



Puerto Rico Exceptional and Natural Events

2010

In compliance with the exceptional events rule, the Puerto Rico Environmental Quality Board (PREQB) prepared this support document which discusses the rationale to apply air quality data flags on fine particulate matter (PM_{2.5} and PM₁₀) concentrations that may have been impacted by exceptional events.

Data Validation and Air Models Division

Summary

The Exceptional Events rule that was promulgated in 2007 in 40 CFR 50.14 (c) (3)(ii) and required, that a state may request exclusion of data for exceptional events for data collected during 2010. This document is the demonstration of the exceptional events for the PM_{2.5} and PM₁₀ data that were affected during 2010 year.

According to the rule, *exceptional events are unusual or naturally occurring events that can affect air quality but are not reasonably controllable or preventable, if an event is determined to be a qualifying exceptional event according to section IV.D, a State, or designated local agency may petition EPA to classify the event as exceptional.* This rule establishes the procedures and criteria that will be used to identify, evaluate, interpret and use monitored air quality data for comparison to the National Ambient Air Quality Standards (NAAQS) in situations where state, local, and tribal air quality agencies request special treatment because the data has been affected by an exceptional event.

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Data Evaluation

In Puerto Rico the air quality is affected by Saharan dust, and volcanic ash from Le Soufriere at Monserrate Island.

- a. In Puerto Rico the impact of the Saharan dust is documented in many ways. It includes spectacular images from satellite, but even these images do not quantify how much and what kind of particles will travel to the Island. The stations classify as FRM, their filters have always shown clearly in their colors, the impact of Saharan dust by the distinctive reddish-brown color.
- b. Montserrat Volcanic Eruptions: Ambient concentrations of particulate matter for which volcanic activity caused or significantly contributed to high levels of particulate matter in an affected area will be treated as natural events.

The volcanic activities affect air quality data related to the particulate matter NAAQS for an extended period of time after an event. Volcanic events can contribute to ambient concentrations of particulate matter due primary emissions of ash and as precursor pollutant like sulfur dioxide that contribute to the secondary formation of particulate matter.

The particulate matter that is request to be excluded as affected by an exceptional event is only the data collected by from the stations classified as the federal reference method (FRM). The PREQB identified fifty two (52) data that were potentially impacted by Sahara Dust and Volcanic ash. Documentation submitted by PREQB claims that Sahara dust and volcanic ash affected significantly the concentration from the sites listed in the tables. Each table represents a date and shows the site and the concentration. Also, EQB classified fourteen (14) days in the PM₁₀ TEOM concentration.

PREQB includes in the next section maps, photos and satellite photos that demonstrate that the Sahara Dust and Volcanic Ash from Le Soufriere affected Puerto Rico. Also, enclose the *Raw Data Qualifier Report* as part of the support documentation in the Appendix I.

Summary of Maps and Graphs

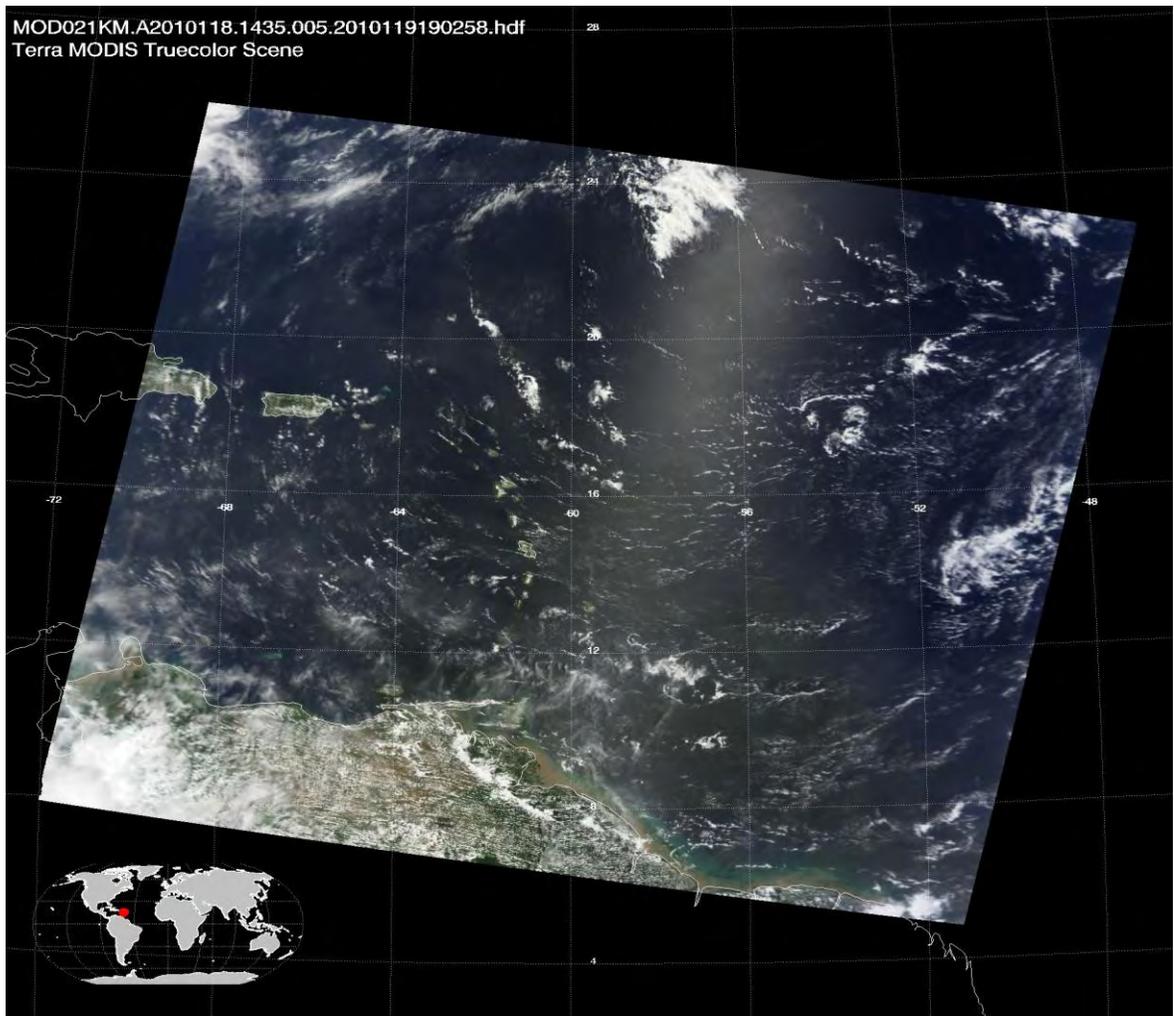
Maps and graphs were generated to provide the PREQB submittal. The graphs and maps were obtained from the:

- Naval Research Lab; <http://www.nrlmry.navy.mil/aerosol/#aerosolobservations>
- NASA (MODerate Resolution Imaging Spectroradiometer) Terra <http://modis-atmos.gsfc.nasa.gov/IMAGES/index.html>
- Weather Underground: <http://espanol.wunderground.com/airport/TISK>

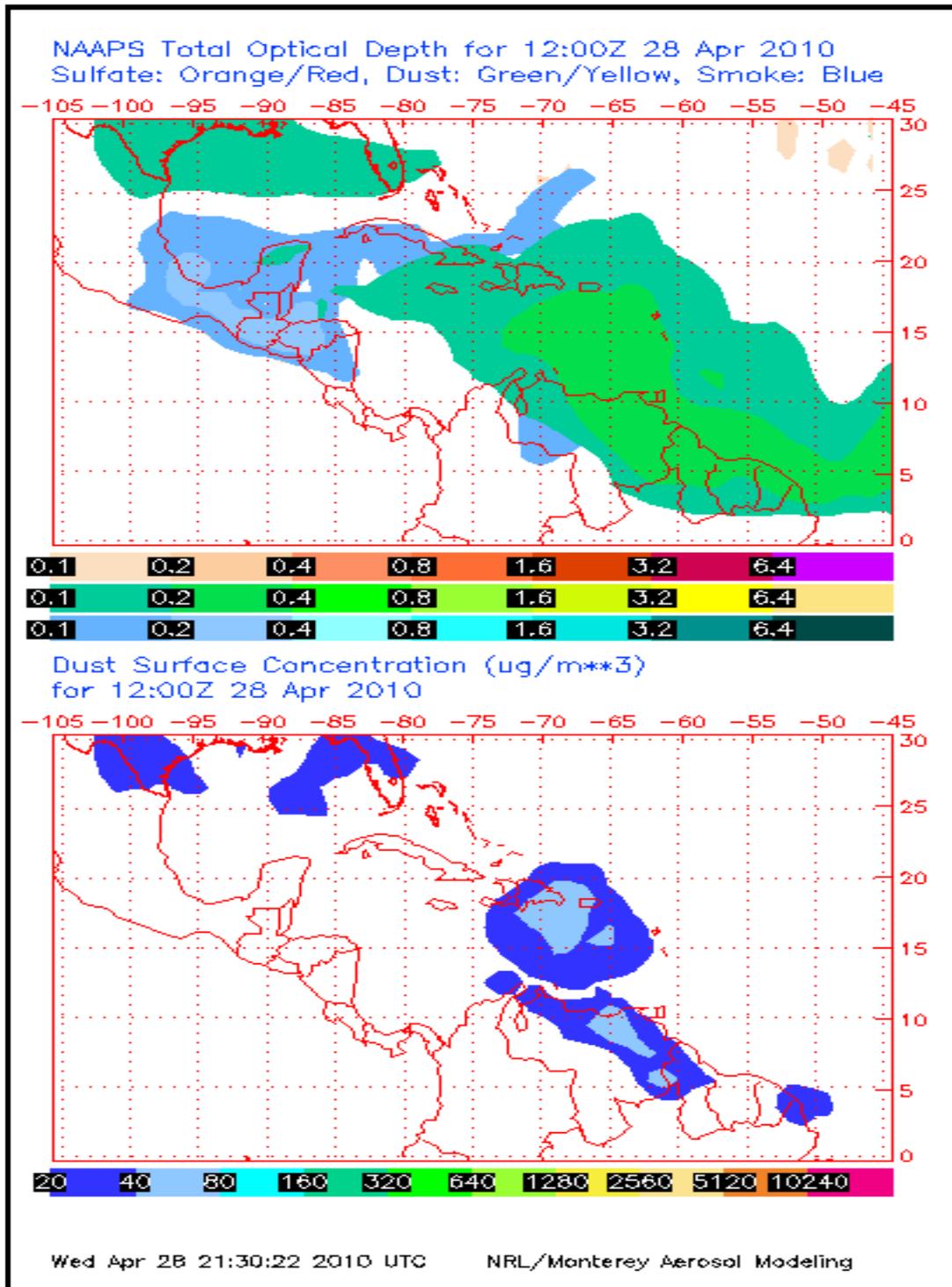
This may include maps using data from AQS, the National Aeronautics and Space Administration (NASA), and the Navy Aerosol Analysis and prediction System (NAAPS). Also, the ambient air monitoring data used in the analysis was obtained from the EPA AQS database.

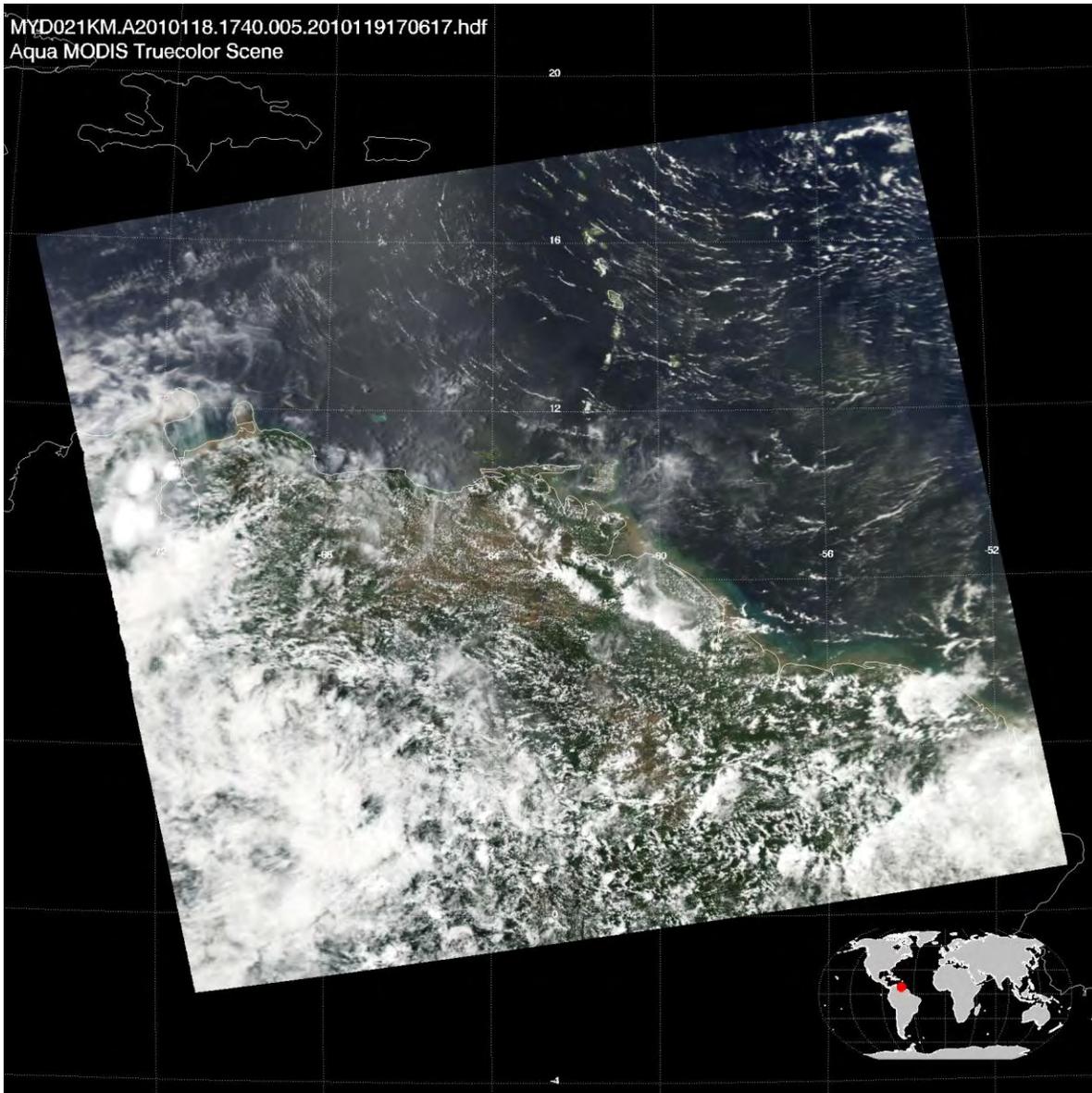
List of days that the data is affected by Natural Events

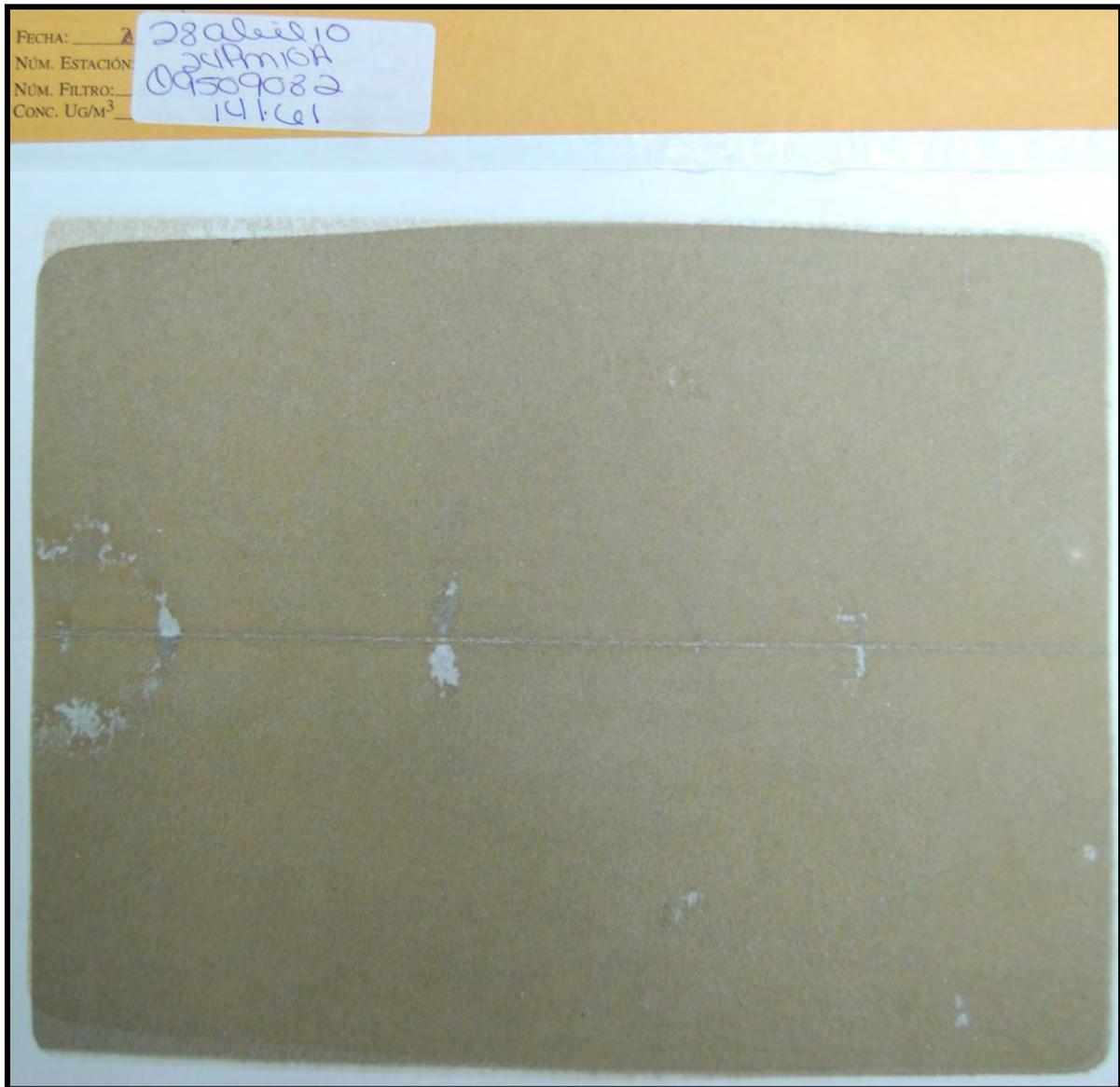
APRIL 28, 2010.....	7
APRIL 29, 2010.....	11
APRIL 30, 2010.....	18
MAY 1, 2010.....	22
JUNE 1, 2010	25
JUNE 2, 2010	30
JUNE 3, 2010	34
JUNE 4, 2010	36
JUNE 5, 2010	44
JUNE 10, 2010.....	48
JULY 7, 2010	54
AUGUST 18, 2010	63
AUGUST 24, 2010	72
SEPTEMBER 21, 2010	79
SEPTEMBER 22, 2010	83



April 28, 2010		
Location	Filter Number	Value
AIRS Num.72-061-0005 EQB 24 PM ₁₀ Guaynabo	09509082	142
AIRS Num.72-053-0003 EQB 22 PM ₁₀ Fajardo	09509089	111



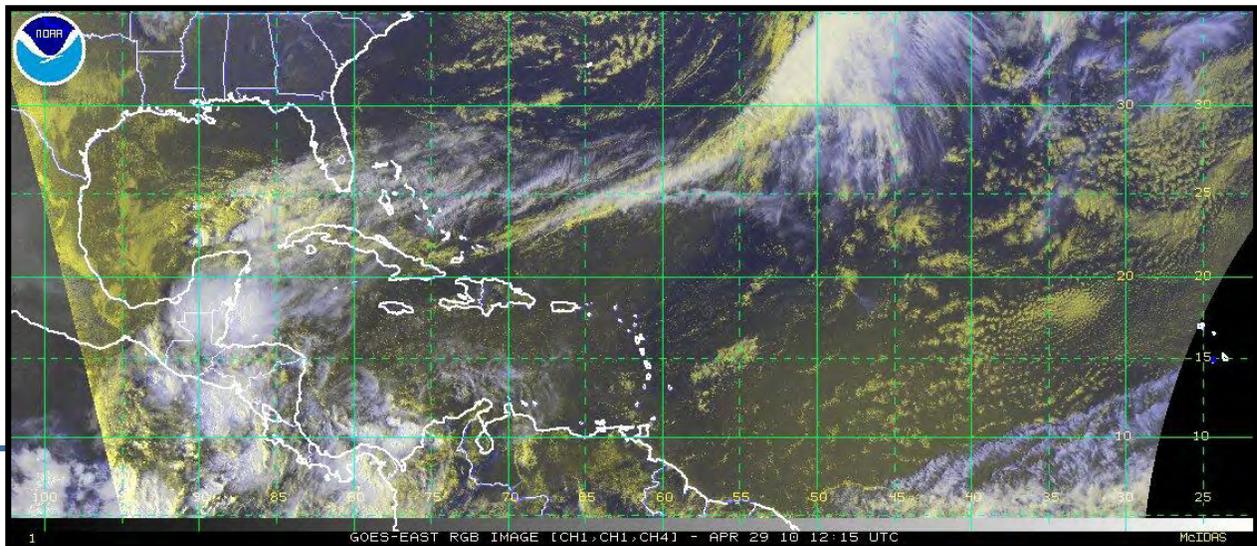


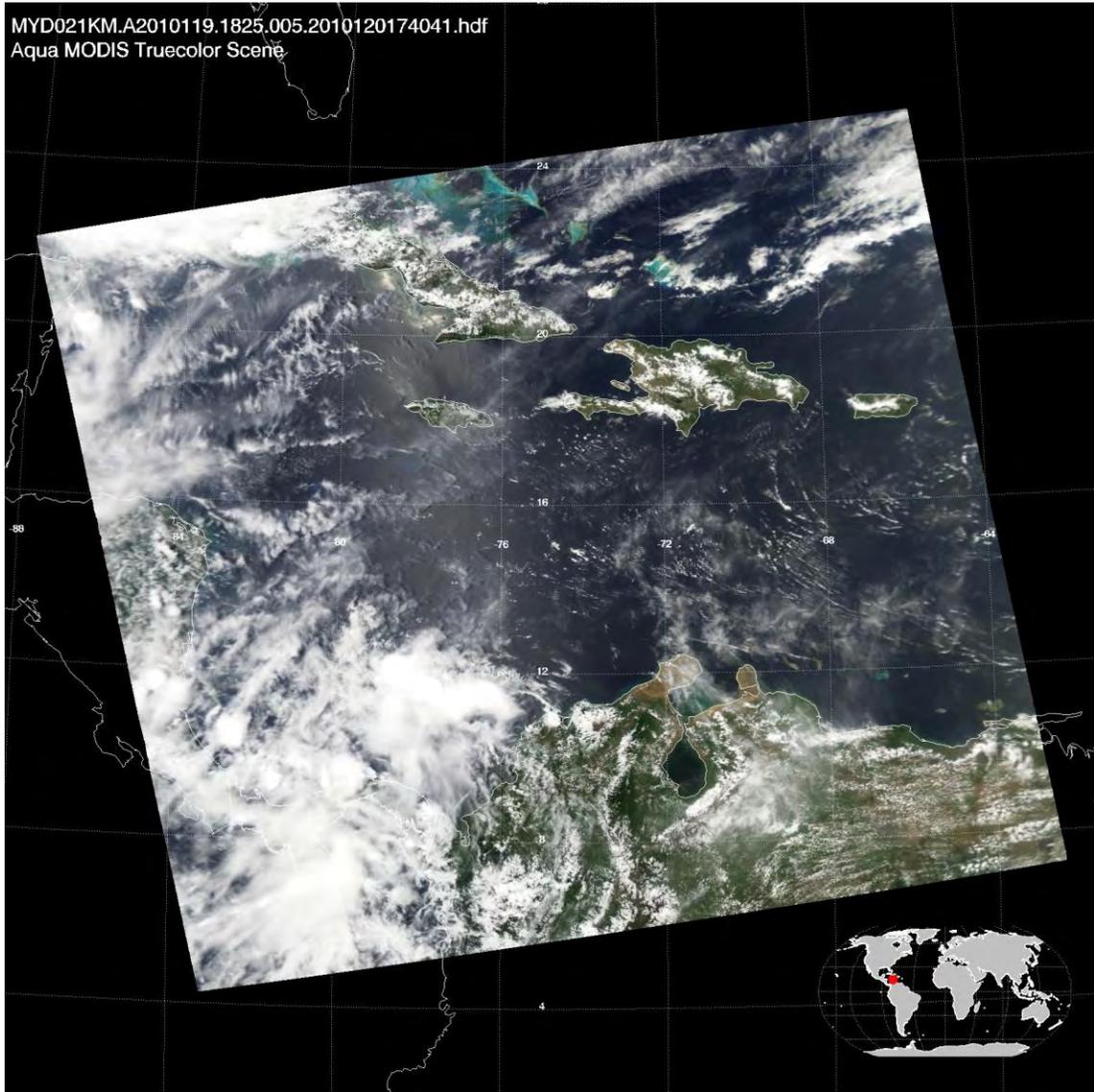


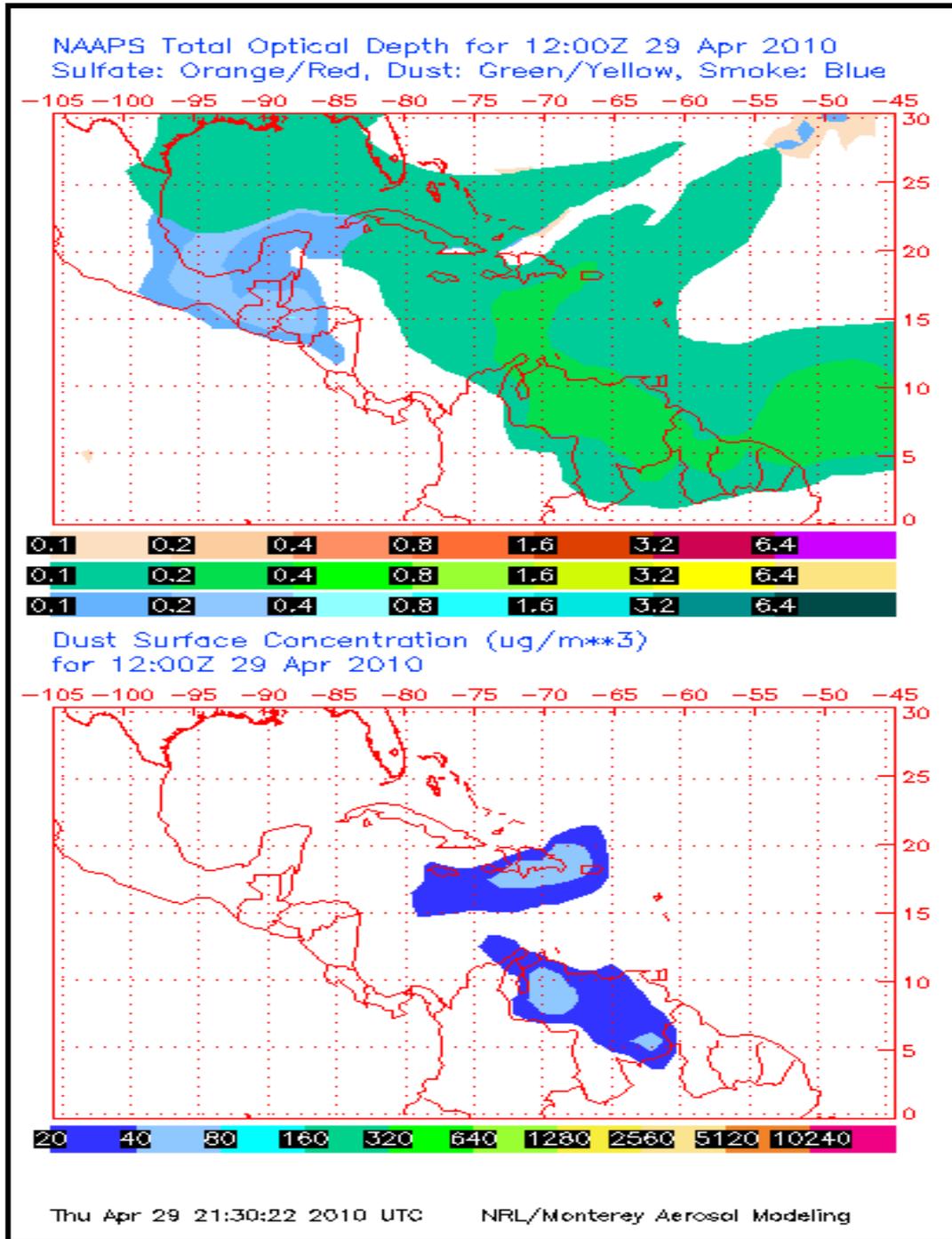
Single Filter Sample PM₁₀: 09509082

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April 29, 2010		
Location	Filter Number	Value
AIRS Num.72-061-0005 EQB 24 PM ₁₀ Guaynabo	09509081	138
AIRS Num.72-061-0001 EQB 7 PM ₁₀ Guaynabo	09509085	134
AIRS Num.72-053-0003 EQB 22 PM ₁₀ Fajardo	09509088	115
AIRS Num.72-057-0008 EQB 15PM ₁₀ Guayama	09509037	120
AIRS Num.72-113-0004 EQB 56 PM ₁₀ Ponce	09509041	135
AIRS Num.72-061-0005 EQB 24 PM _{2.5} Guaynabo	8268009	28.21
AIRS Num.72-113-0004 EQB 56 PM _{2.5} Ponce	8268012	26.42









