**NOAA GOES-R Air Quality Proving Ground**

**2nd Annual Advisory Group Workshop**

**January 12, 2012**

**Case Study Worksheet**

**Goals:** The goals of this breakout session are to give you the opportunity to view proxy ABI aerosol products in detail, anticipate how they will enhance air quality forecasting and/or analysis, and provide feedback to NOAA on ABI data visualization and format options.

**Instructions:** There are two case studies for you to review: **March 25, 2011** (fires) and **July 30, 2011** (haze). Accompanying Power Point files contain general air quality and meteorological information about the events; review this information first for each case study to familiarize yourself with the air quality event. Then review the proxy ABI aerosol products for the event, which are available on a special section of the NOAA IDEA website (link available from the AQPG website, <http://alg.umbc.edu/aqpg/>). Use the steps below to guide your analysis.

***Please answer the questions about the proxy ABI aerosol products on the accompanying Case Study Questionnaire.*** Your answers will be the basis of the Group Discussion this afternoon.

**March 25, 2011 Case Study**

**Case Study Event Summary:** Two relatively small fires were burning in southeastern Georgia, resulting in localized Code Yellow (Moderate) and isolated Code Orange (Unhealthy for Sensitive Groups) PM2.5 conditions in Georgia and Florida.

1. **Open the accompanying “March 25 2011\_AQI\_Met” Power Point file *and activate it in “slide show” mode.*** The file can be downloaded from the AQPG website (<http://alg.umbc.edu/aqpg/>). Review the air quality and meteorological information in the PPT file:

* **24-hour average PM2.5 AQI values (slide 2)**
* **Synoptic surface analysis and radar for 12-15 UTC (slides 3-4)**
* **Terra MODIS true color and aerosol optical depth (AOD) images (slides 5-6).** The Terra satellite has a morning overpass, so these images correspond to observations at approximately 10:30 AM local time. Note the smoke plumes (grey diffuse features) corresponding to the fires in Georgia. If you are having trouble seeing the smoke plumes in the true color image, look at the AOD image (slide 6). Areas of higher AOD values (yellow colors) in the image correspond to high concentrations of PM2.5 from smoke. The plumes should be evident in southern Georgia/northern Florida and streaming out across the Atlantic to the east.
* **GOES Aerosol and Smoke Product (GASP) animation (slide 7).** GASP is AOD from the GOES geostationary satellite. It is similar to MODIS AOD but has 30 minute temporal resolution, so there are many more observations per day, which can be more useful for near real-time analysis. Areas of high AOD corresponding to smoke from the fires should be evident in southern Georgia/northern Florida and streaming out across the Atlantic to the east.

1. **Proxy ABI aerosol products for March 25.** Proxy ABI products are a representation of what images from the ABI will look like when the GOES-R satellite launches in 2015. ***Since they are generated from model output, you should not expect the proxy images to be completely faithful representations of the observed conditions.***

Click on the link to the proxy ABI aerosol products (slide 8 of PPT file or accessible from AQPG website): <http://www.star.nesdis.noaa.gov/smcd/spb/aq/aqpg_v2/>

1. **Proxy ABI AOD for March 25.** From the home page for the proxy ABI products (“GOES-R Air Quality Proving Ground Demo”), click on the “GOES-R proxy natural color and aerosol images” figure (left-hand figure).

* From the pull-down menu at the top of the page, select “March 25” and click “Go.”
* Underneath the pull-down menu, select the radial button for “AOD animated.” It may take a minute for the images to load.
* Review the animated loop of proxy AOD images. Experiment with stopping the **animation** and controlling the animation speed with the controls above the images.
* Stop the animation and experiment with the **zoom** feature. Click on the “Zoom” button (to the right of the animation controls) and then click on an area of interest in the image to zoom in. Additional clicking on the image will zoom in further. Left click and hold to move the field of view of the image. Click “Un-zoom” to go back to the original field of view.
* Experiment with the **county boundaries** feature. Click on the “county boundaries” button underneath the animation controls to show all of the counties for the available field of view. Zoom in to the region of the fires to see the extent of the counties directly impacted by the smoke plumes.
* Experiment with the **AOD contour** feature. Contours of AOD values of 0.4 and 0.7 are provided to help focus on areas that roughly correspond to Moderate (Code Yellow) and USG (Code Orange) PM2.5 air quality. Click on the “AOD contour” button underneath the animation controls to see the contours. This feature is not as effective for wildfires, which have high AOD values; the contours are more effective for dust or haze events.

