI) Cooperative Agreement NA17AE1623 for their support on this work. Also, to the NOAA Center for Atmospheric Science (NCAS) at Howard University and its researchers for their guidance and suggestions, as well as to the rest of the members from the AEROSE VIII expedition. I would like to thank the members of the Environmental Physics Lab at the University of Texas at El Paso who offered opinions and a friendly ear to my ideas.



### Mass Concentration ( $\mu\text{g}/\text{m}^3$ )

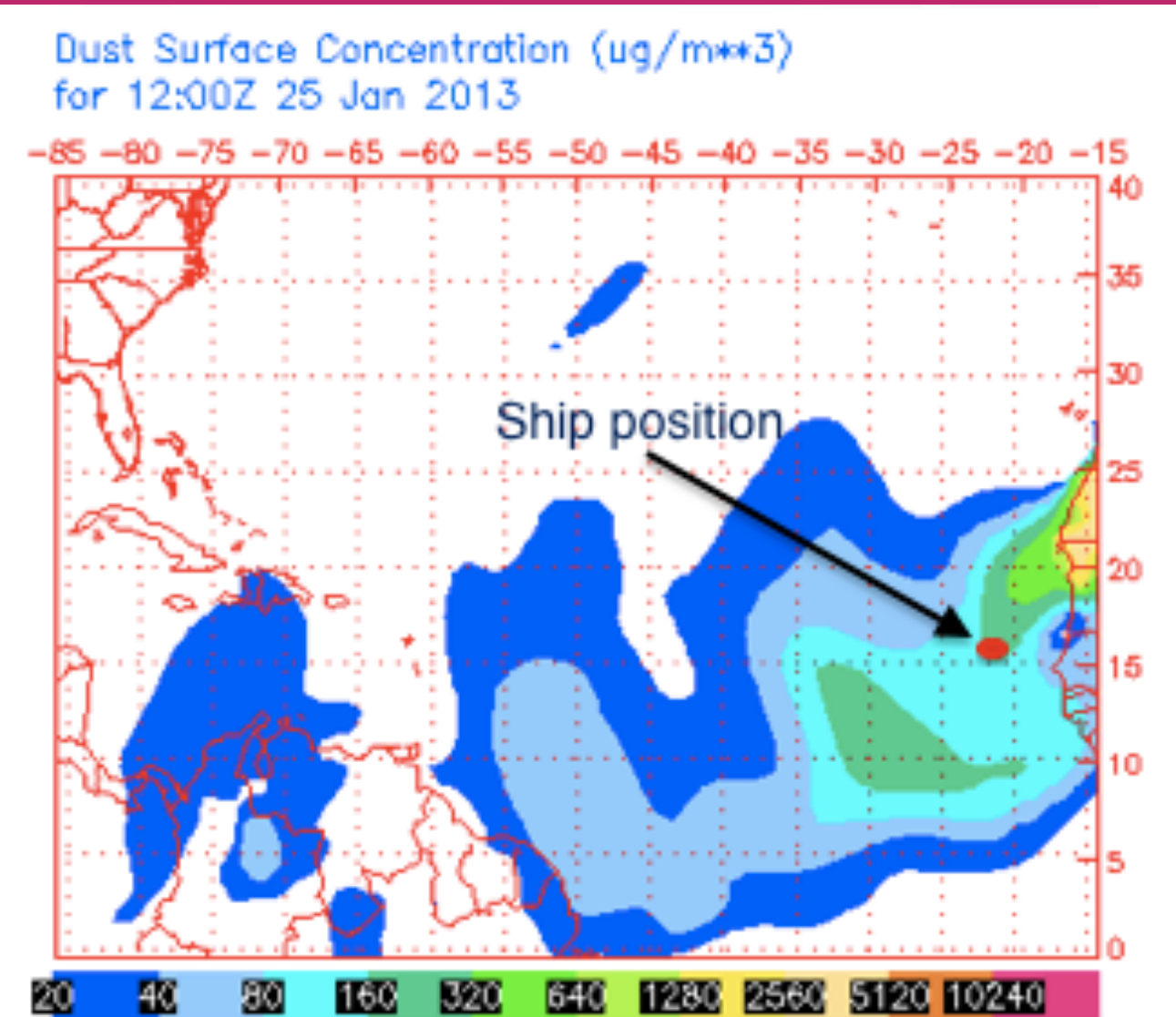
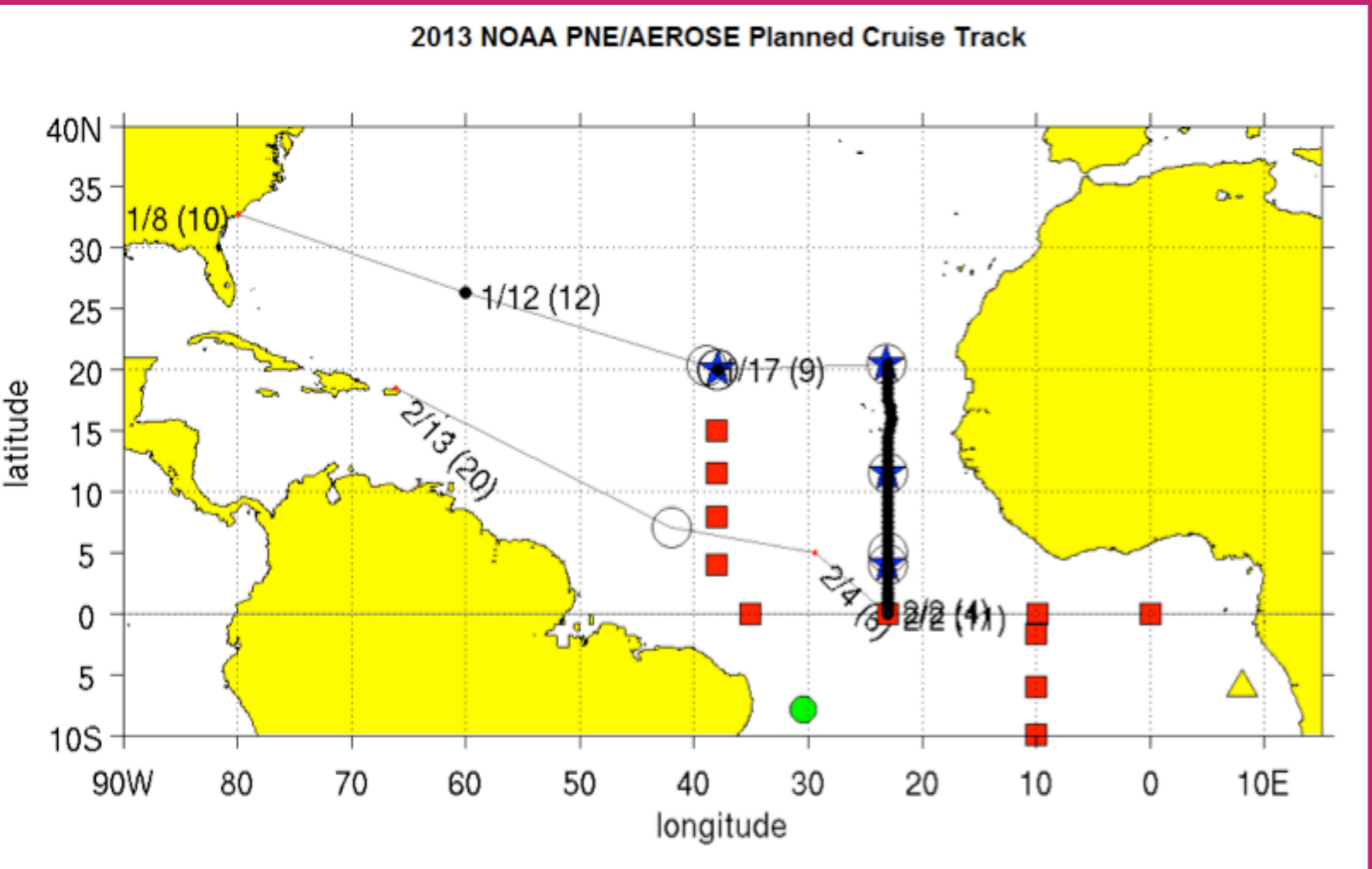
Forecasted	Measured
40-80	0.0759