Single Filter Sample PM₁₀: 09509081



Single Filter Sample PM₁₀: 09509085

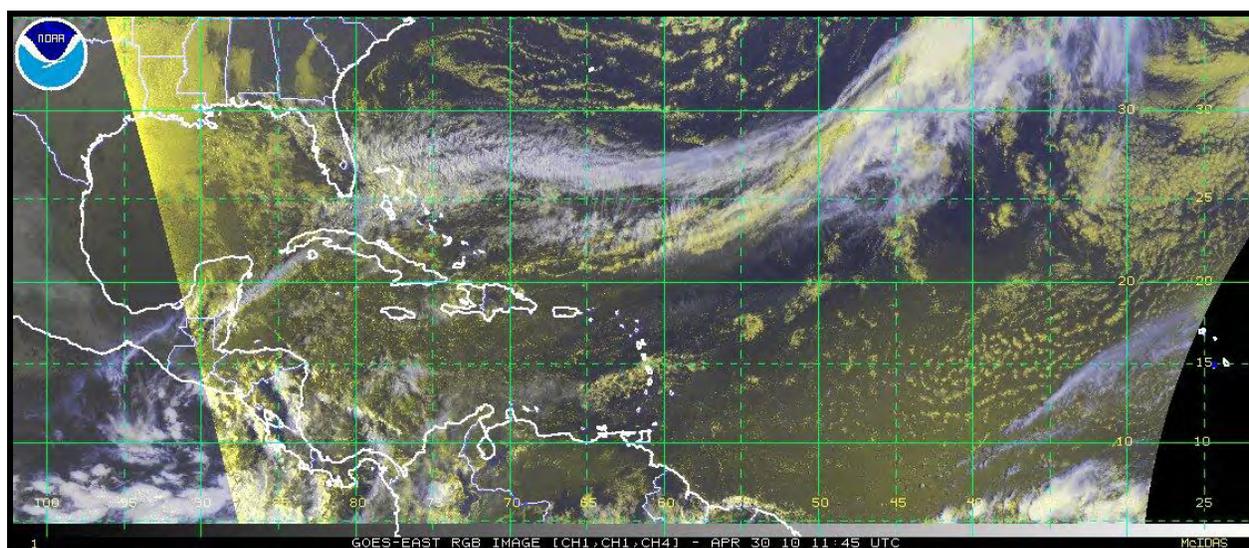


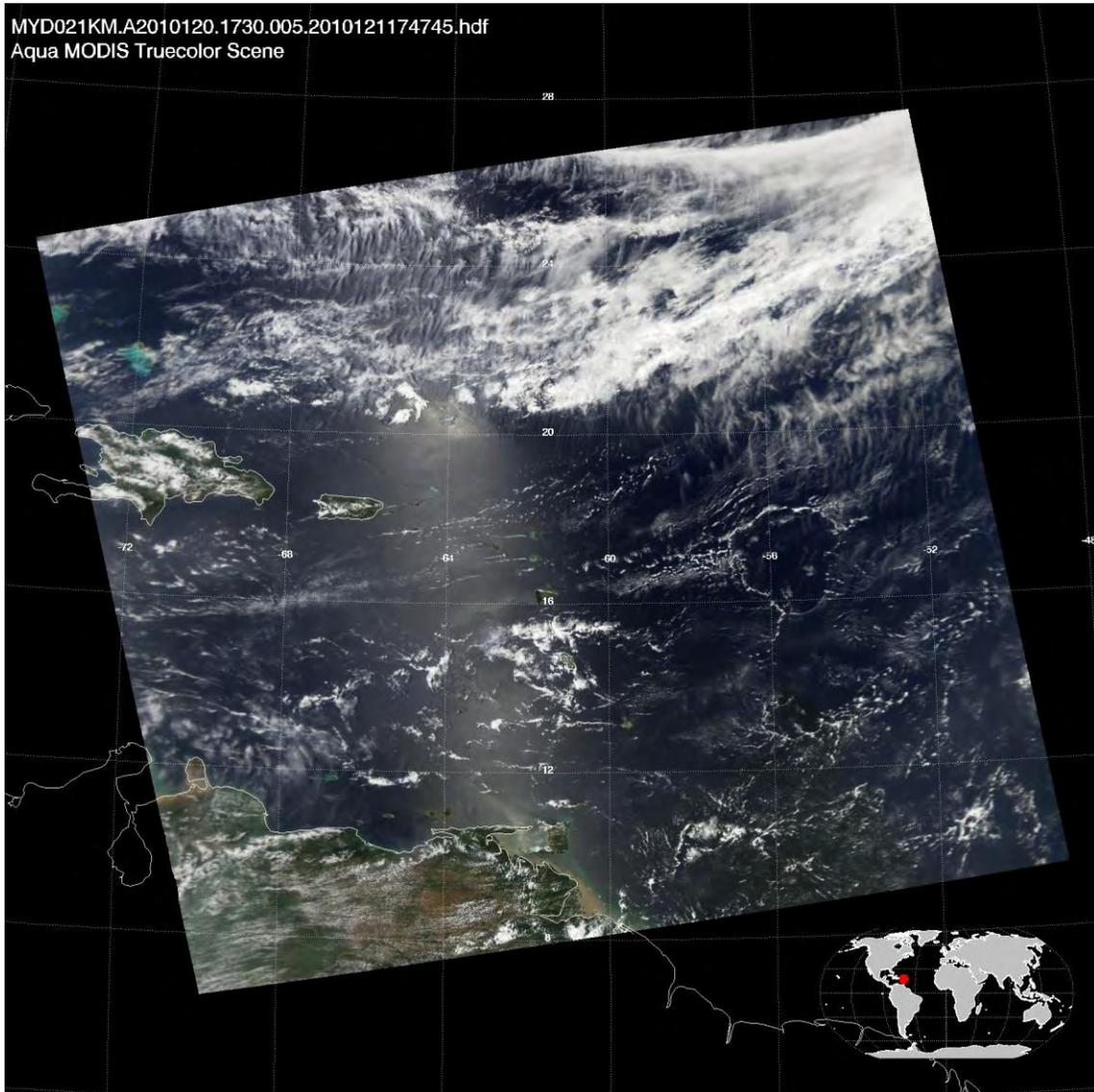
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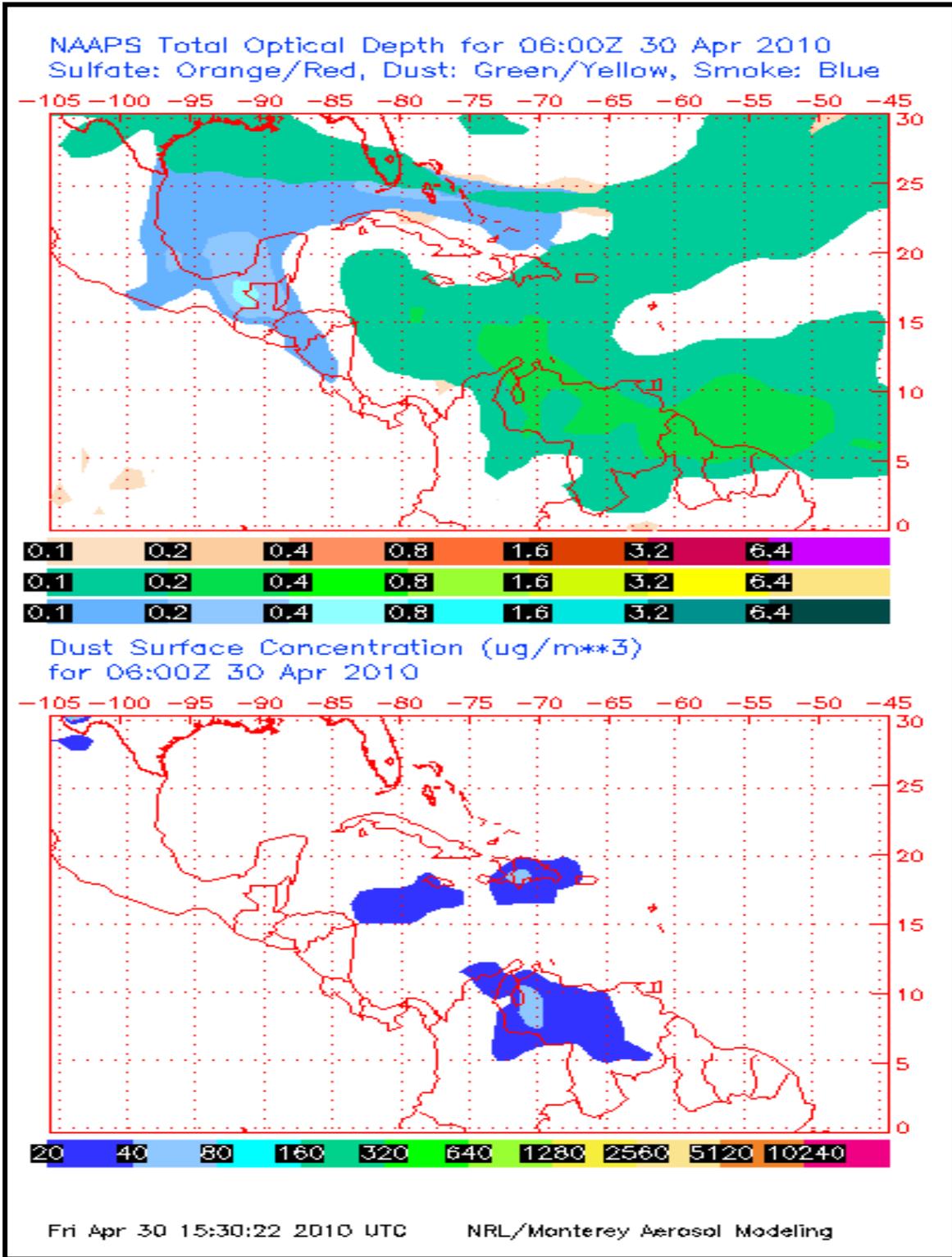


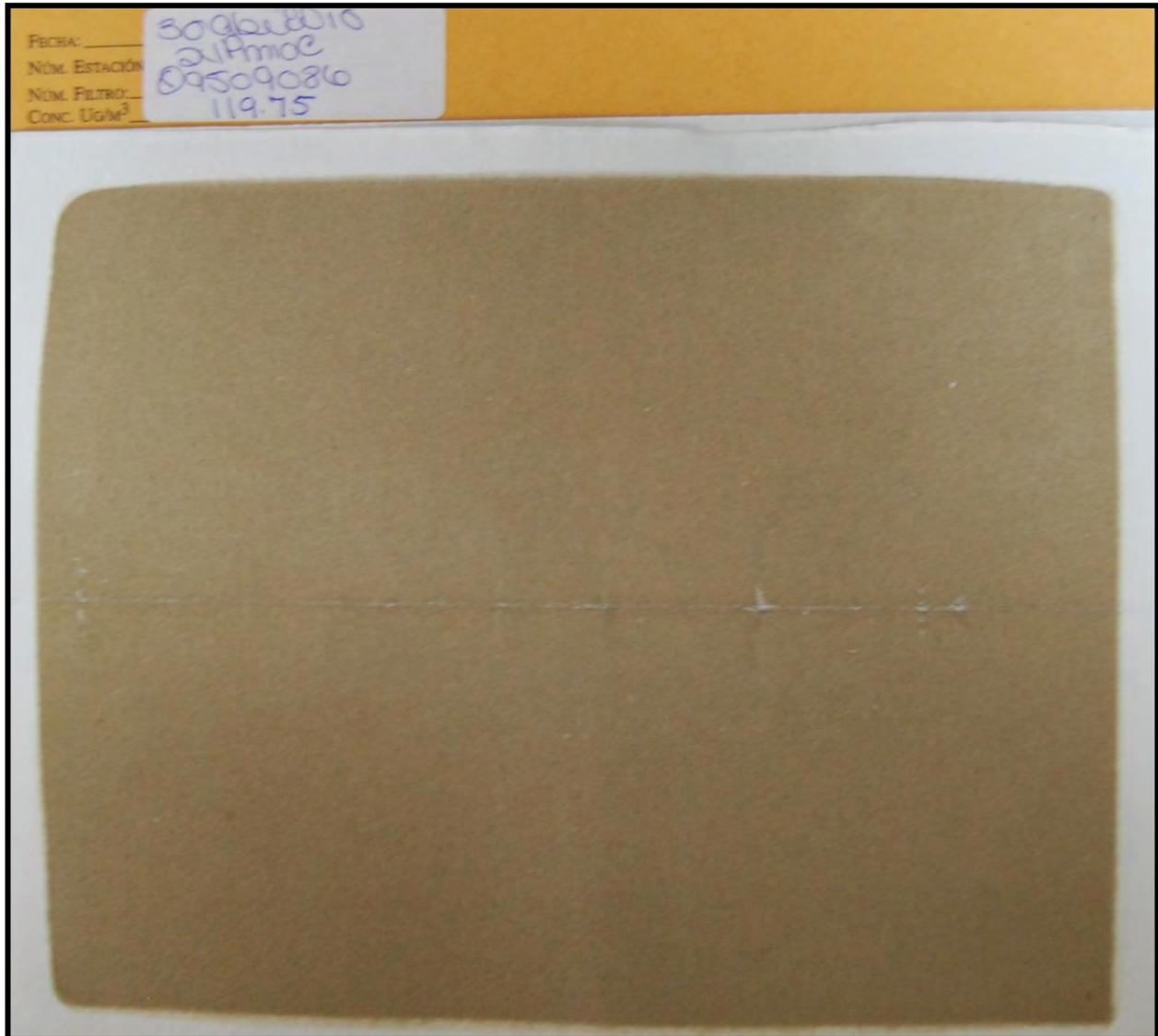
Single Filter Sample $PM_{2.5}$: 8268012

April 30, 2010		
Location	Filter Number	Value
AIRS Num.72-061-0005 EQB 24 PM ₁₀ Guaynabo	09509086	120
AIRS Num.72-053-0003 EQB 22 PM ₁₀ Fajardo	09509092	95



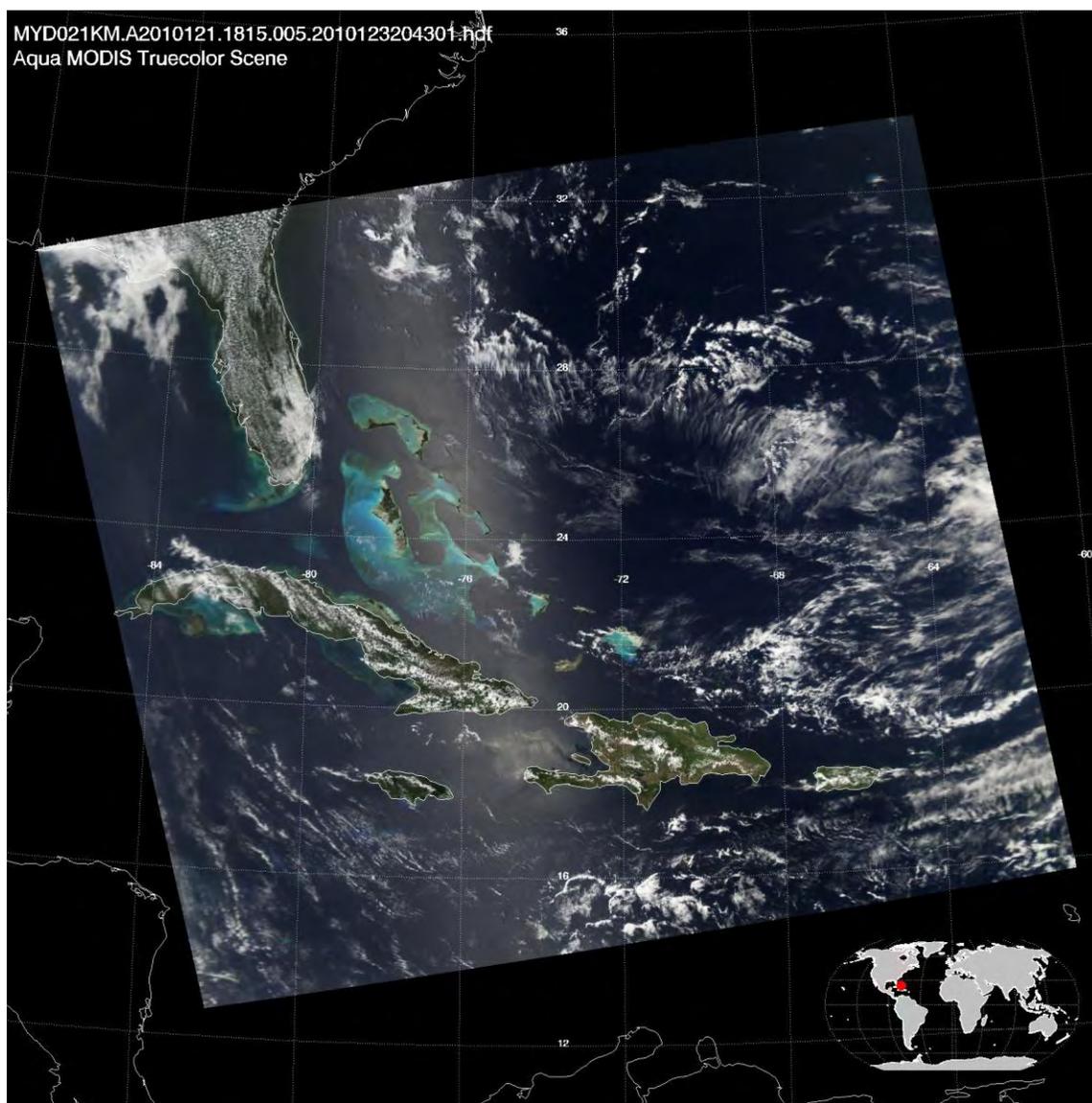


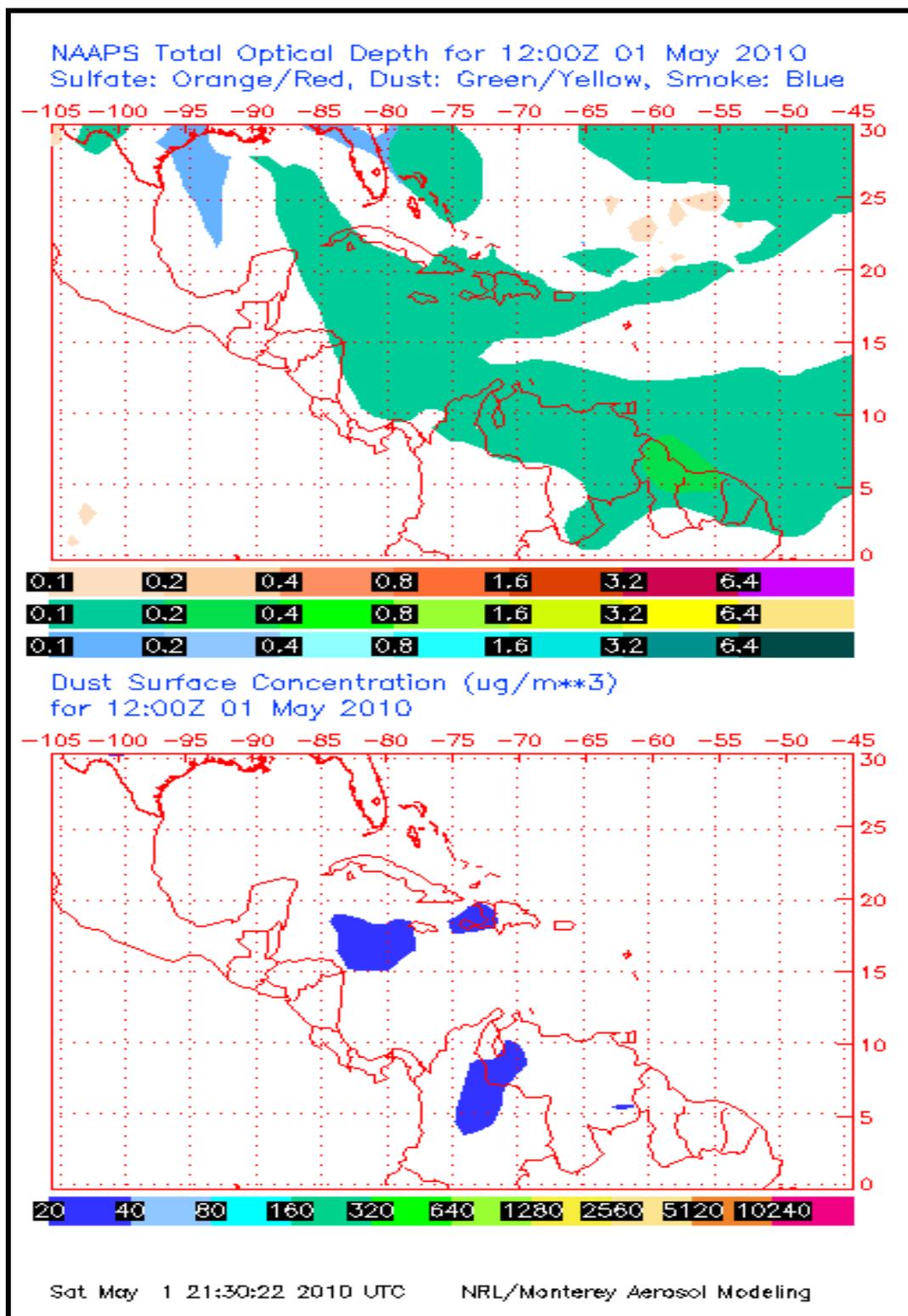




Single Filter Sample PM₁₀: 09509086

May 1, 2010		
Location	Filter Number	Value
AIRS Num.72-061-0005 EQB 24 PM ₁₀ Guaynabo	09509083	84