1. **Proxy ABI synthetic natural color (RGB) for March 25.**

* Underneath the pull-down menu at the top of the page, select the radial button for “RGB animated.” It may take a minute for the images to load.
* Review the animated loop of RGB images. Experiment with stopping the animation and controlling the animation speed with the controls above the images.
* As with the proxy AOD images, experiment with the “Zoom” and “county boundaries” features.

1. **Proxy ABI aerosol type for March 25.**

* Underneath the pull-down menu at the top of the page, select the radial button for “Aerosol type animated.” It may take a minute for the images to load.
* Click on “Air quality index (AQI) derived from AOD” (right-hand figure).
* Review the animated loop of aerosol type images. Experiment with stopping the animation and controlling the animation speed with the controls above the images.
* As with the other proxy aerosol images, experiment with the “Zoom” and “county boundaries” features.

1. **Proxy ABI Air Quality Index (AQI) derived from AOD for March 25.**

* Click on the light bulb at the top left side of the webpage to return to the home page for the “GOES-R Air Quality Proving Ground Demo”: (<http://www.star.nesdis.noaa.gov/smcd/spb/aq/aqpg_v2/>)
* Click on the “Air quality index (AQI) derived from AOD” figure (right-hand figure).
* From the pull-down menu at the top of the page, select “March 25” and click “Go.”
* Review the animated loop of AQI images. Experiment with stopping the animation and controlling the animation speed with the controls above the images.
* As with the proxy AOD images, experiment with the “AOD contour,” “Zoom” and “county boundaries” features.

**July 30, 2011 Case Study**

**Case Study Event Summary:** This day was near the end of a fairly typical summer air quality episode in the Eastern U.S. Haze in the eastern Mid-Atlantic region, possibly mixed with smoke from fires burning in eastern North Carolina, produced in Code Yellow (Moderate) PM2.5 air quality.

1. **Open the accompanying “July 30 2011\_AQI\_Met” Power Point file *and activate it in “slide show” mode.*** The file can be downloaded from the AQPG website (<http://alg.umbc.edu/aqpg/>). Review the air quality and meteorological information in the PPT file:

* **24-hour average PM2.5 AQI values (slide 2)**
* **Synoptic surface analysis and radar for 12-15 UTC (slides 3-4)**
* **Terra MODIS true color and aerosol optical depth (AOD) images (slides 5-6).** The haze is visible in southeastern Virginia, eastern North Carolina, eastern South Carolina, and offshore over the Atlantic Ocean as a diffuse grey feature. If you are having trouble seeing the haze in the true color image, look at the AOD image (slide 6). Areas of higher AOD values (yellow, orange, and red colors) in the image correspond to high concentrations of PM2.5 from the haze.
* **GOES Aerosol and Smoke Product (GASP) animation (slide 7).** Areas of high AOD corresponding to haze should be particularly evident in eastern North Carolina and offshore over the Atlantic Ocean.

1. **Review Proxy ABI aerosol products for July 30.** Use the same link to the proxy ABI aerosol products as for the March 25 case study (slide 8 of PPT file or accessible from AQPG website): <http://www.star.nesdis.noaa.gov/smcd/spb/aq/aqpg_v2/>

Using the same steps as for the March 25 case study, review the proxy AOD, RGB, aerosol type, and AQI products. Experiment with the animation controls, zoom in/out feature, county boundaries, and AOD contours.

1. **Answer questions 1-5 on the Case Study Questionnaire about the proxy ABI products, delivery system, and visualization options.**

**Background Comparison for AOD Imagery**

There are several options for the background of the proxy AOD imagery. We would like your feedback on which background works best for you.

1. **AOD Background Comparison.** Open the accompanying “AOD Background Comparison” Power Point file *and activate it in “slide show” mode.*The file can be downloaded from the AQPG website (<http://alg.umbc.edu/aqpg/>). Review the 4 background options for the AOD imagery (natural topography, black, grey/clouds, and white) and indicate your preference on the **Case Study Questionnaire** (question 6).