### Mass Concentration ( $\mu\text{g}/\text{m}^3$ )

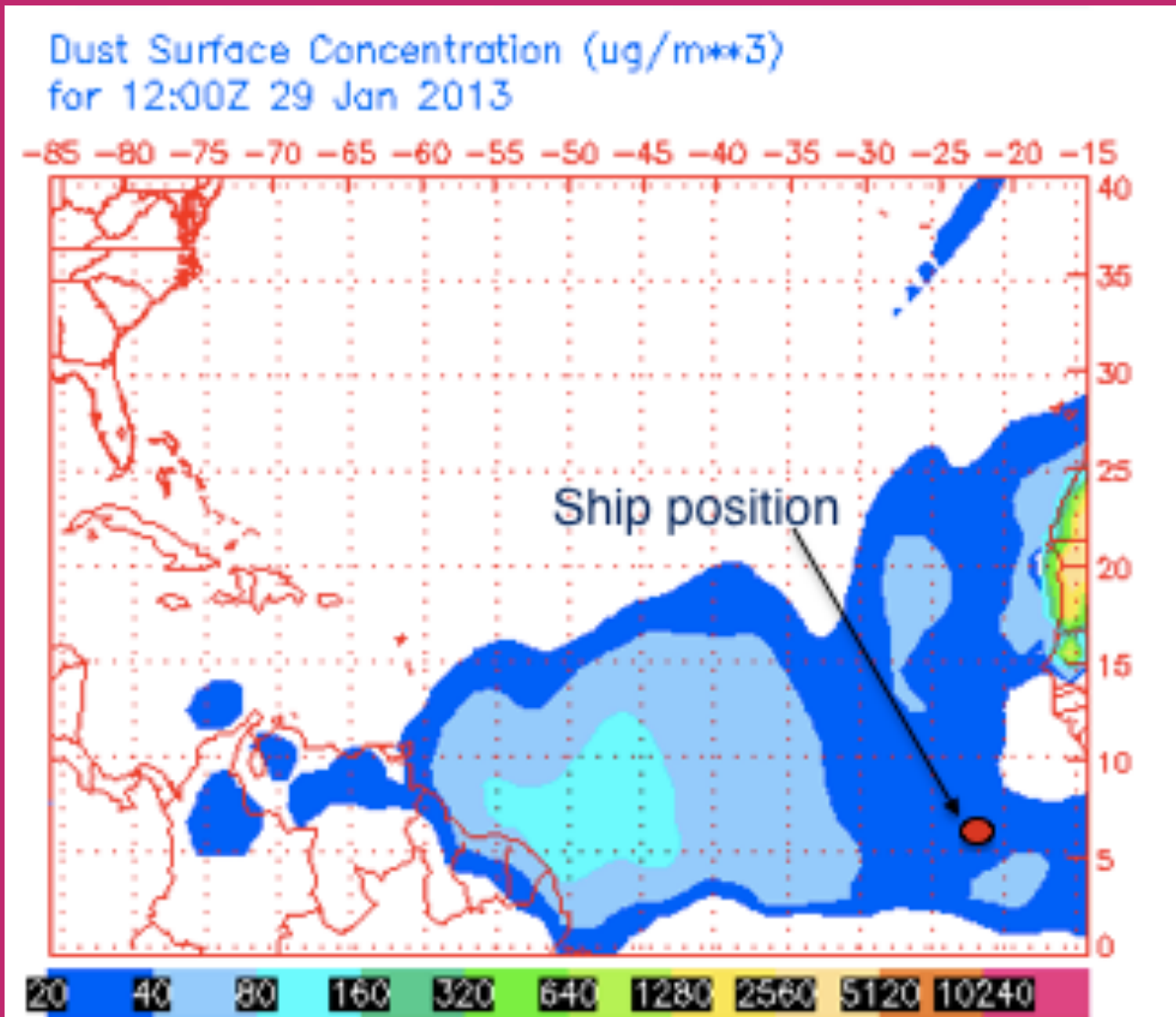
Forecasted	Measured
20-40	0.02903

## Preliminary Results



### Mass Concentration ( $\mu\text{g}/\text{m}^3$ )

Forecasted	Measured
160-320	0.13374



### Mass Concentration ( $\mu\text{g}/\text{m}^3$ )

Forecasted	Measured
20-40	0.2147