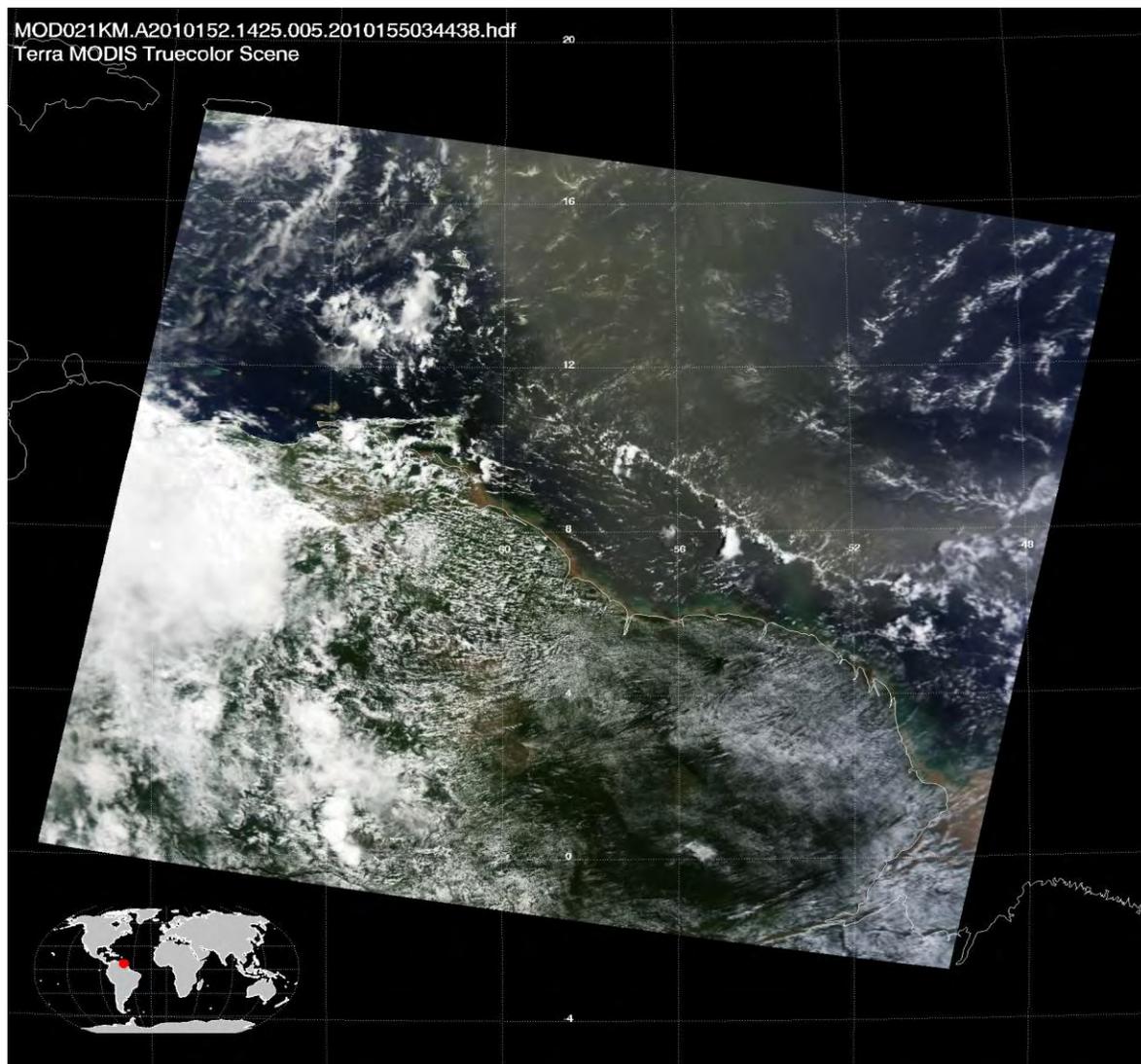


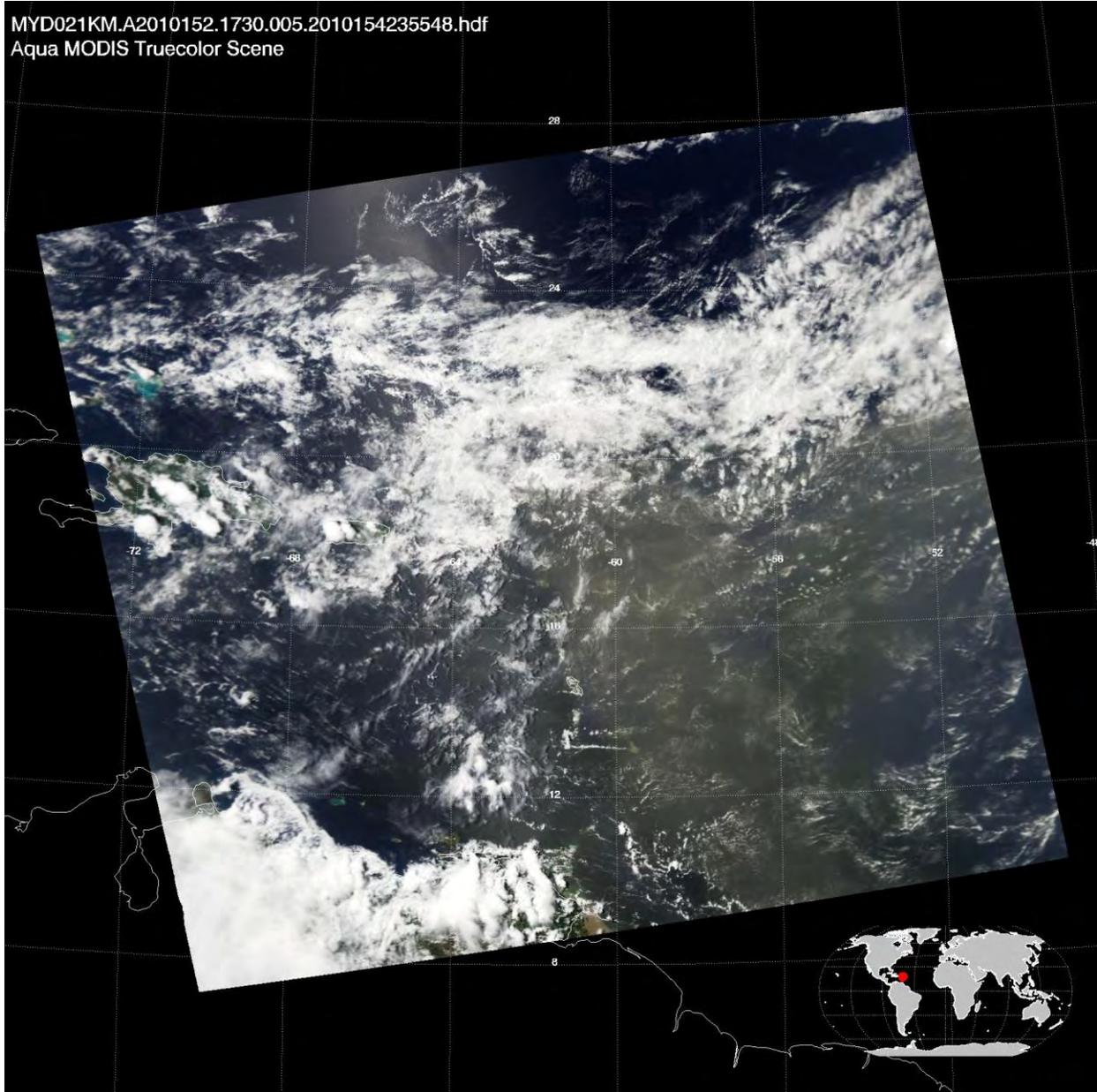


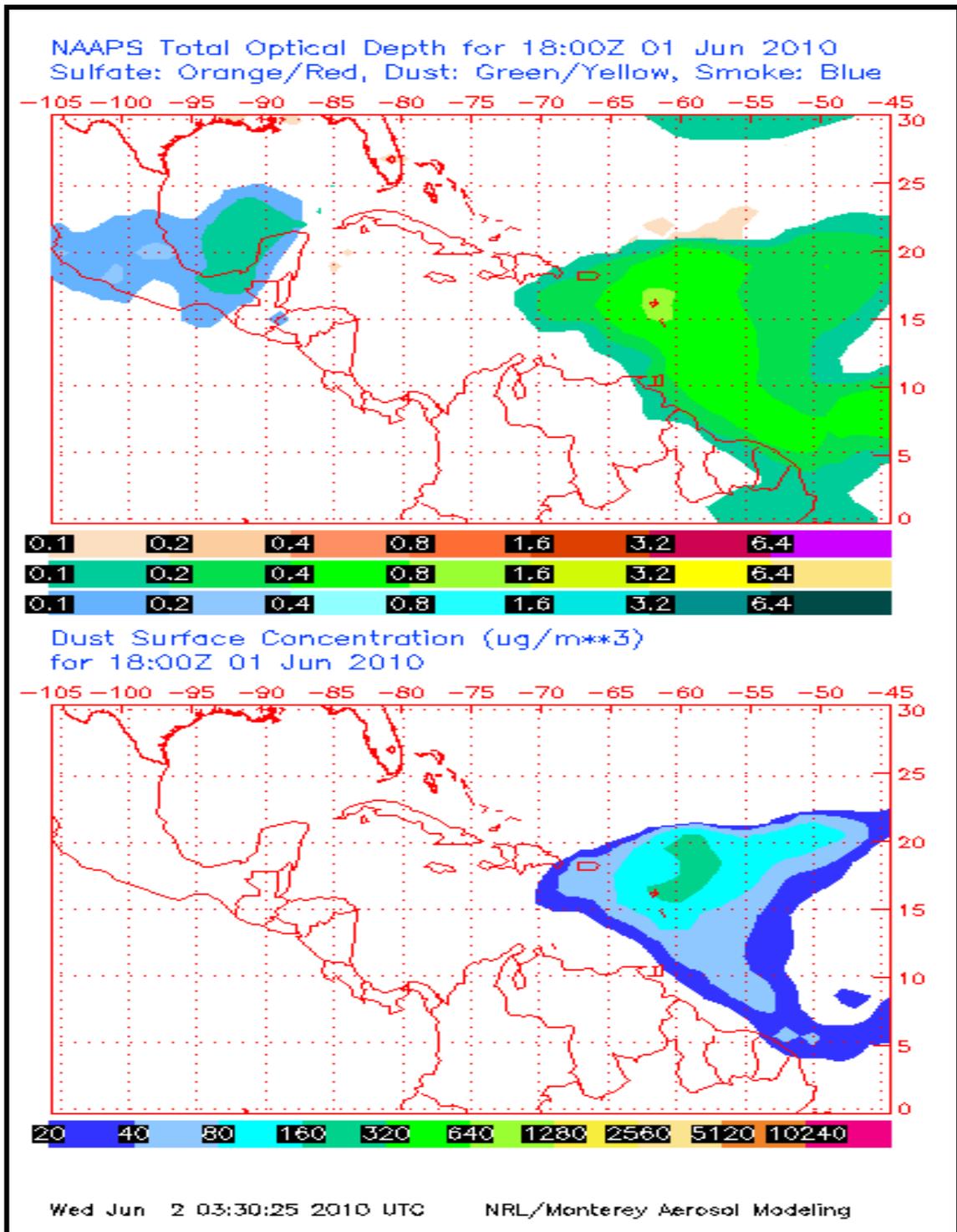


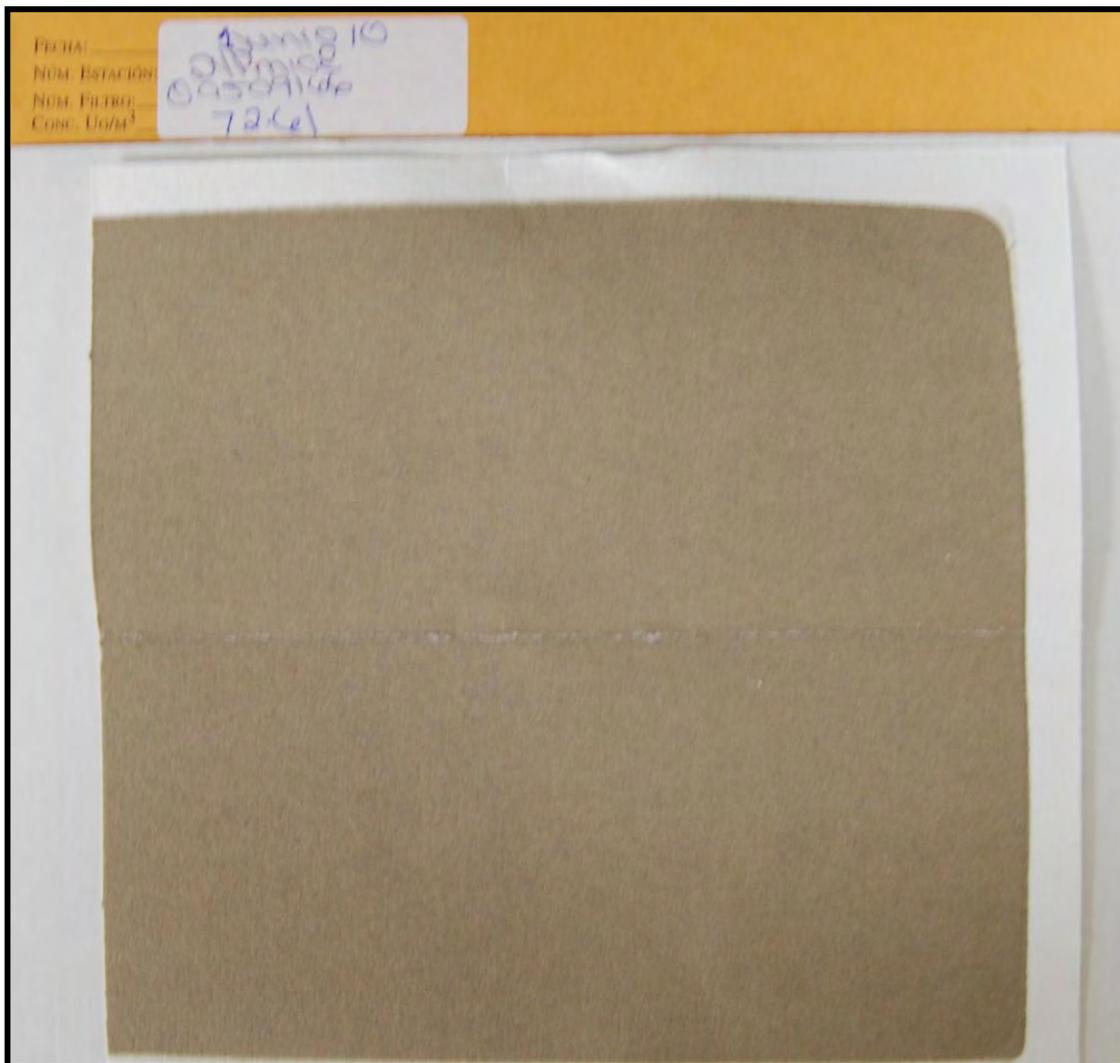
Single Filter Sample PM₁₀: 09509083

June 1, 2010		
Location	Filter Number	Value
AIRS Num.72-061-0005 EQB 24 PM _{2.5} Guaynabo	8268042	18.29







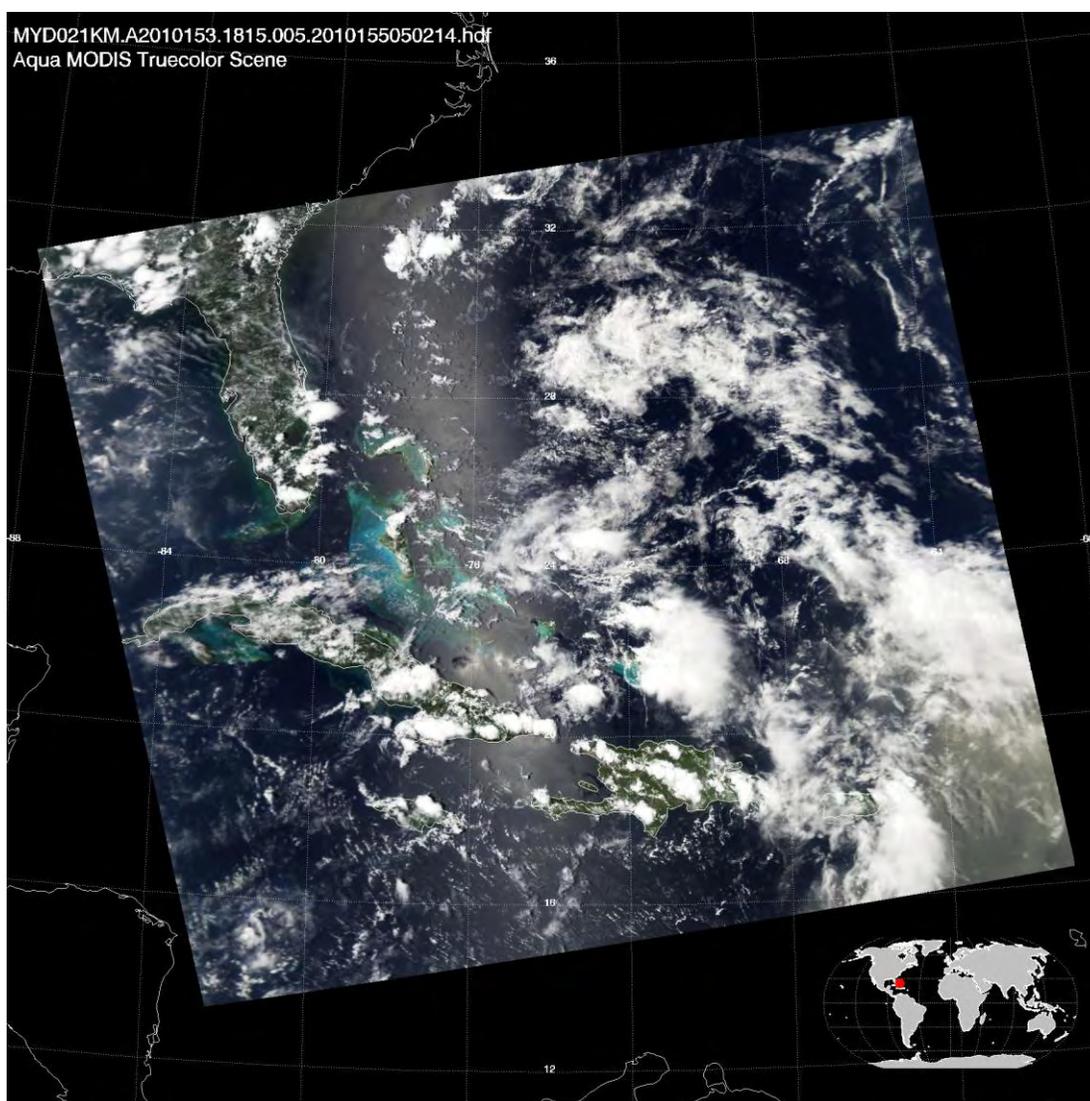


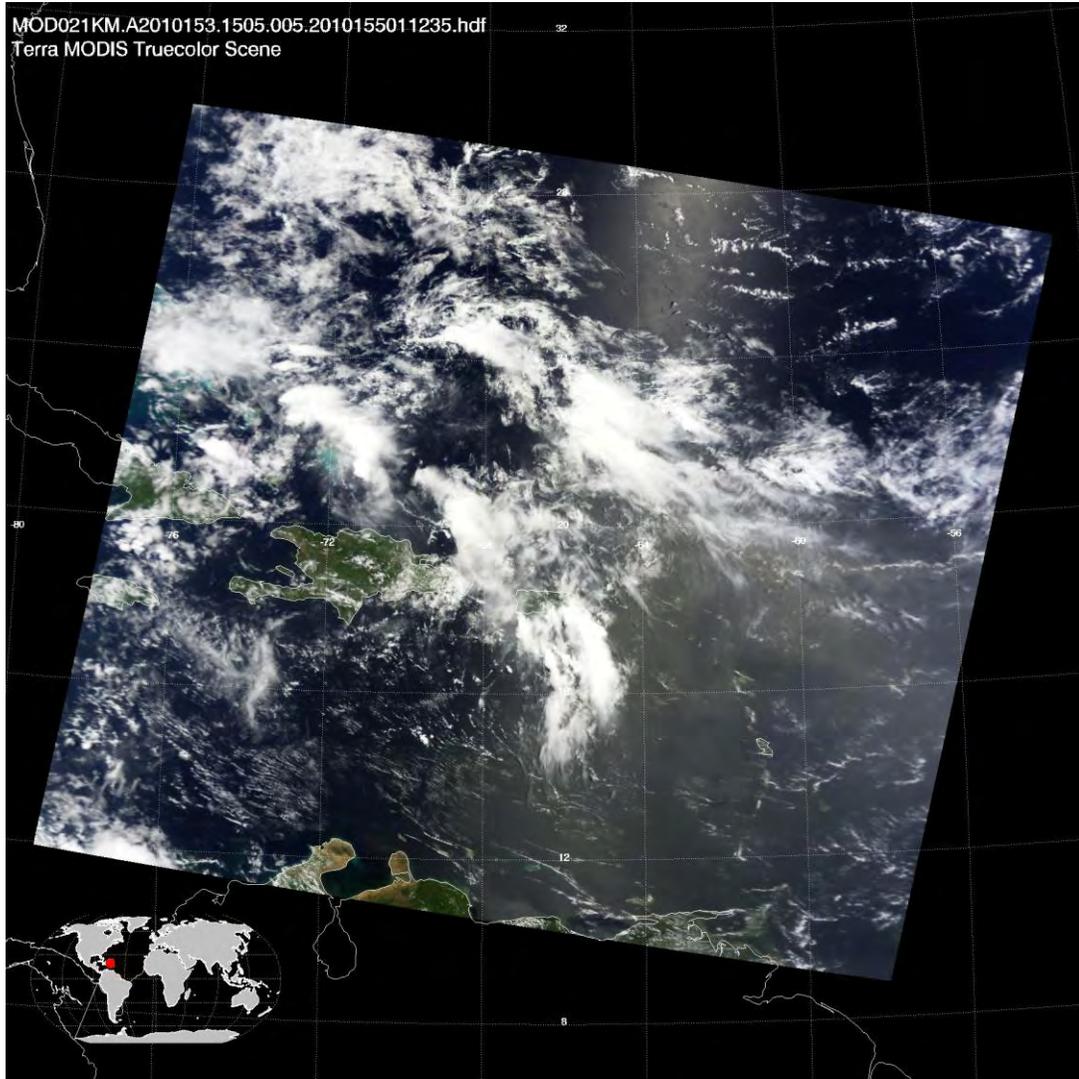
Single Filter Sample PM₁₀: 09509166

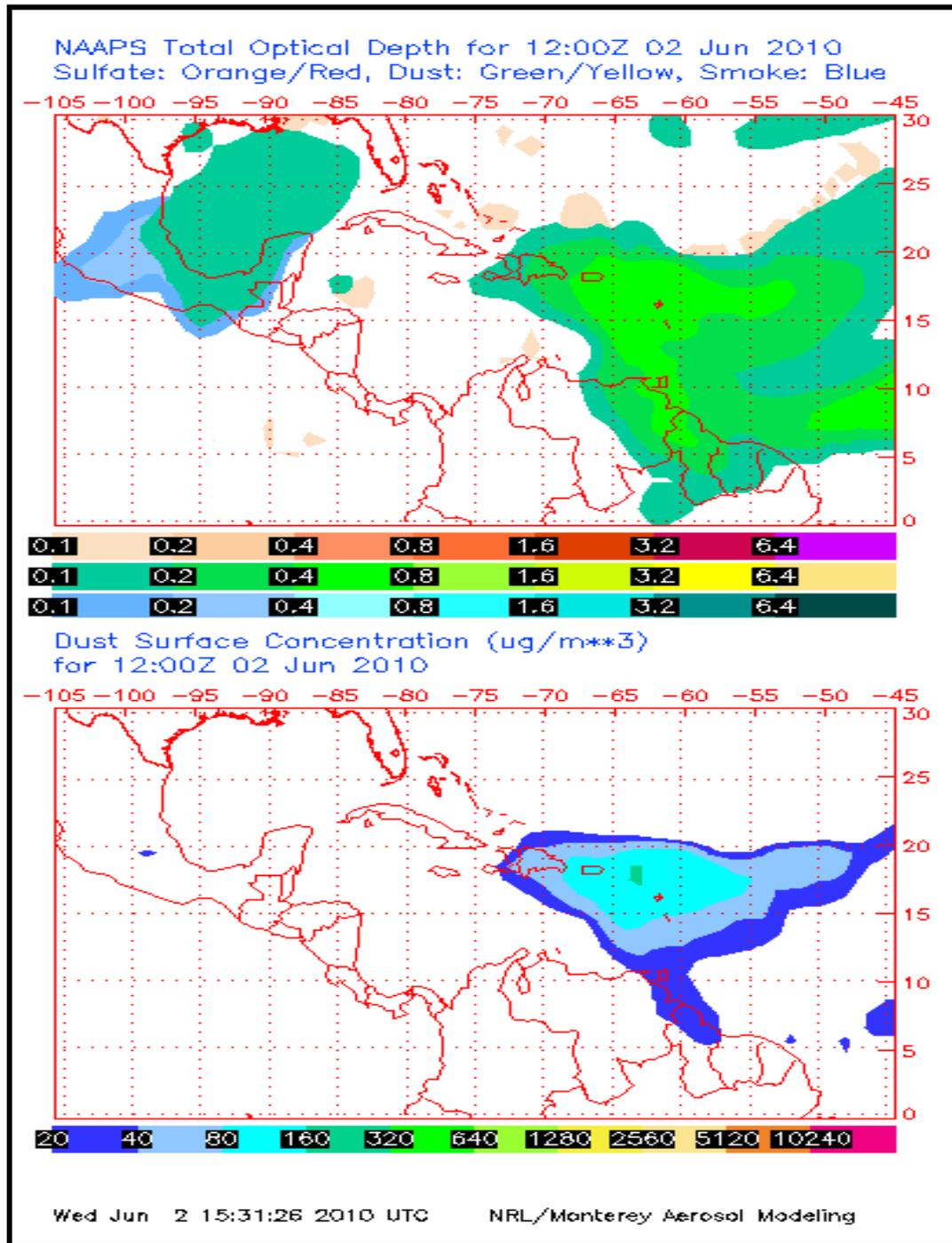


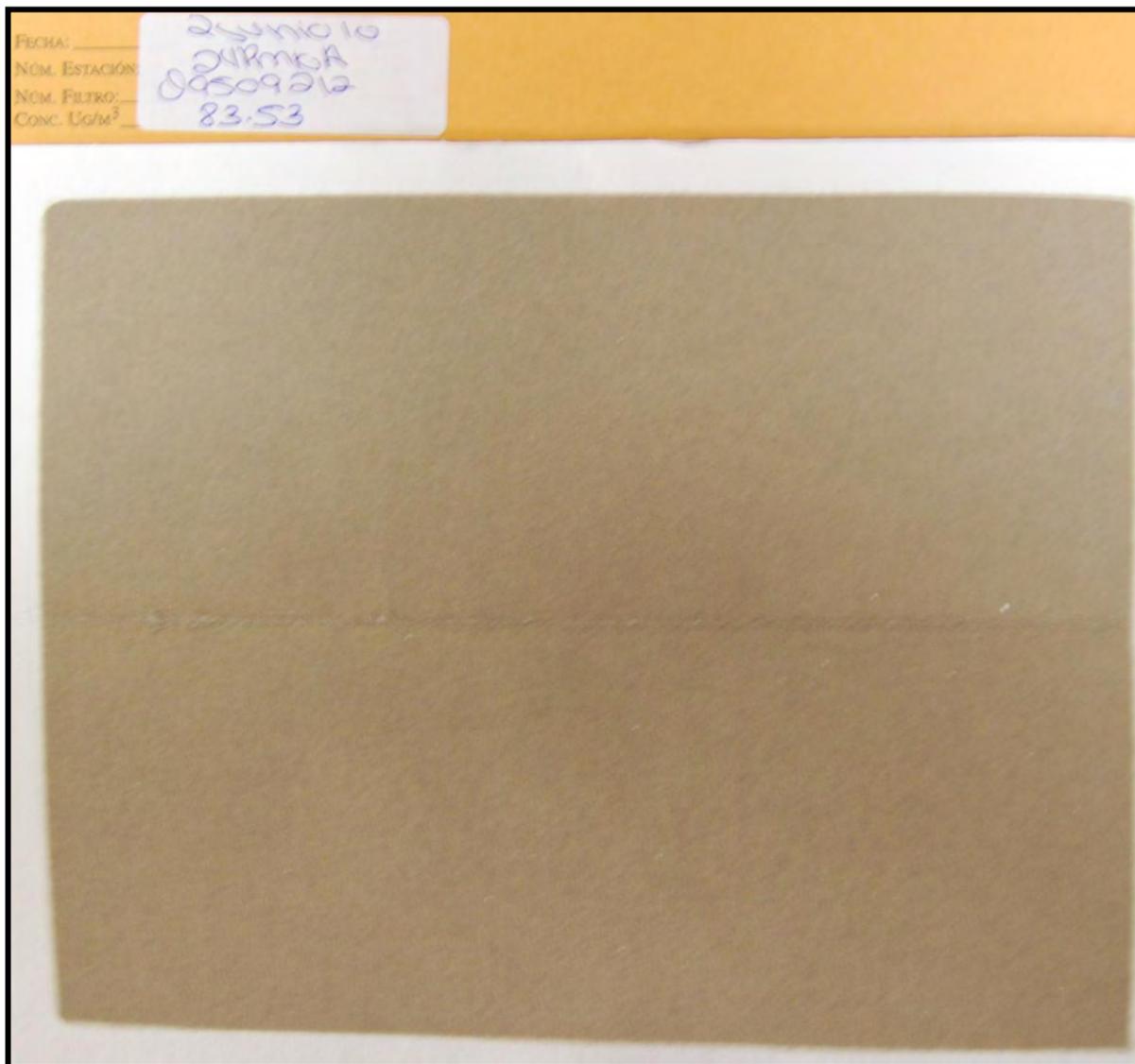
Single Filter Sample PM_{2.5}: 8268042

June 2, 2010		
Location	Filter Number	Value
AIRS Num.72-061-0005 EQB 24 PM ₁₀ Guaynabo	09509212	84
AIRS Num.72-053-0003 EQB 22 PM ₁₀ Fajardo	09509193	85



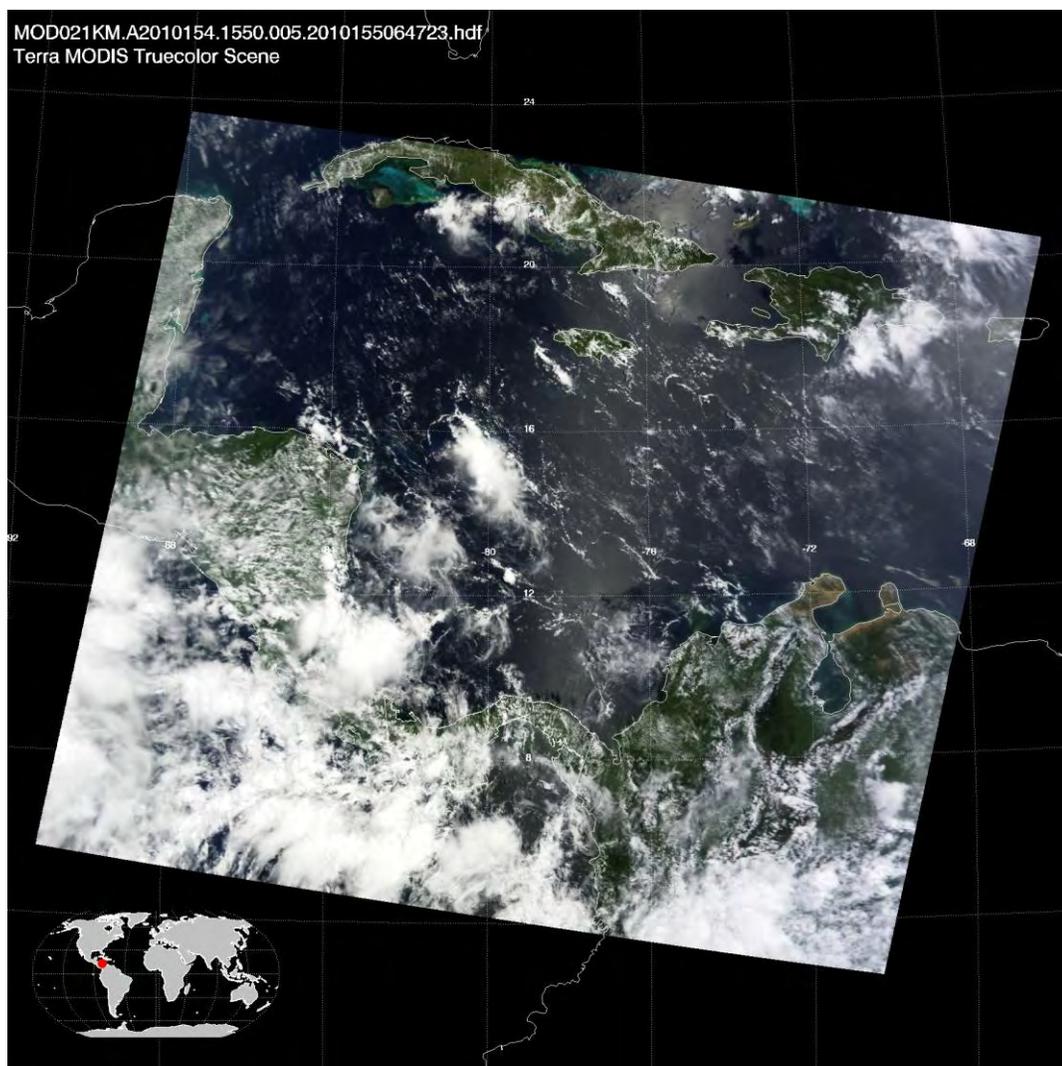


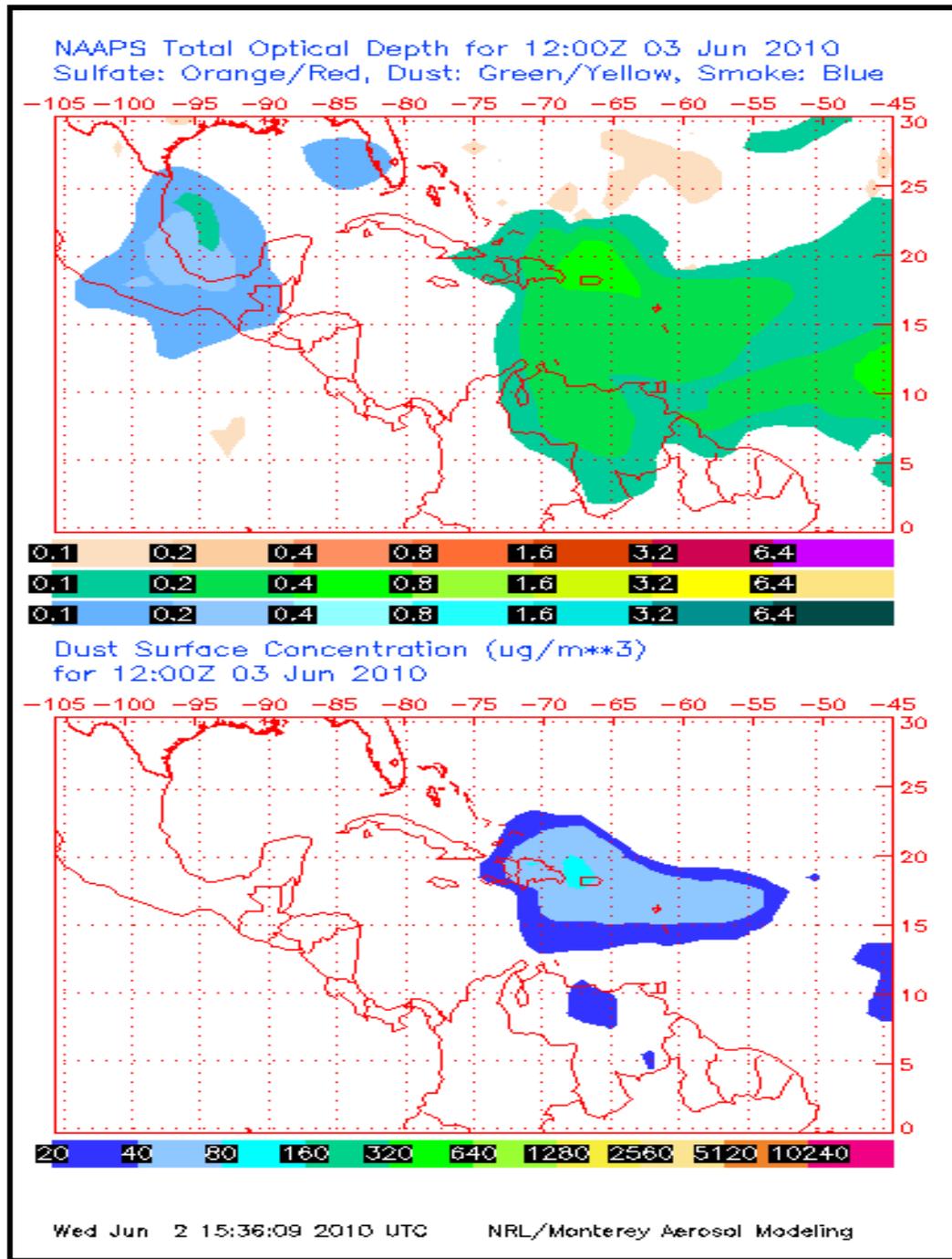




Single Filter Sample PM₁₀: 09509212

June 3, 2010		
Location	Filter Number	Value
AIRS Num.72-061-0005 EQB 24 PM ₁₀ Guaynabo	09509213	143
AIRS Num.72-053-0003 EQB 22 PM ₁₀ Fajardo	09509192	121



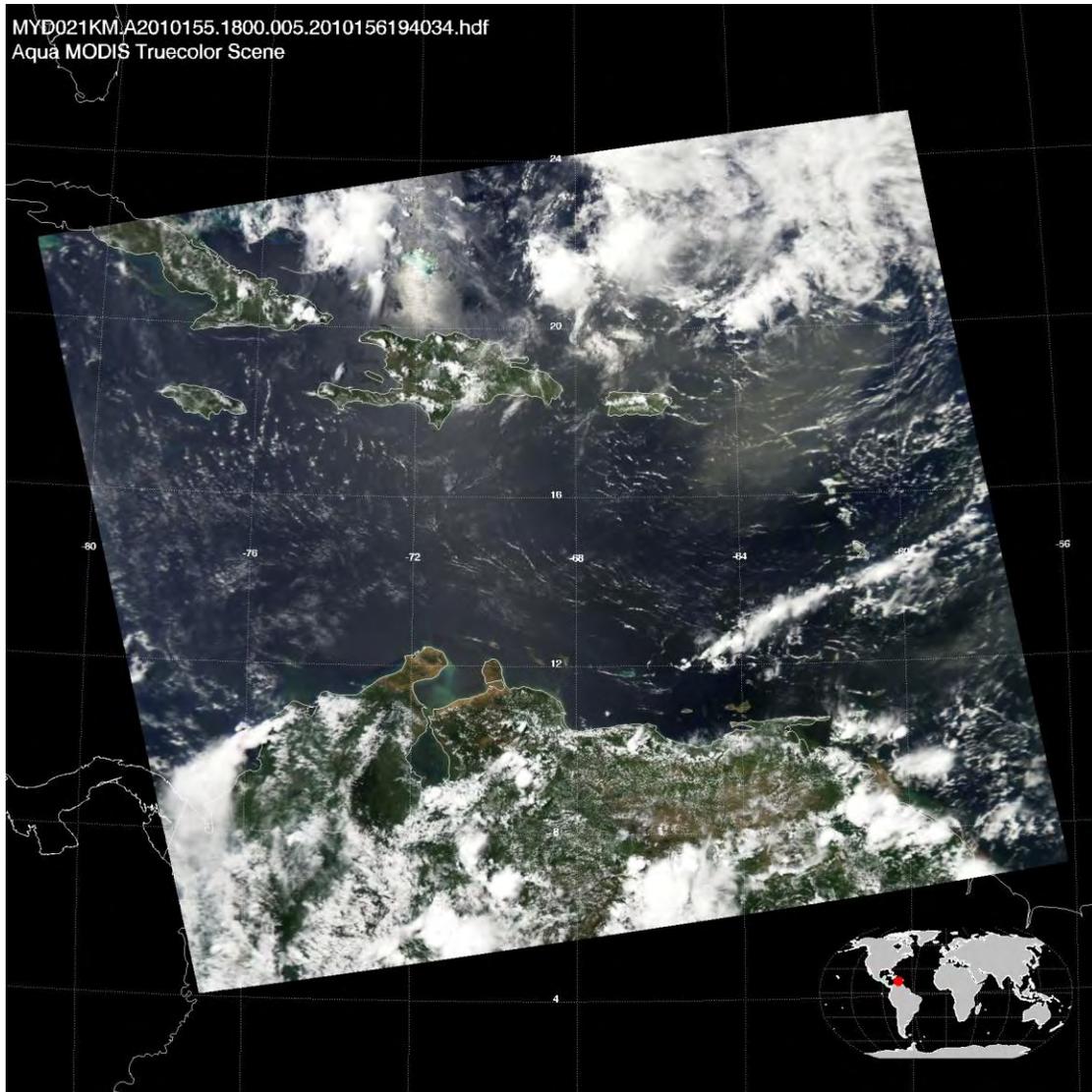


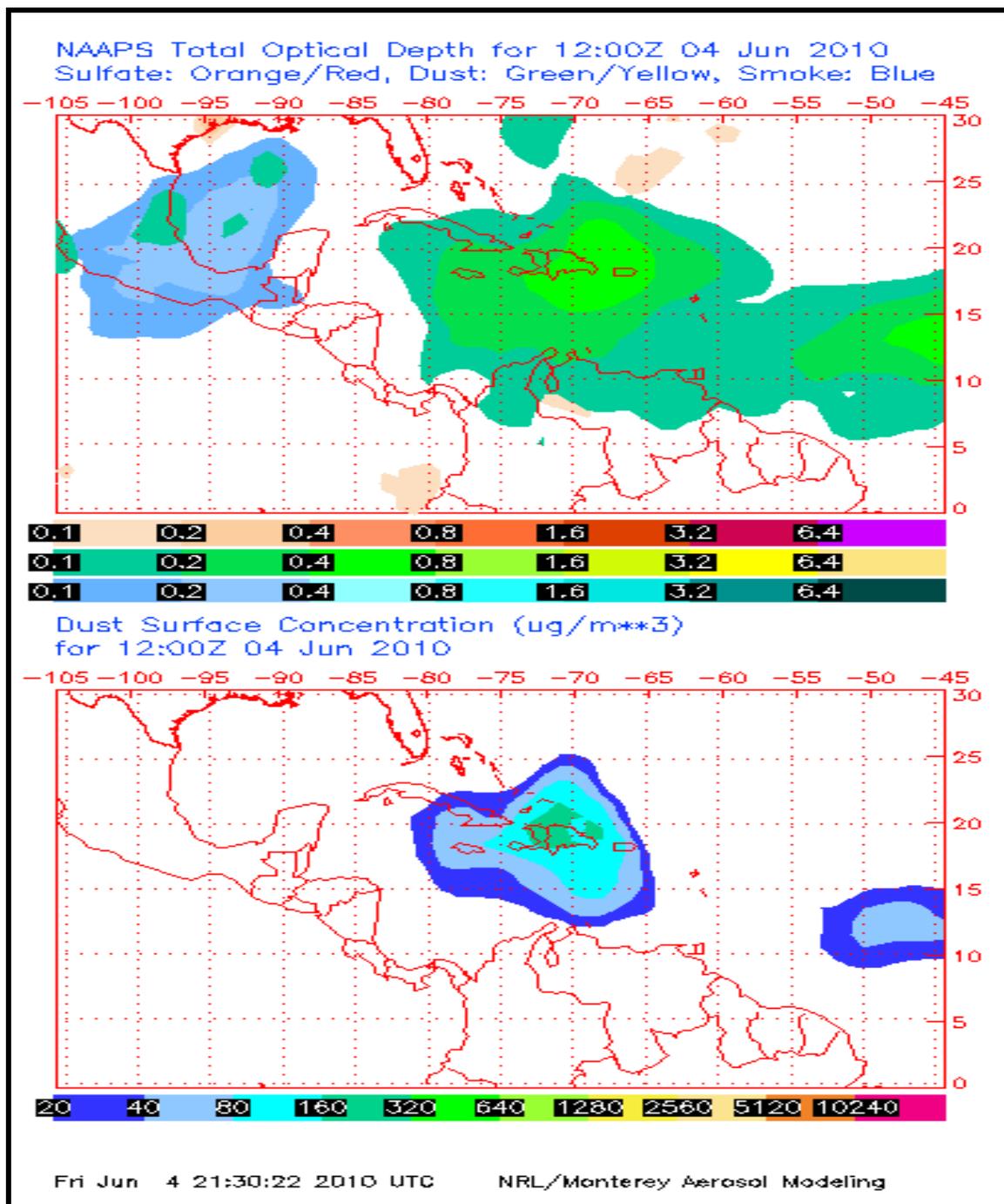


Single Filter Sample PM₁₀: 09509213

June 4, 2010		
Location	Filter Number	Value

AIRS Num.72-061-0001 EQB 7 PM ₁₀ Guaynabo	09509218	152
AIRS Num.72-053-0003 EQB 22 PM ₁₀ Fajardo	09509191	124
AIRS Num.72-061-0005 EQB 24 PM ₁₀ Guaynabo	09509220	153
AIRS Num.72-057-0008 EQB 15PM ₁₀ Guayama	09509205	126
AIRS Num.72-057-0008 EQB 15 PM _{2.5} Guayama	8268060	24.23
AIRS Num.72-053-0003 EQB 22 PM _{2.5} Fajardo	8268057	21.21
AIRS Num.72-061-0005 EQB 24 PM _{2.5} Guaynabo	8268047	31.63







Single Filter Sample PM₁₀: 09509220



Single Filter Sample PM_{2.5}: 8268060

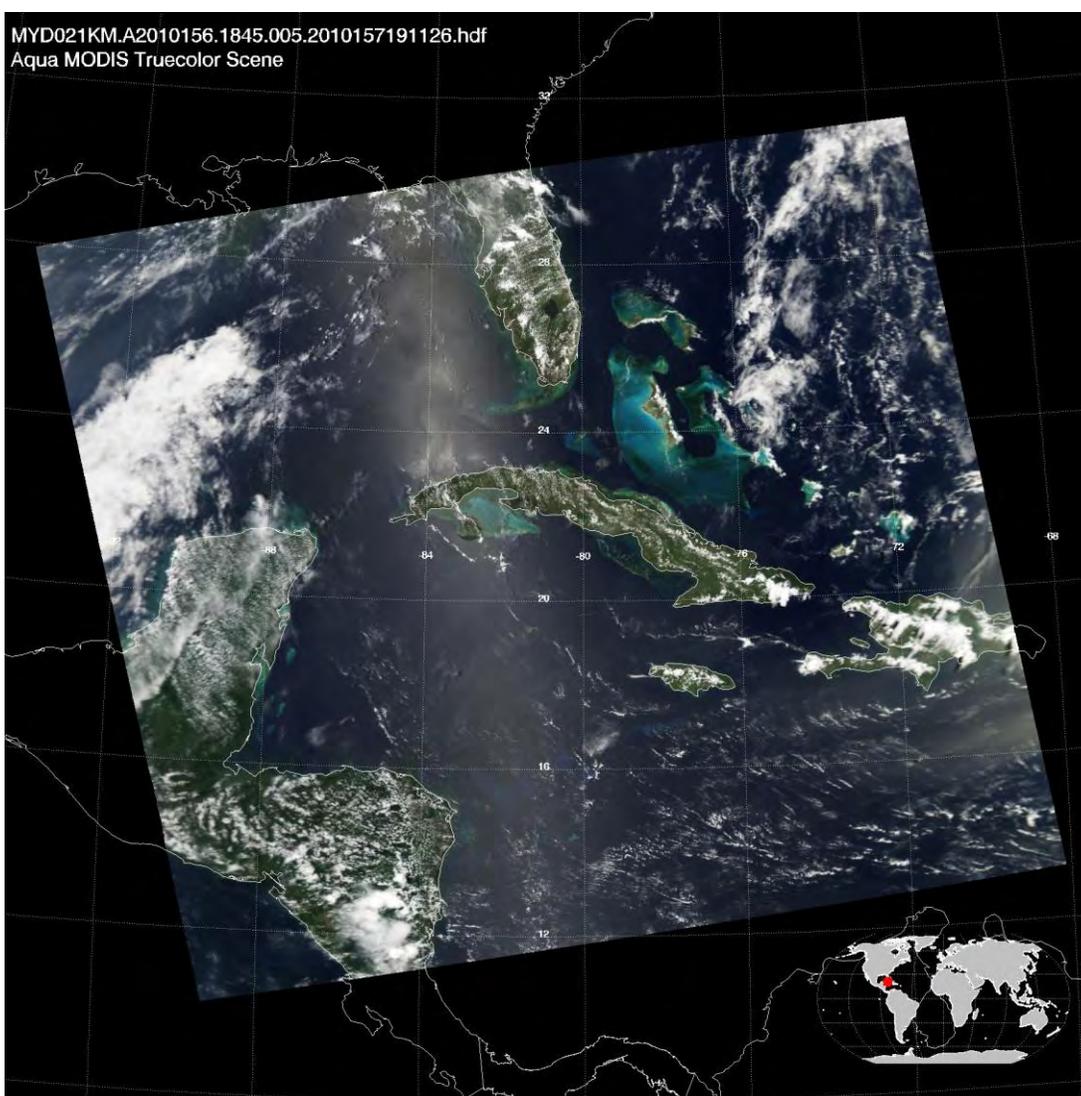


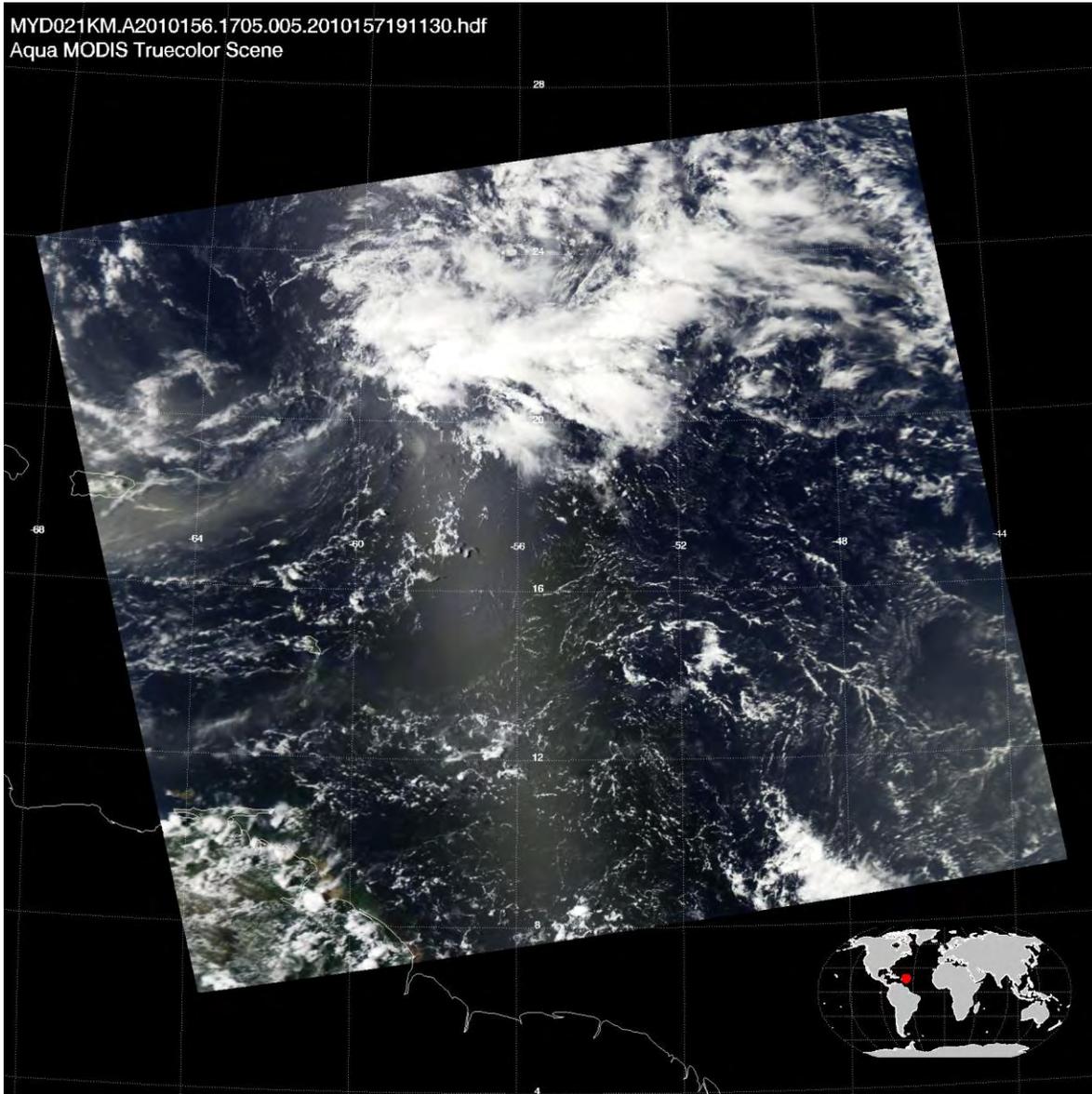
Single Filter Sample PM_{2.5}: 8268057

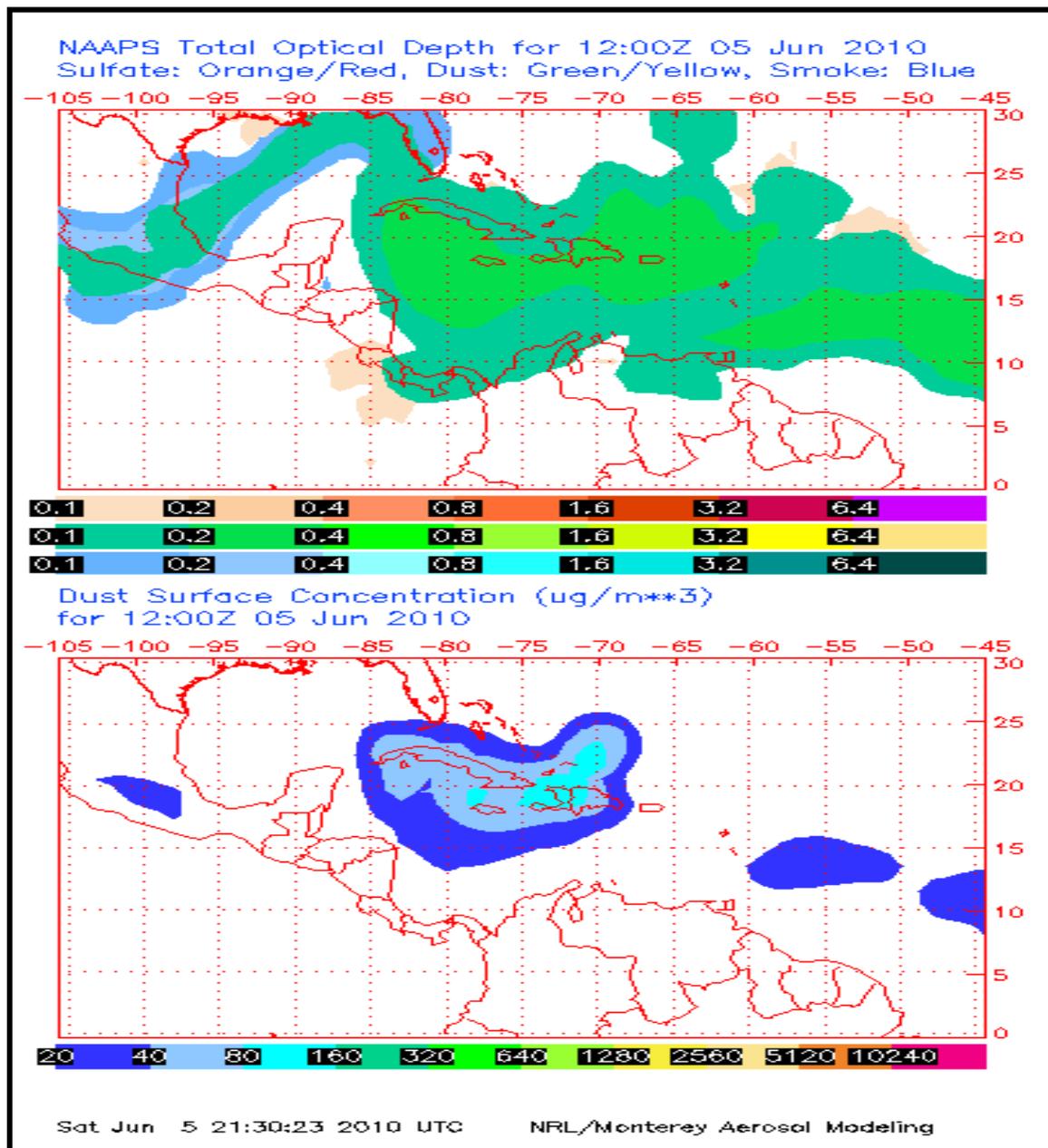


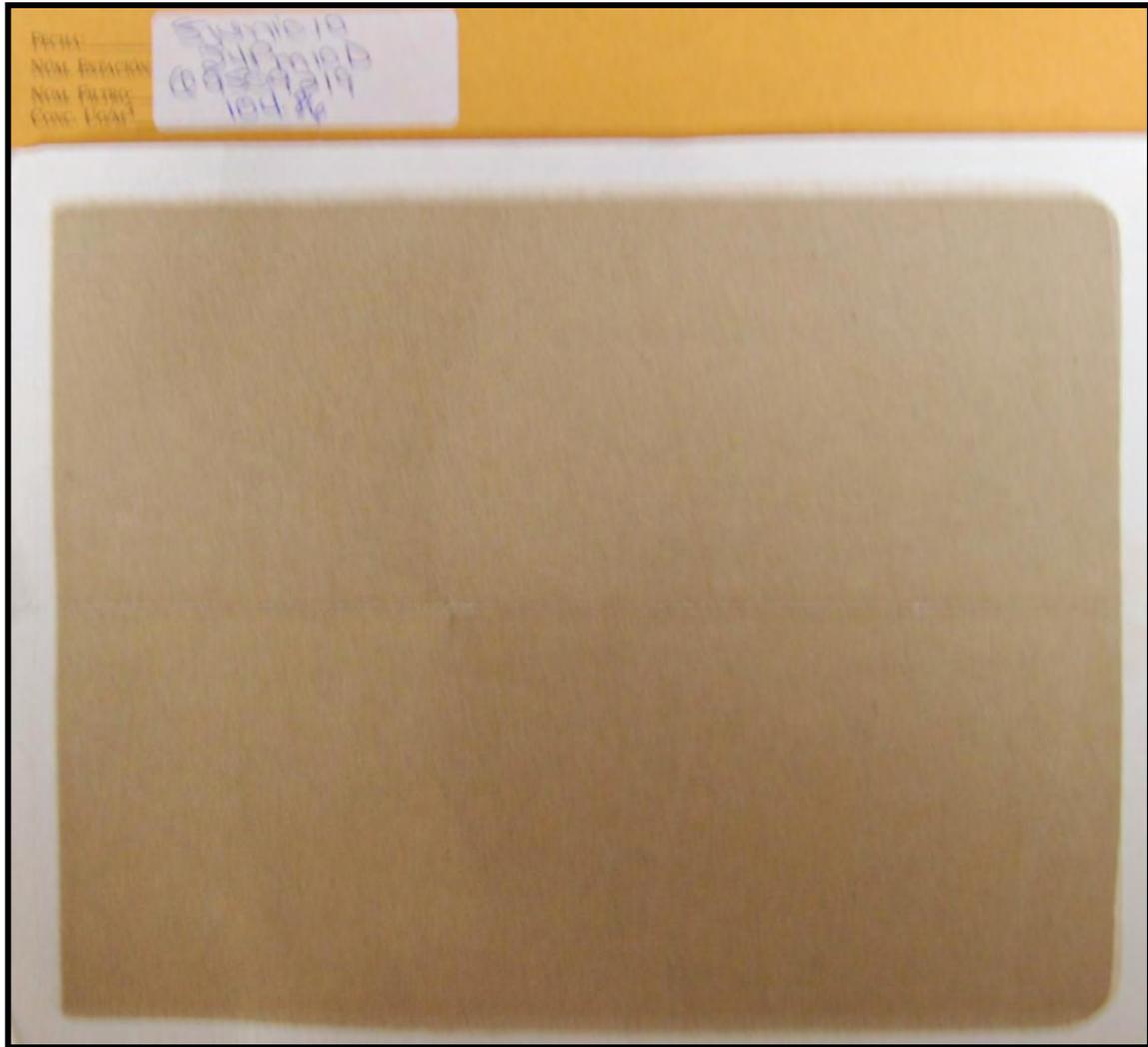
Single Filter Sample PM_{2.5}: 8268047

June 5, 2010		
Location	Filter Number	Value
AIRS Num.72-061-0005 EQB 24 PM ₁₀ Guaynabo	0950205	105
AIRS Num.72-053-0003 EQB 22 PM ₁₀ Fajardo	09509251	79



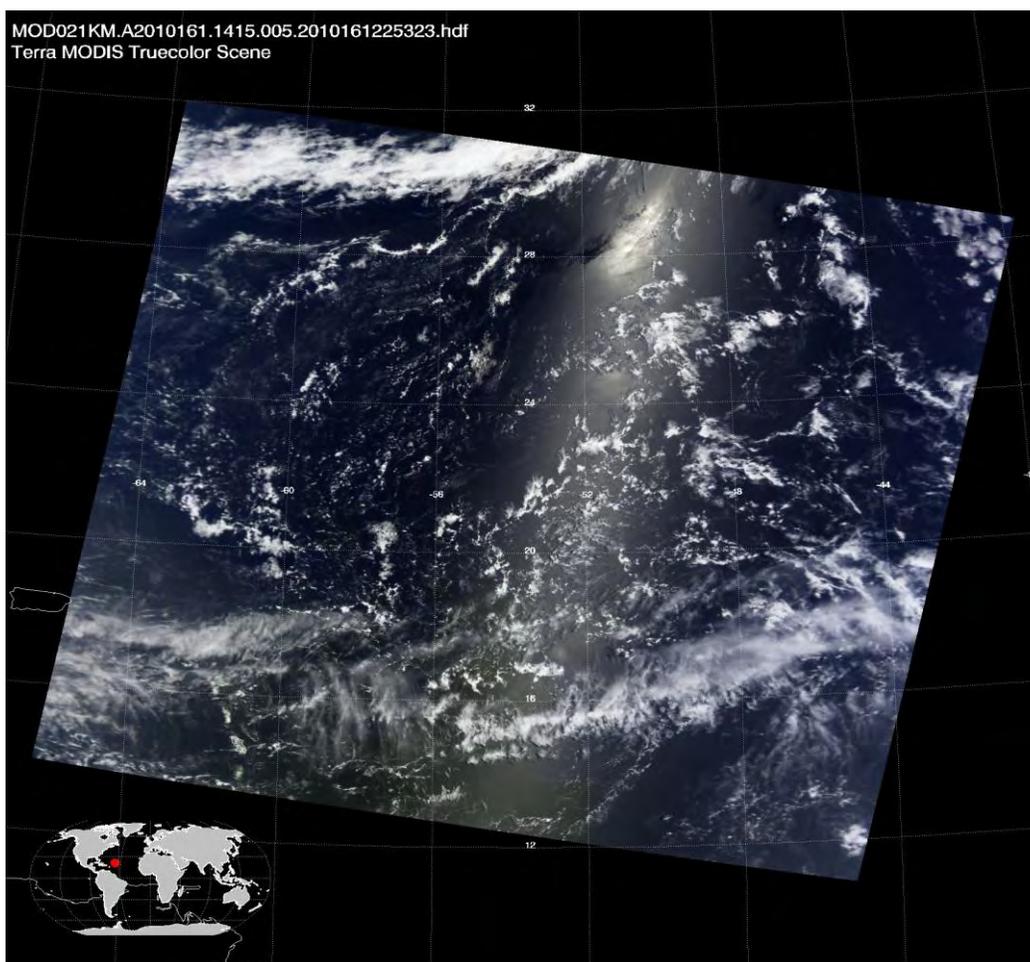


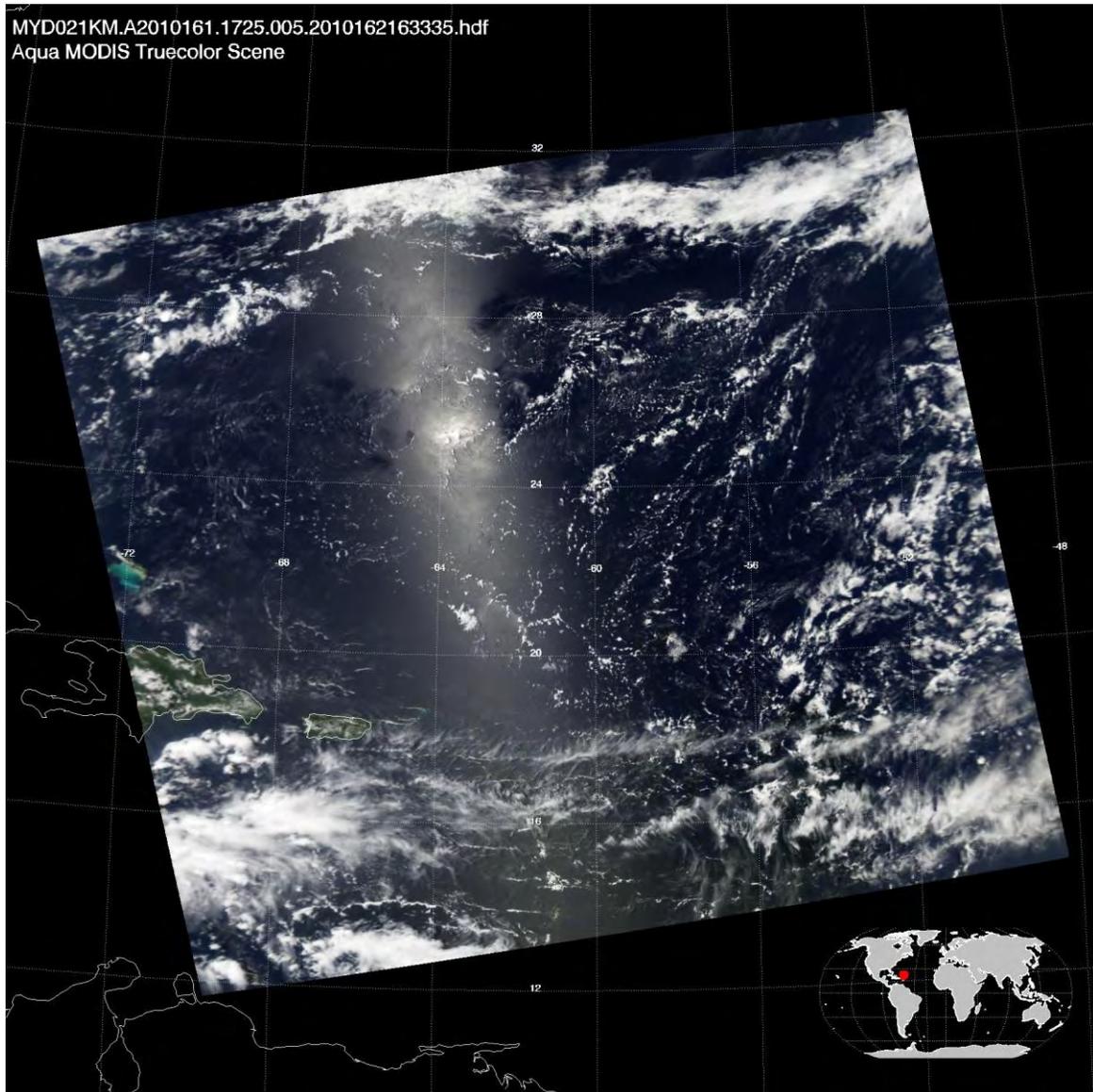


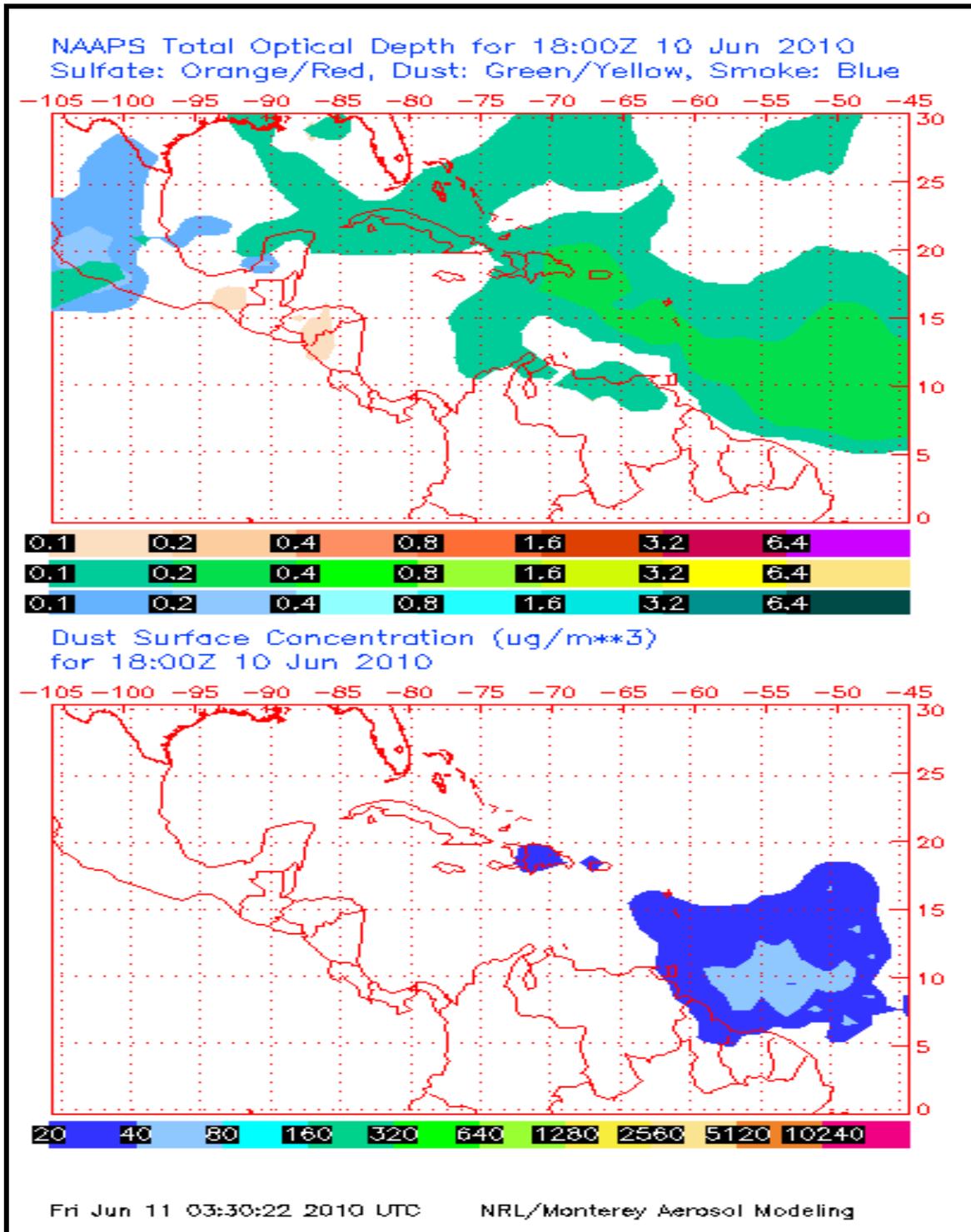


Single Filter Sample PM₁₀: 09509205

June 10, 2010		
Location	Filter Number	Value
AIRS Num.72-061-0001 EQB 7 PM ₁₀ Guaynabo	09509241	78
AIRS Num.72-061-0005 EQB 24 PM ₁₀ Guaynabo	09509248	78
AIRS Num.72-113-0004 EQB 56 PM ₁₀ Ponce	09509240	75









Single Filter Sample PM₁₀: 09509241

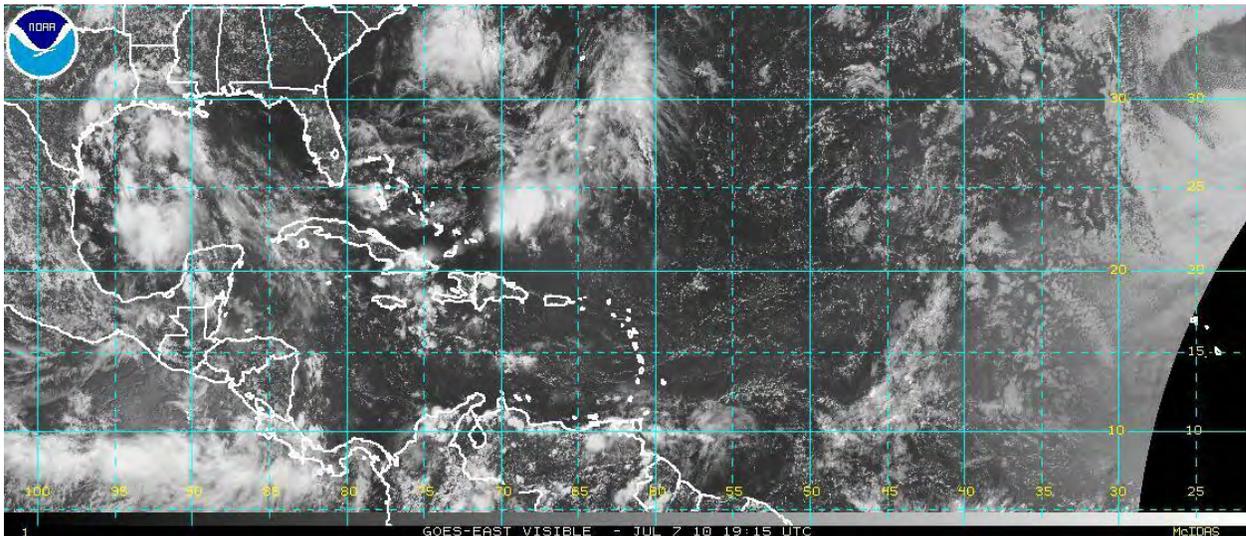


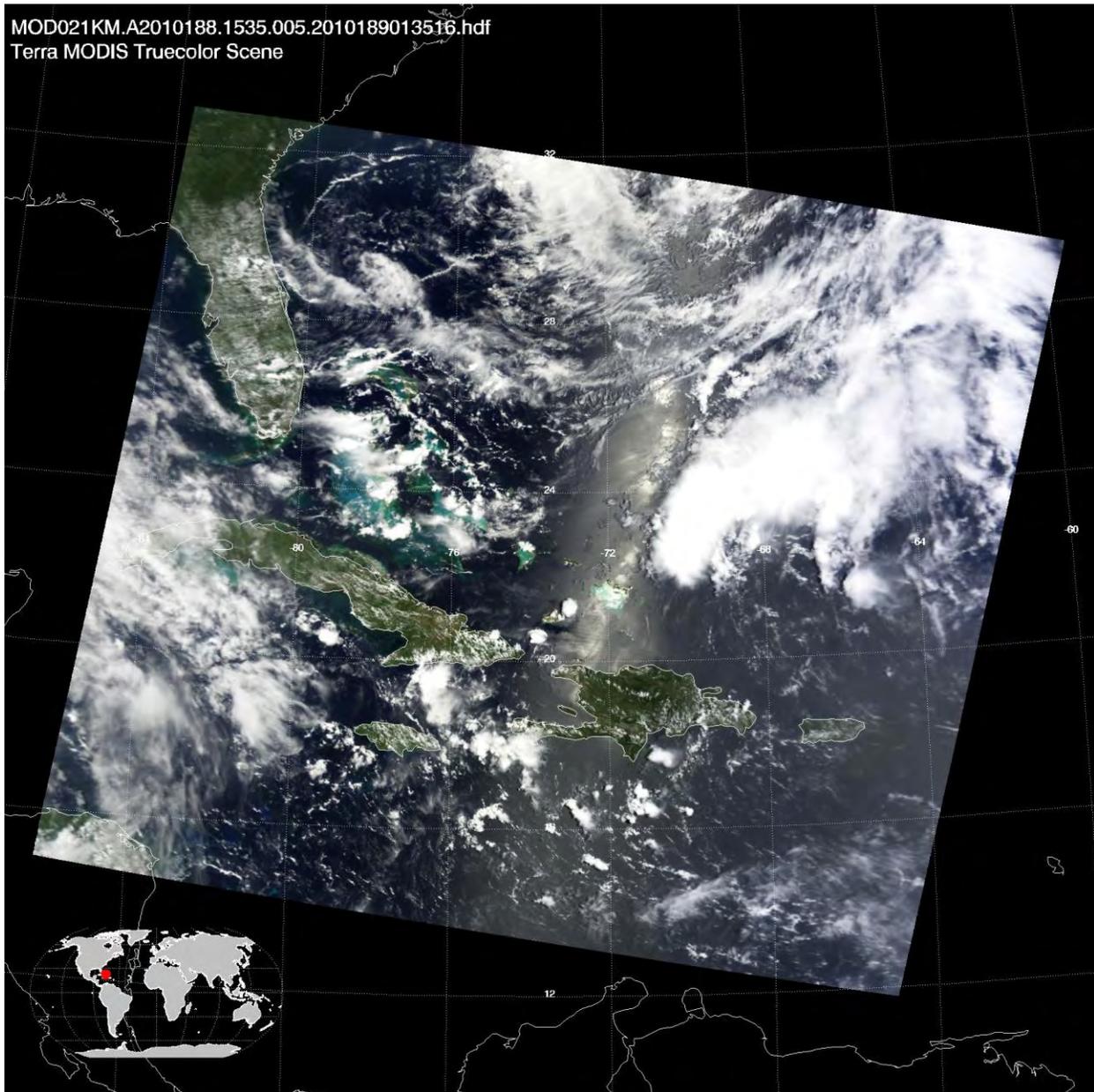
Single Filter Sample PM₁₀: 09509248



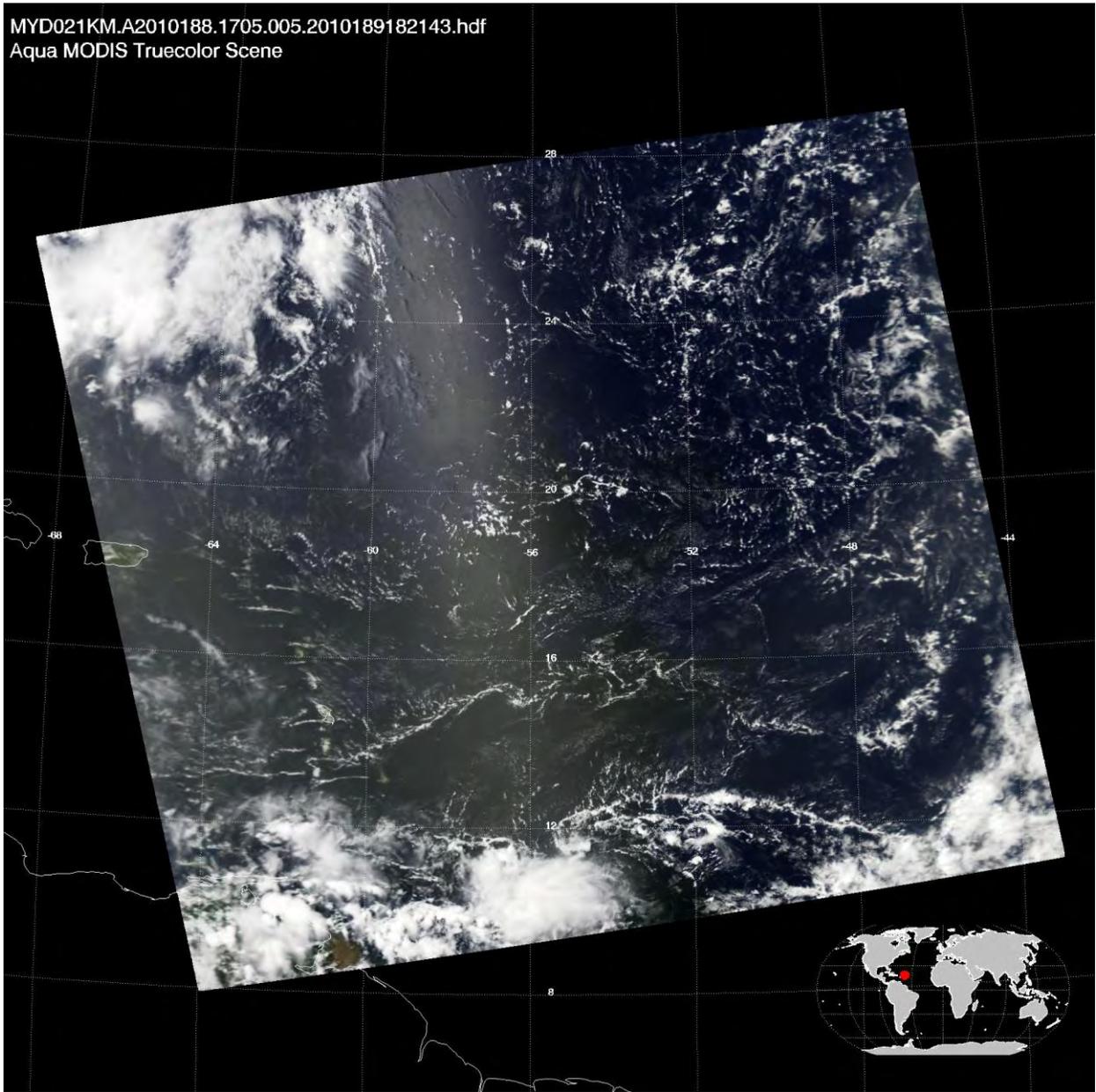
Single Filter Sample PM_{2.5}: 8268063

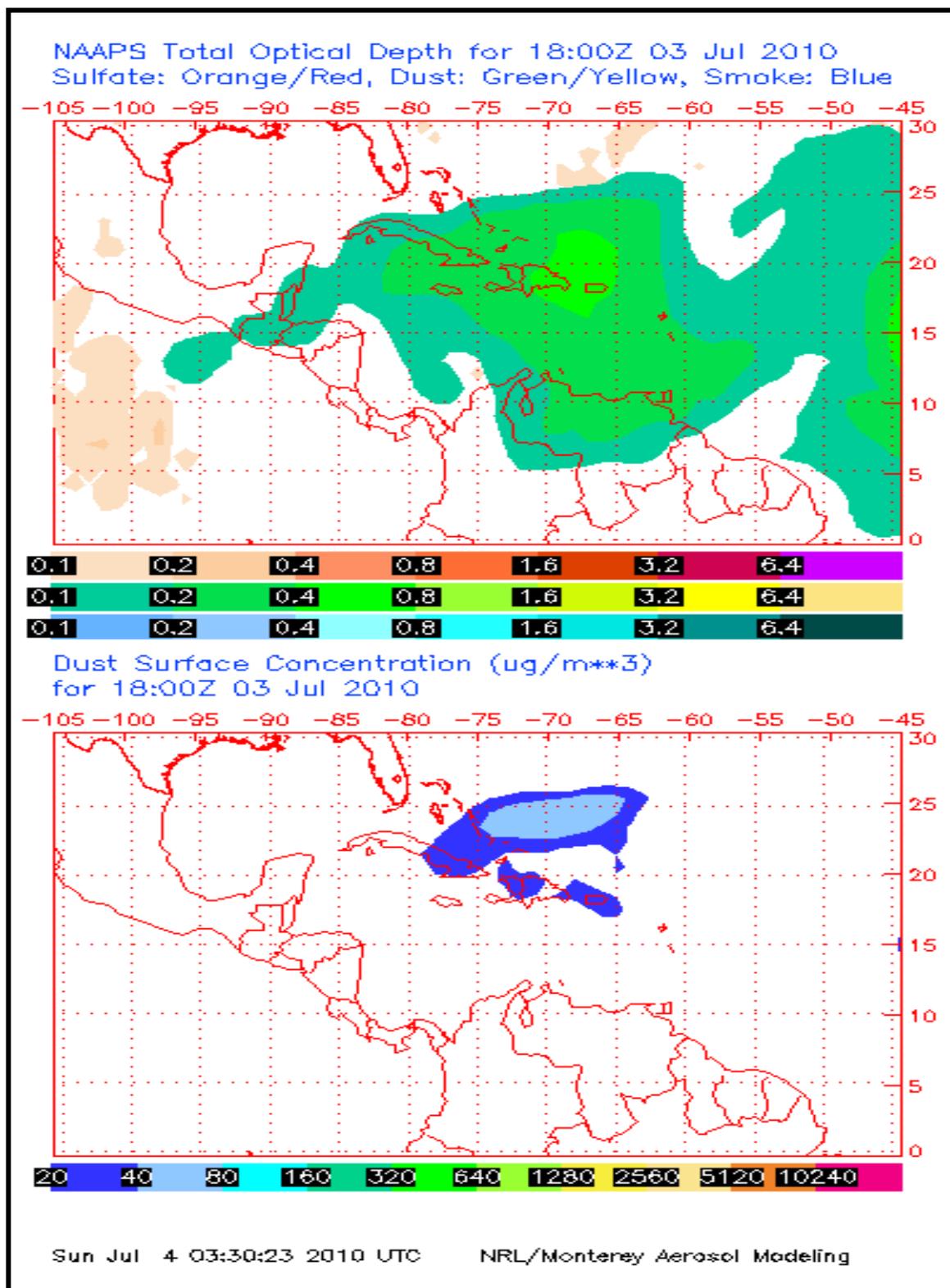
July 7, 2010		
Location	Filter Number	Value
AIRS Num.72-061-0001 EQB 7 PM ₁₀ Guaynabo	09509307	89
AIRS Num.72-061-0005 EQB 24 PM ₁₀ Guaynabo	0950926	91
AIRS Num.72-053-0003 EQB 22 PM ₁₀ Fajardo	09509332	81
AIRS Num.72-057-0008 EQB 15PM ₁₀ Guayama	09509337	88
AIRS Num.72-113-0004 EQB 56 PM ₁₀ Ponce	09509287	88

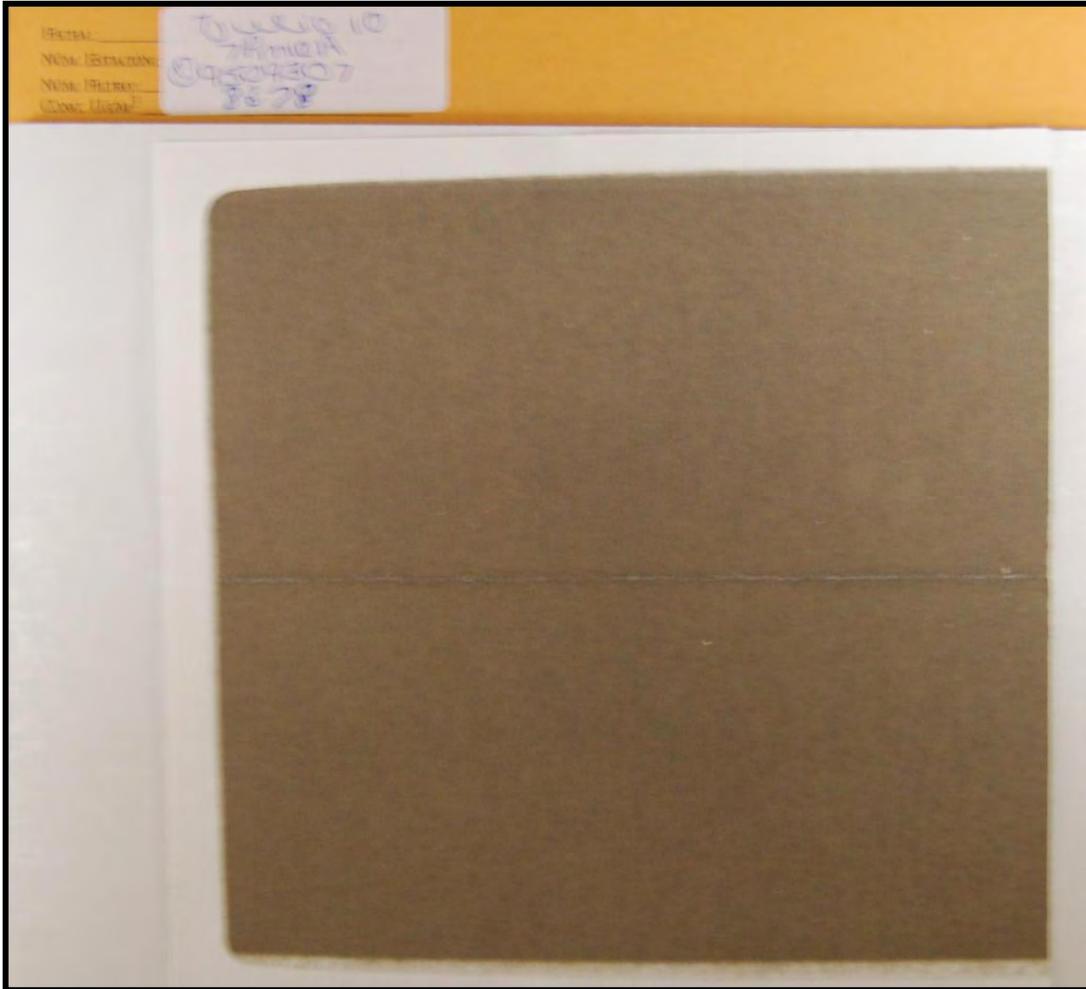




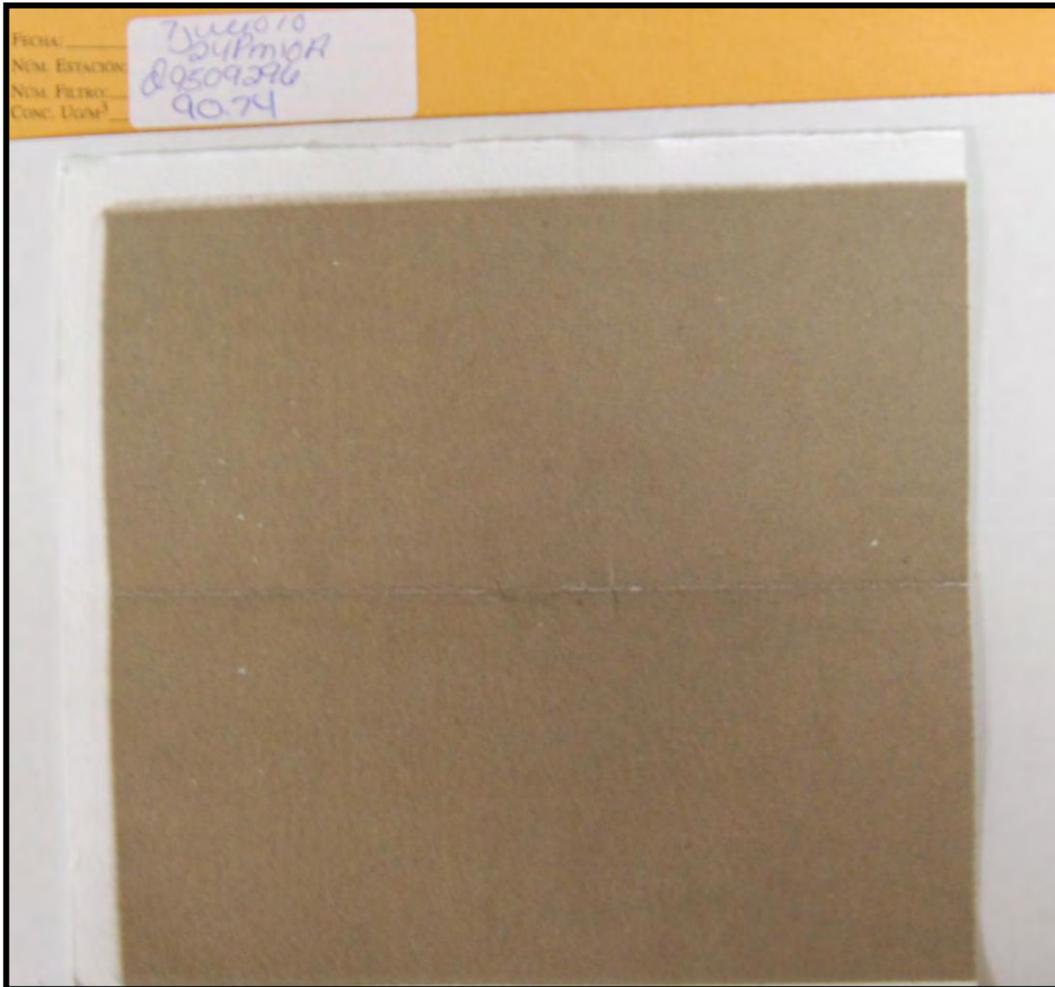
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Aqua MODIS Truecolor Scene







Single Filter Sample PM₁₀: 09509307



Single Filter Sample PM₁₀: 09509296



Single Filter Sample PM_{2.5}: 8268124

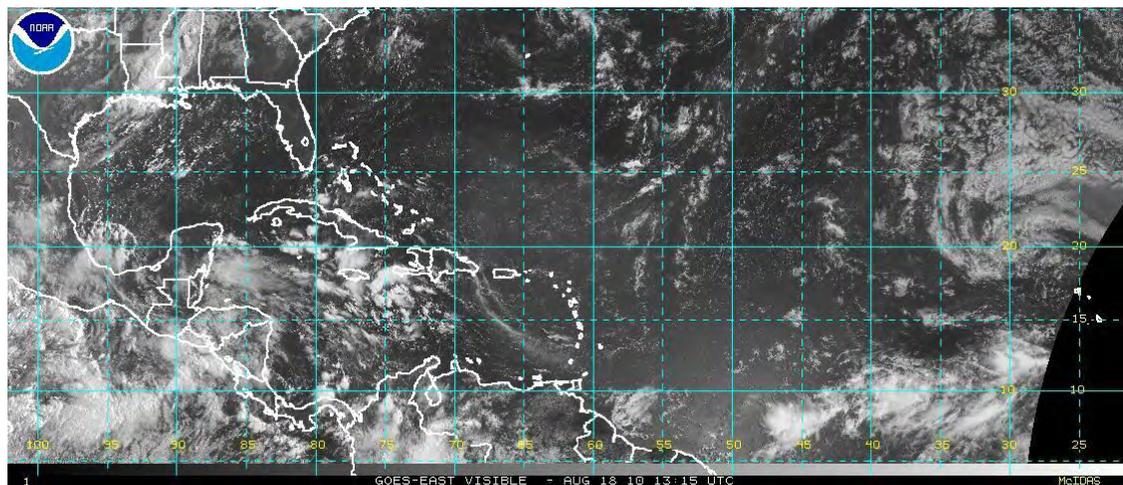


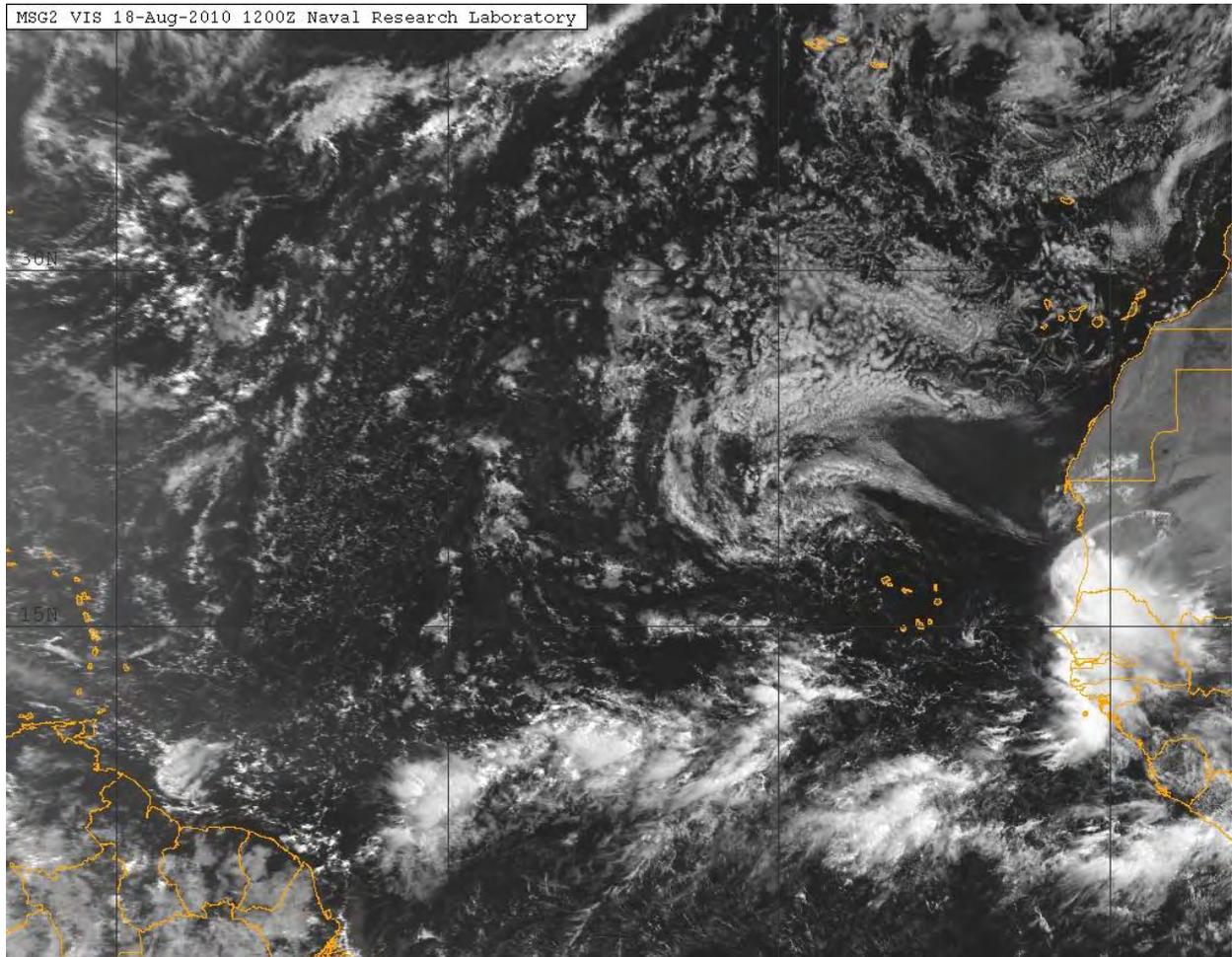
Single Filter Sample PM_{2.5}: 8268116

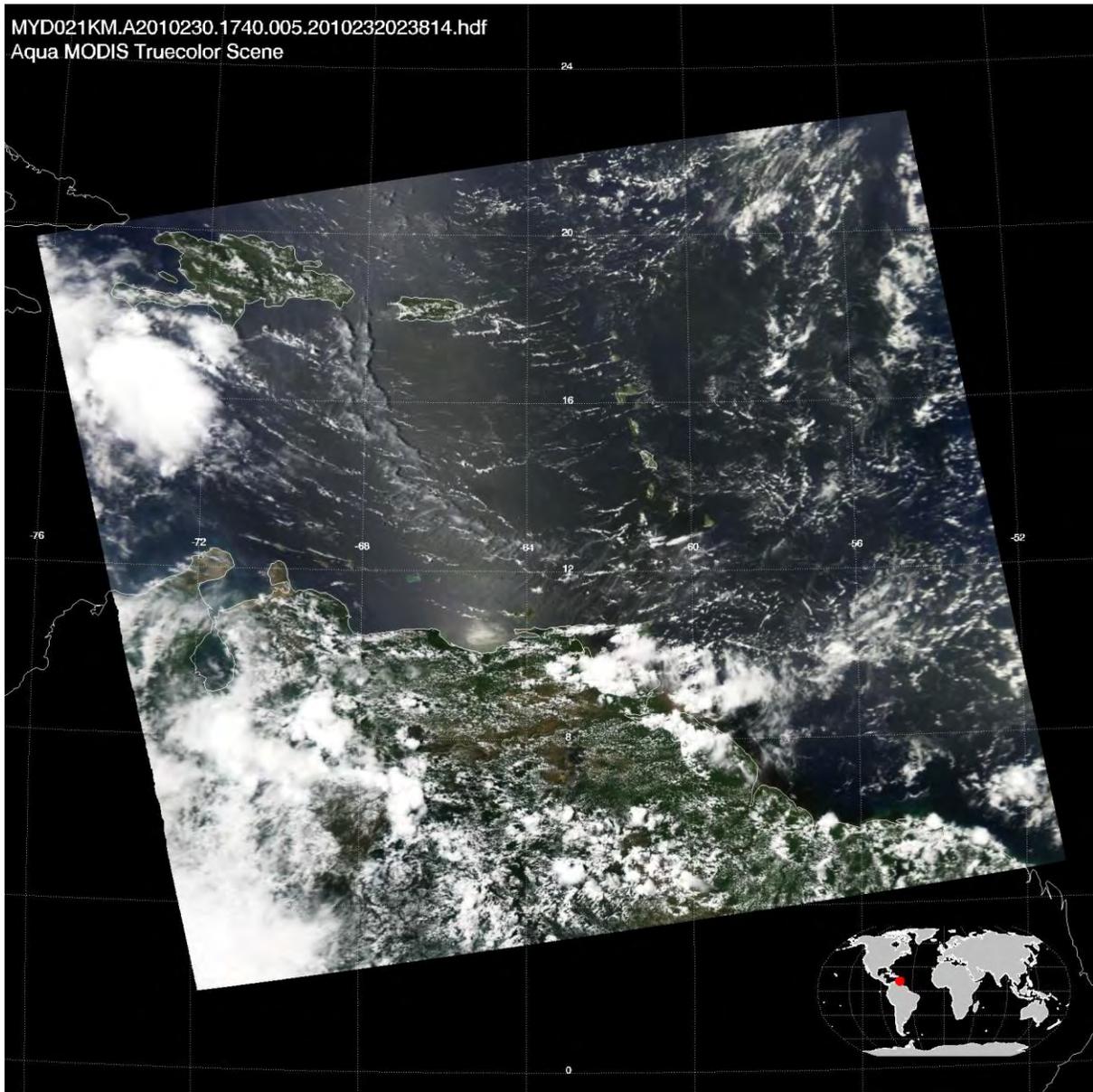


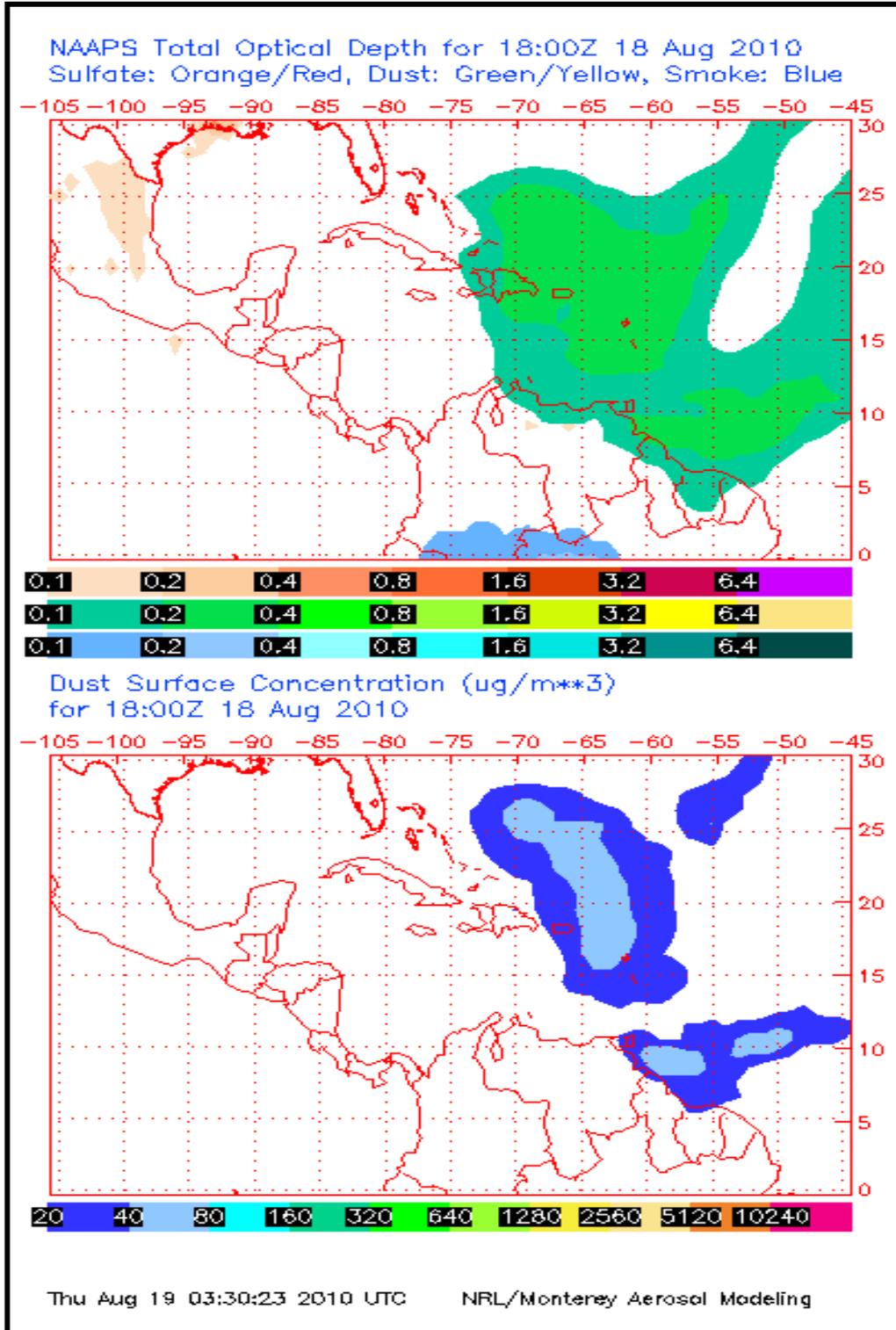
Single Filter Sample $PM_{2.5}$: 8268108

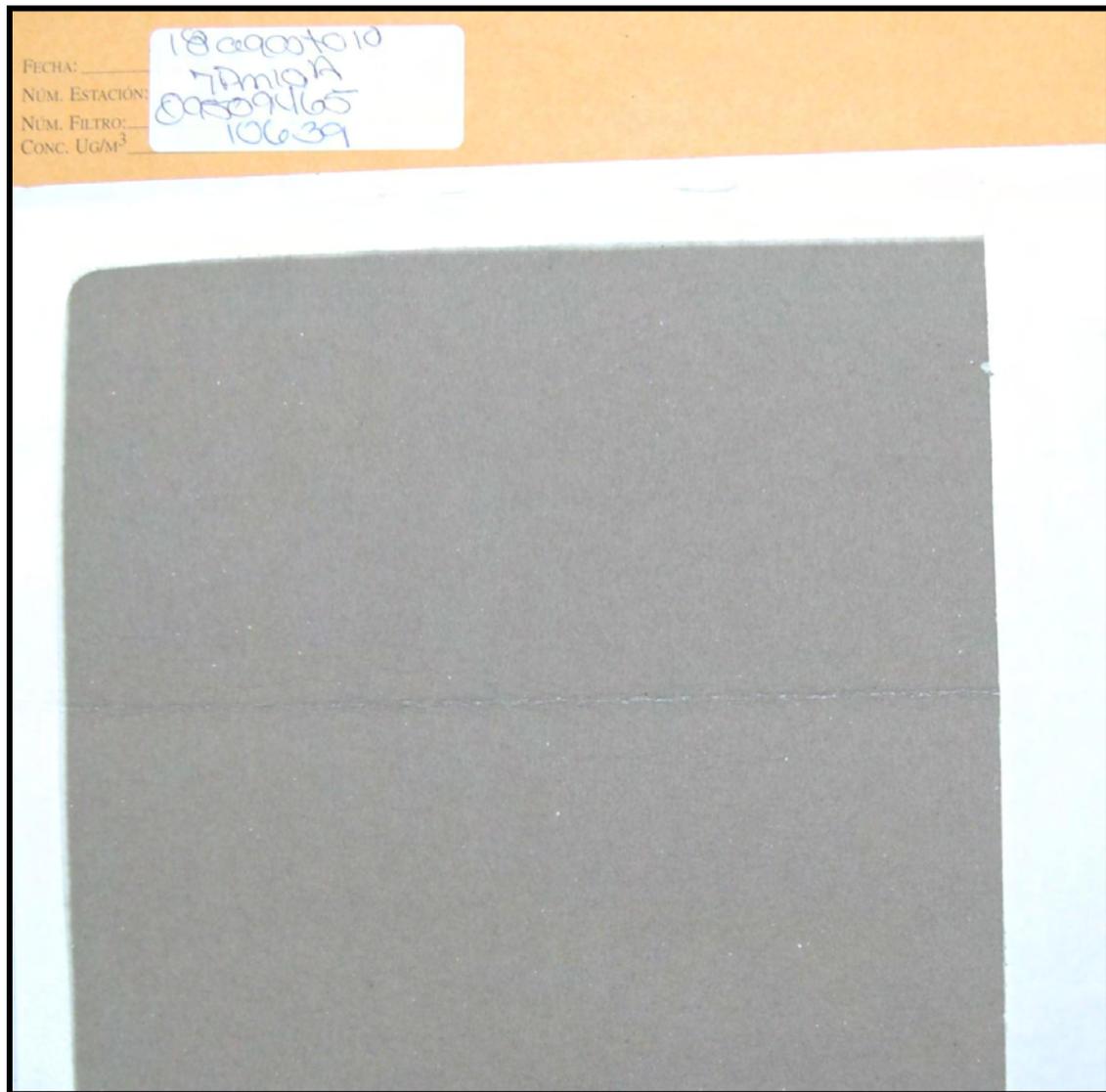
August 18, 2010		
Location	Filter Number	Value
AIRS Num.72-061-0001 EQB 7 PM ₁₀ Guaynabo	09509465	106
AIRS Num.72-061-0005 EQB 24 PM ₁₀ Guaynabo	09509467	112
AIRS Num.72-053-0003 EQB 22 PM ₁₀ Fajardo	09509476	98
AIRS Num.72-057-0008 EQB 15PM ₁₀ Guayama	09509423	84
AIRS Num.72-113-0004 EQB 56 PM ₁₀ Ponce	09509471	83
AIRS Num.72-061-0005 EQB 24 PM _{2.5} Guaynabo	8268193	20.29
AIRS Num.72-053-0003 EQB 22 PM _{2.5} Fajardo	8268189	21.04



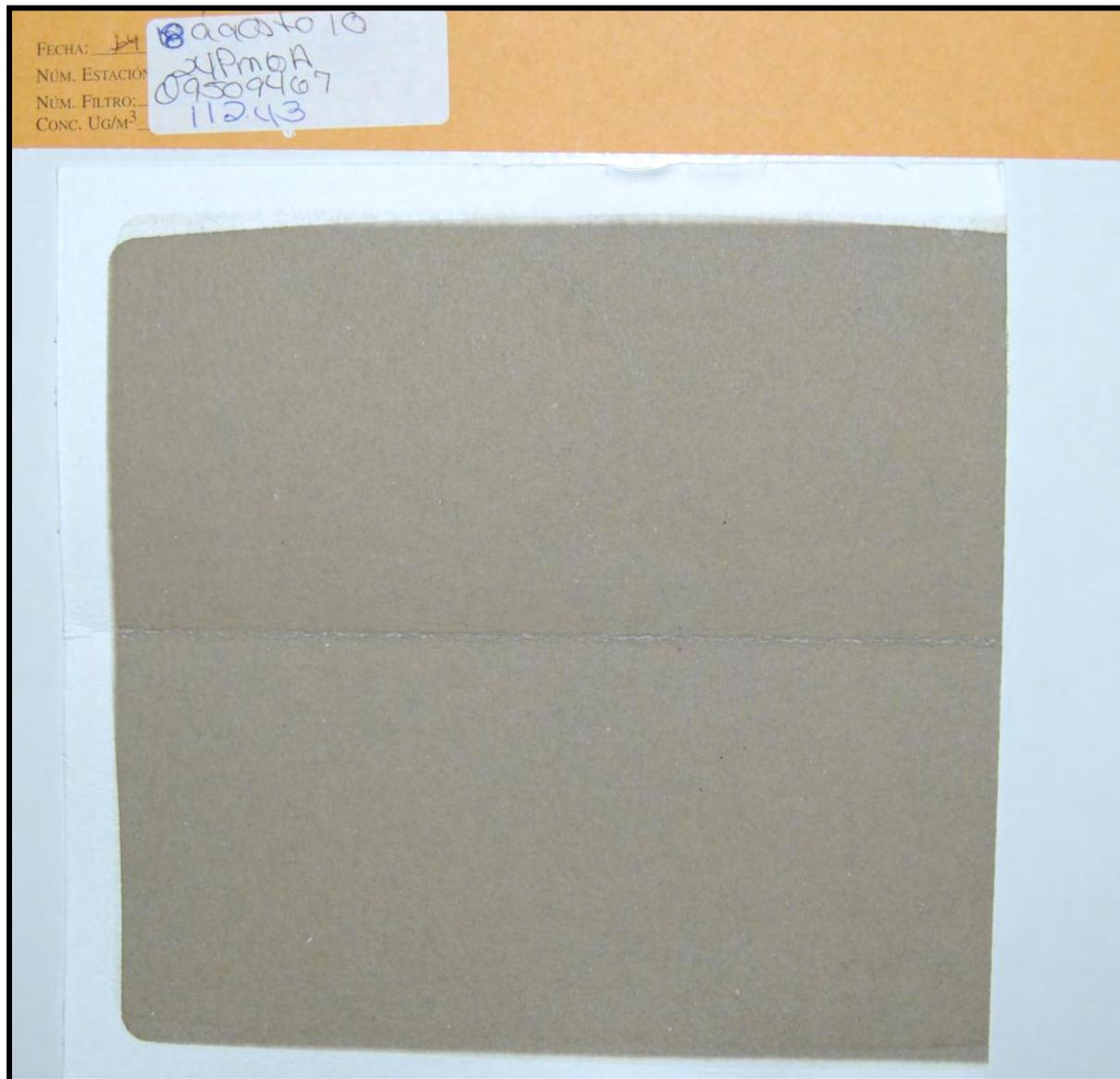








Single Filter Sample PM₁₀: 09509465



Single Filter Sample PM₁₀: 09509467



Single Filter Sample PM_{2.5}: 8268193

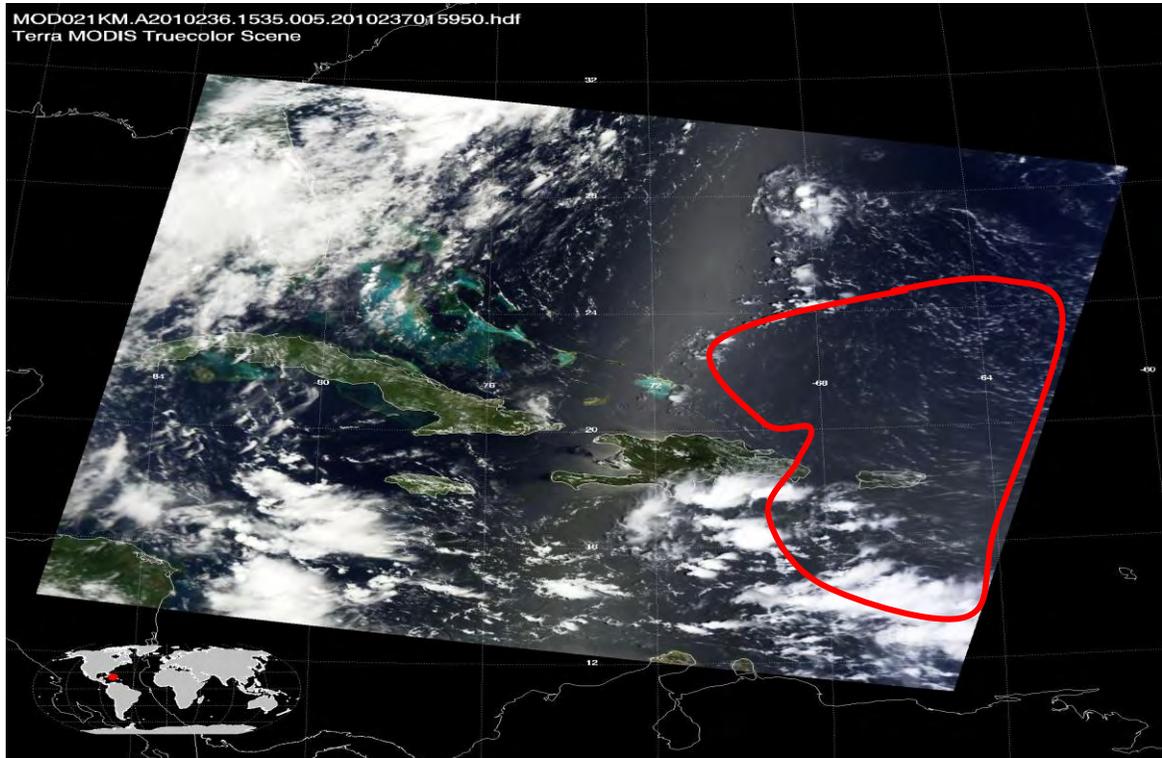


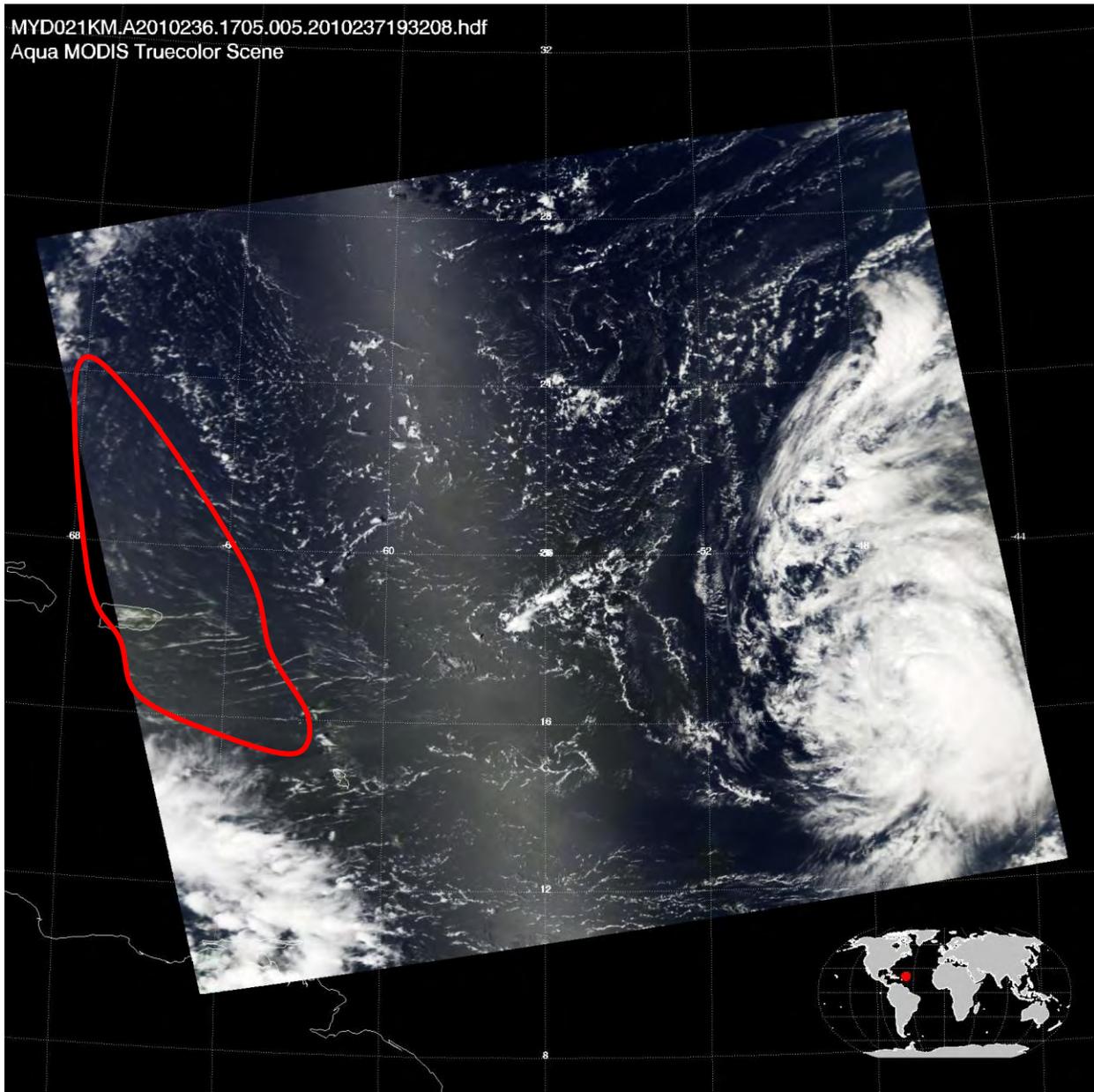
Single Filter Sample PM_{2.5}: 8268189

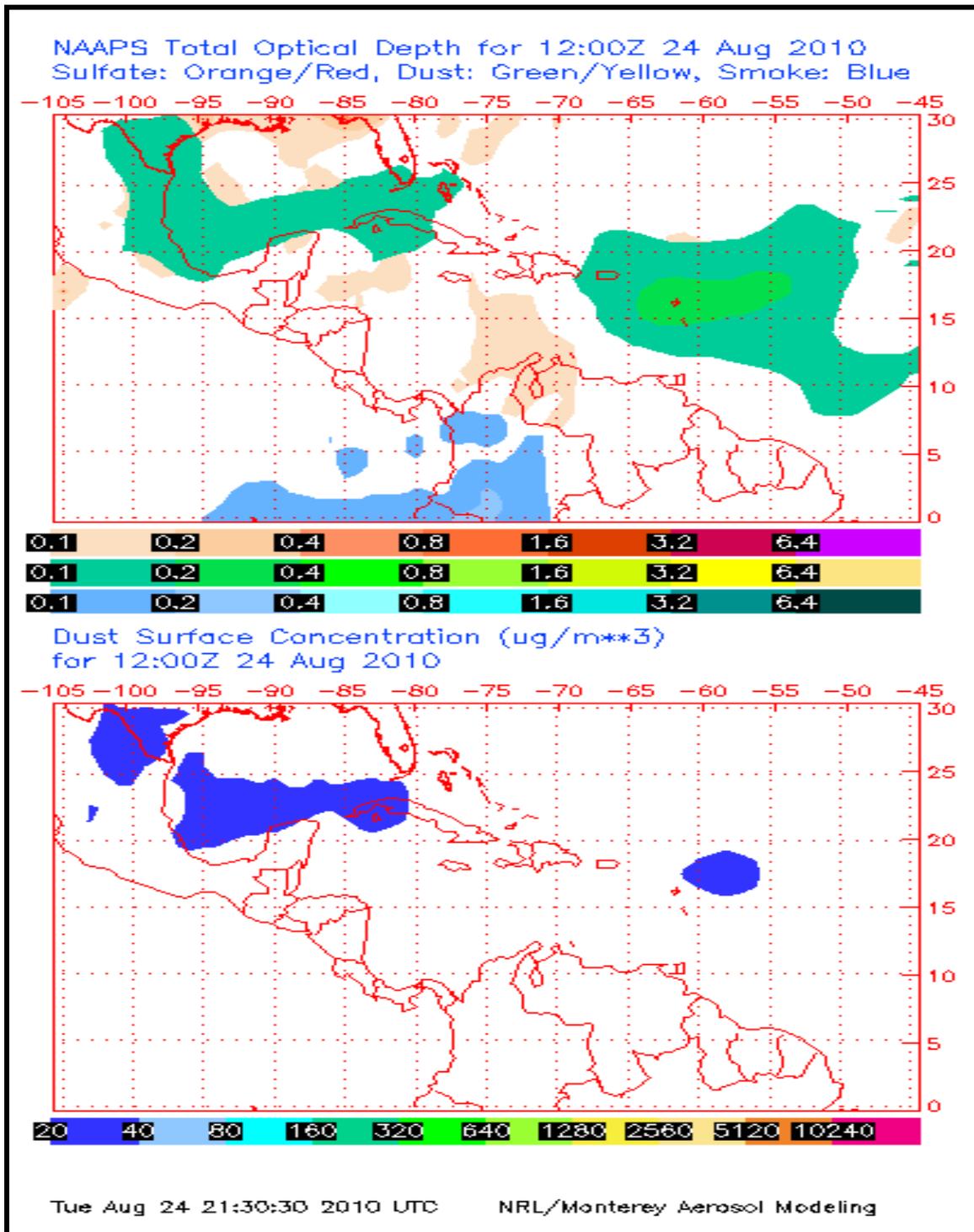


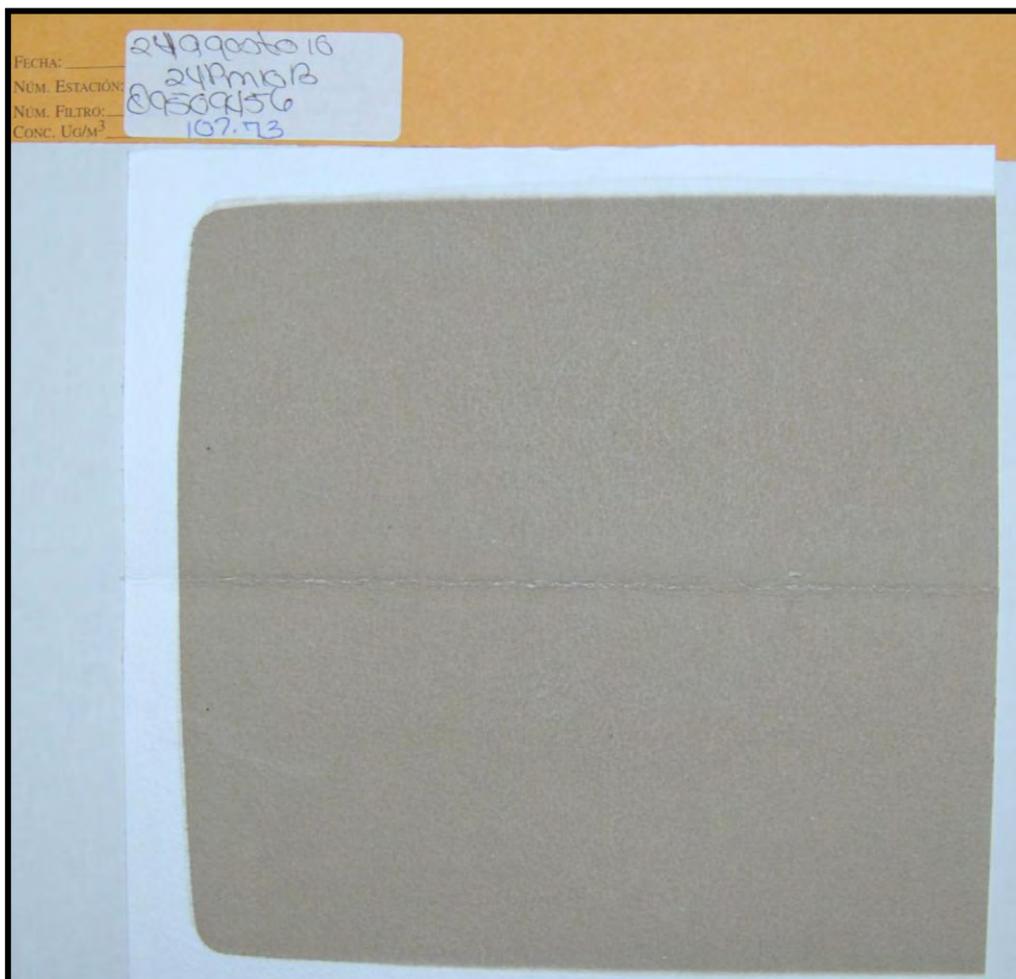
Single Filter Sample PM_{2.5}: 8268196

August 24, 2010		
Location	Filter Number	Value
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AIRS Num.72-053-0003 EQB 22 PM ₁₀ Fajardo	09509385	90
AIRS Num.72-057-0008 EQB 15PM ₁₀ Guayama	09509454	92
AIRS Num.72-113-0004 EQB 56 PM ₁₀ Ponce	09509458	87
AIRS Num.72-061-0005 EQB 24 PM _{2.5} Guaynabo	8268202	17.63
AIRS Num.72-053-0003 EQB 22 PM _{2.5} Fajardo	8268198	17.51
AIRS Num.72-113-0004 EQB 56 PM _{2.5} Ponce	8268194	18.21

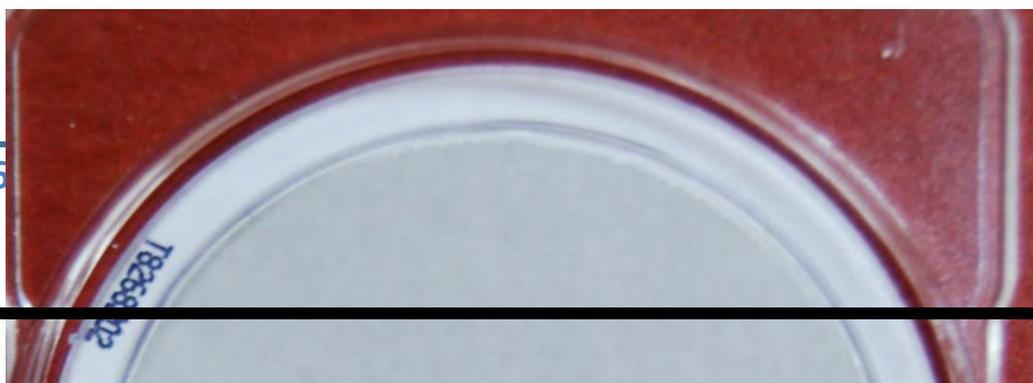


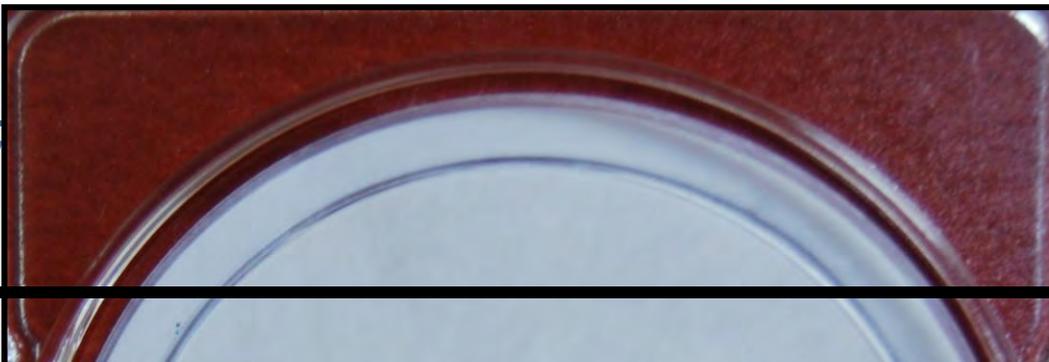






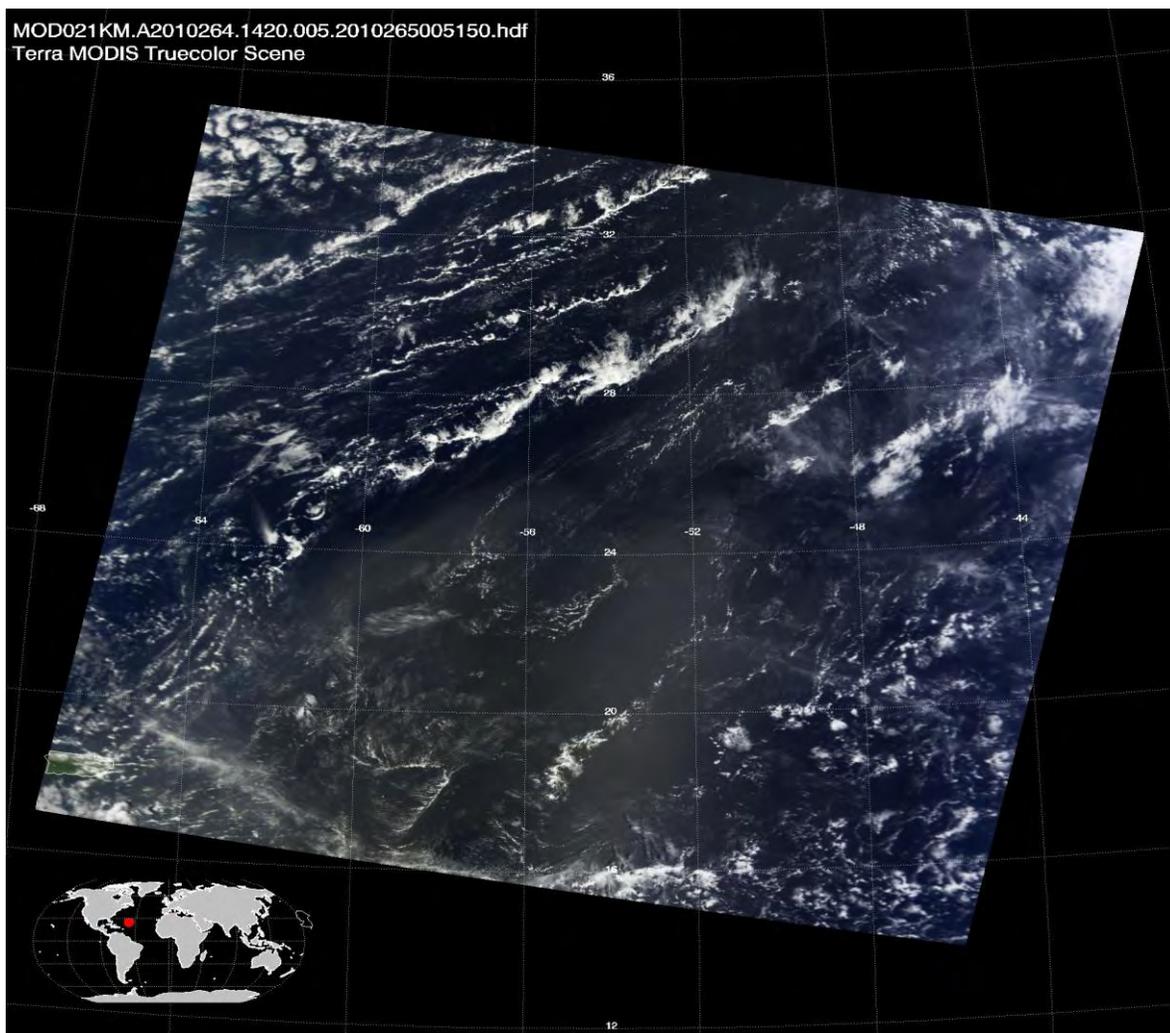
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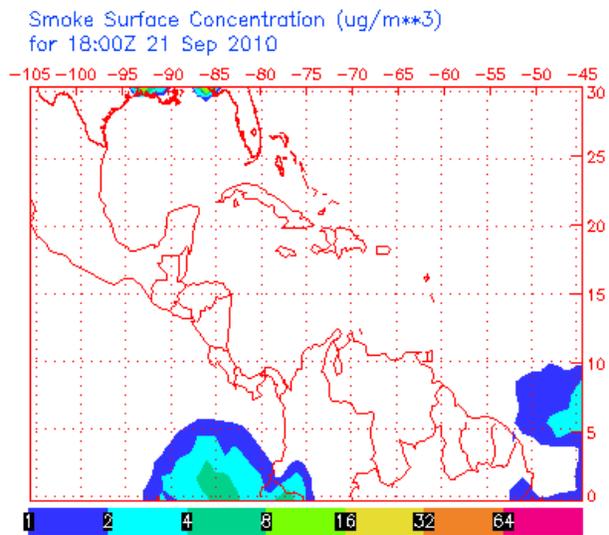
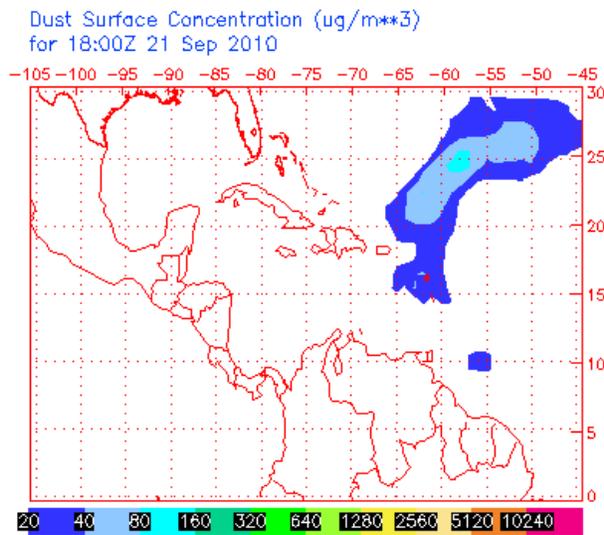
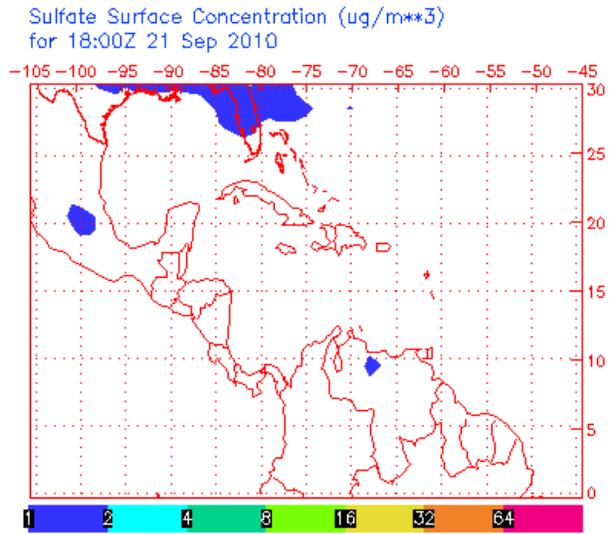
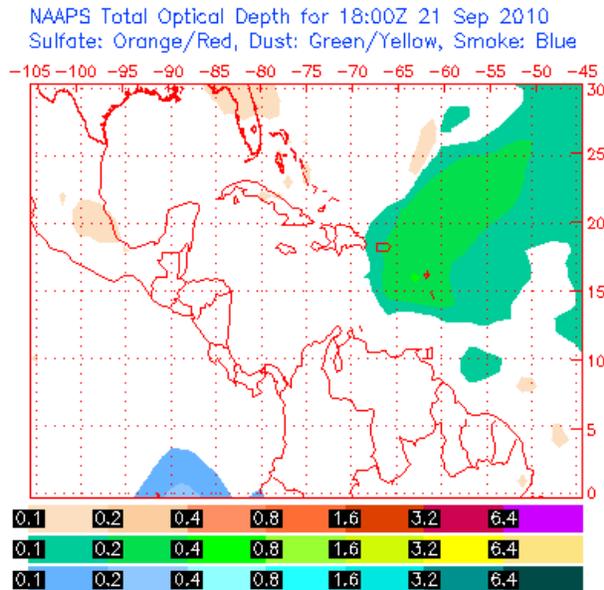




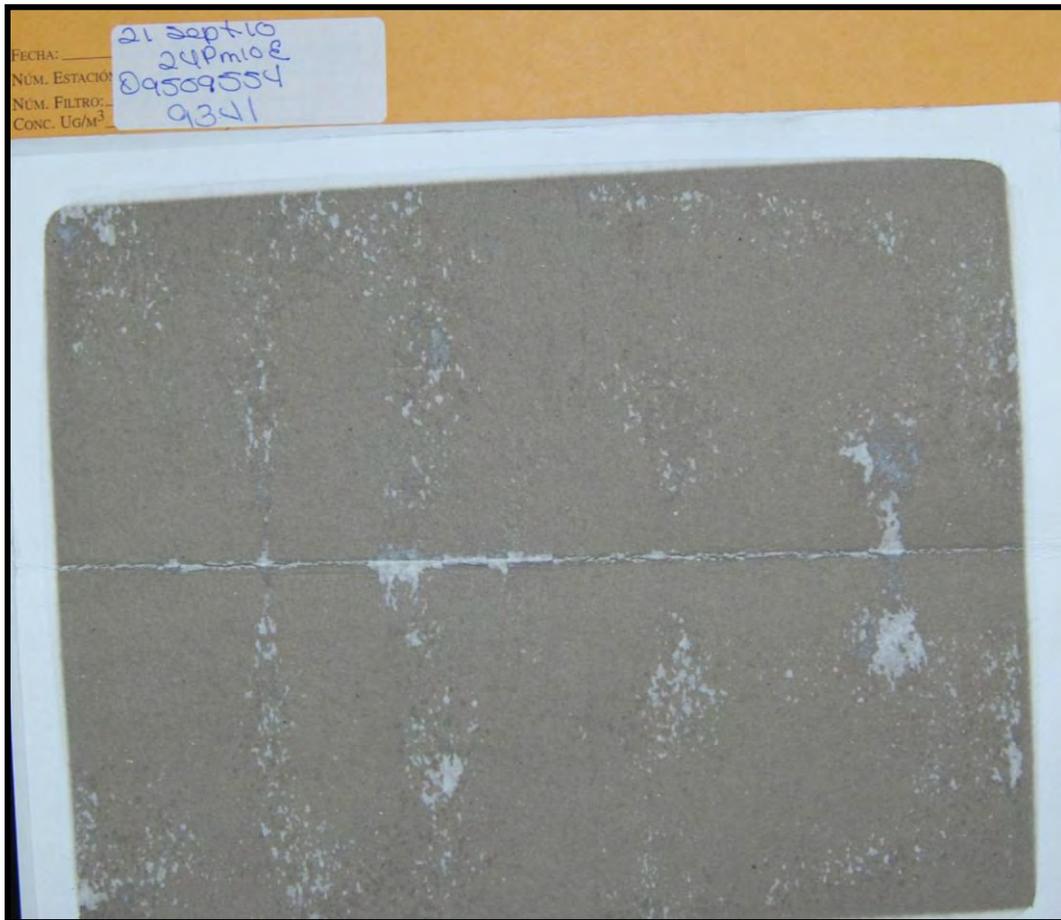
September 21, 2010		
Location	Filter Number	Value

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AIRS Num.72-053-0003 EQB 22 PM ₁₀ Fajardo	09509556	89



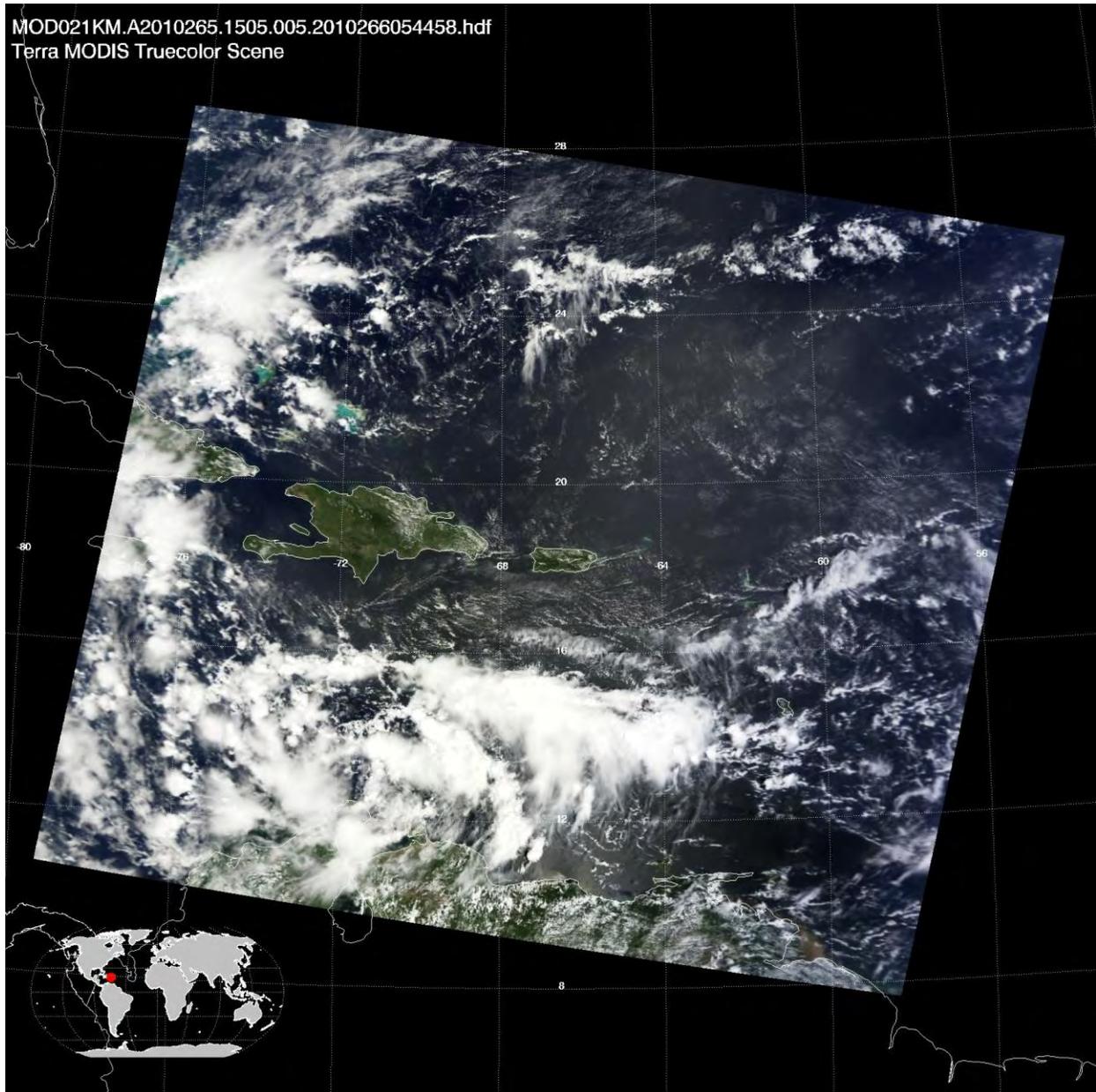


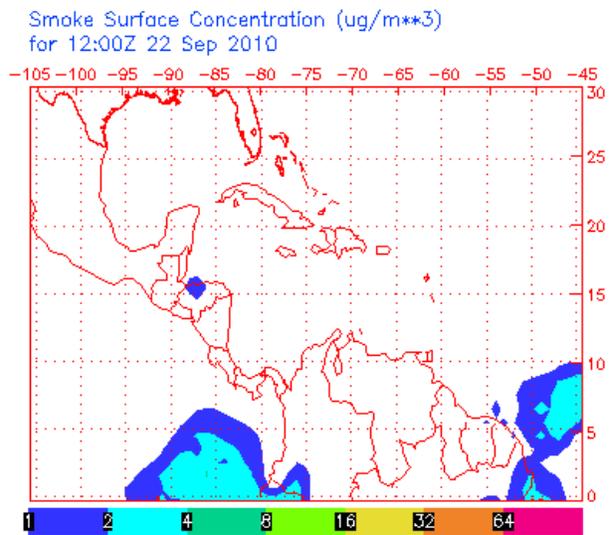
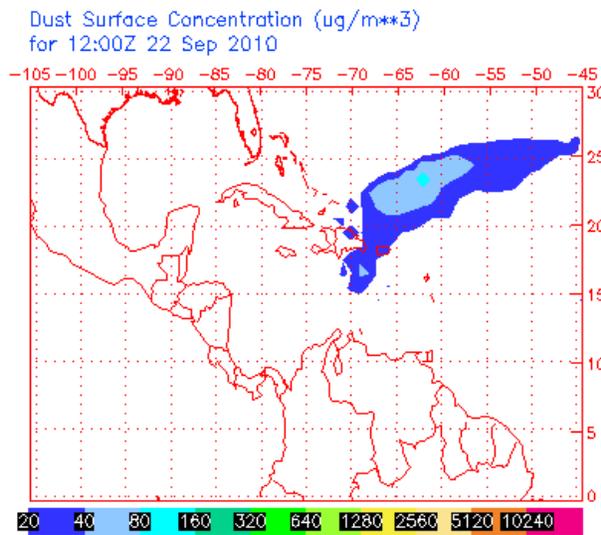
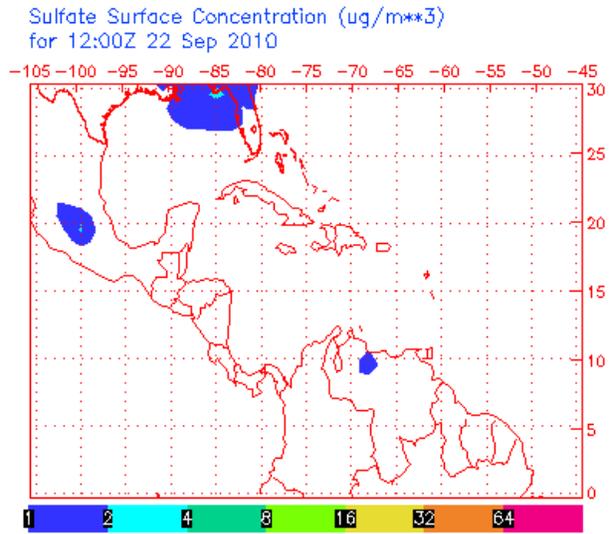
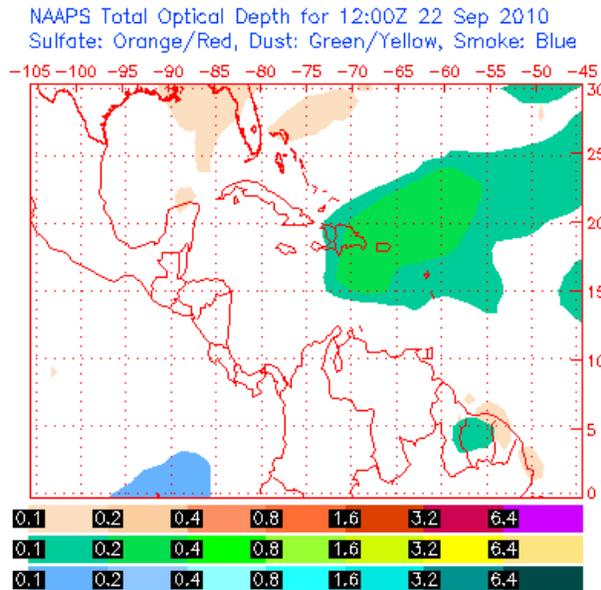
Wed Sep 22 03:30:32 2010 UTC NRL/Monterey Aerosol Modeling



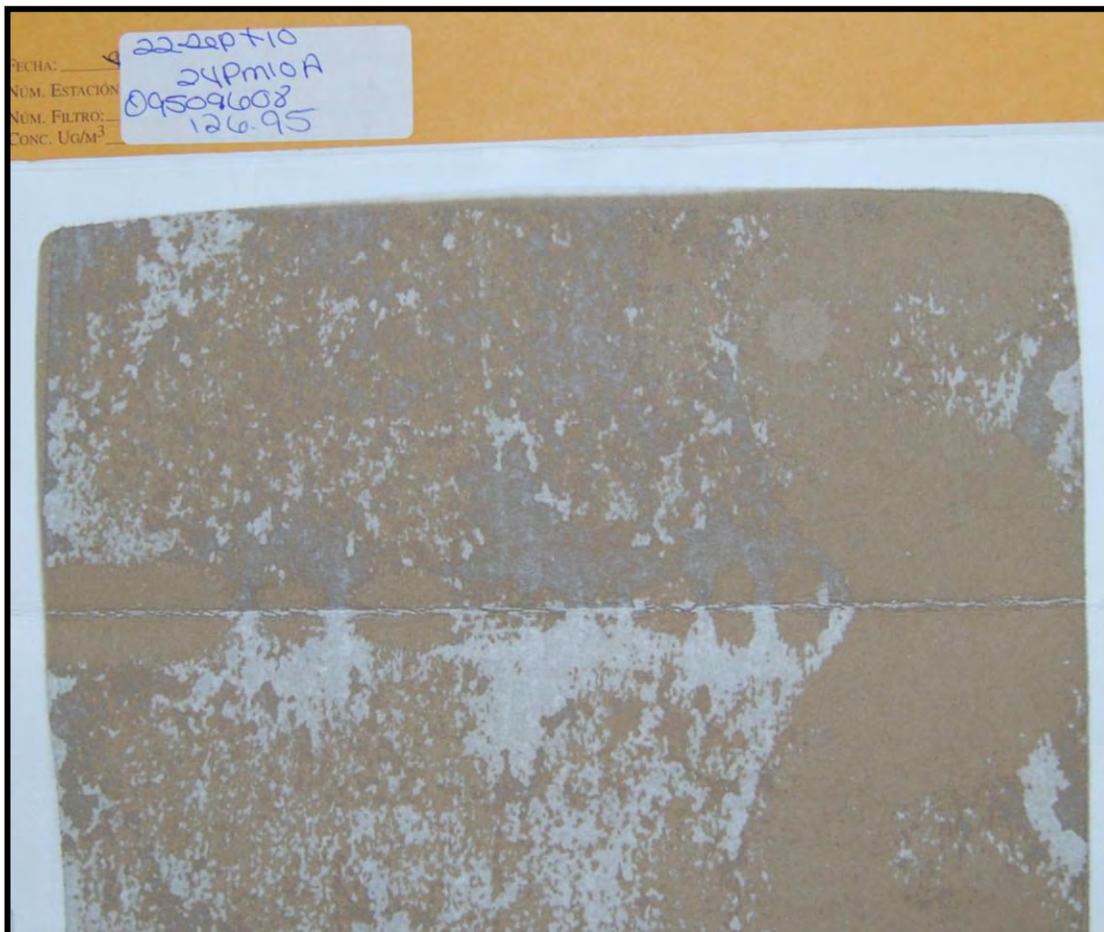
Single Filter Sample PM₁₀: 09509554

September 22, 2010		
Location	Filter Number	Value
AIRS Num.72-061-0005 EQB 24 PM ₁₀ Guaynabo	09509608	127
AIRS Num.72-053-0003 EQB 22 PM ₁₀ Fajardo	09509616	107





Wed Sep 22 21:30:27 2010 UTC NRL/Monterey Aerosol Modeling



Single Filter Sample PM₁₀: 0950608

Appendix I:

Raw Data Qualifier Report