

## **NTRD Program Disclaimers**

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**Texas Commission on Environmental Quality  
New Technology Research & Development (NTRD) Program  
Monthly Project Status Report**

Contract Number: 582-5-70807-0009

Grantee: The University of Texas at Austin

Date Submitted: April 15, 2006

Report for the **Monthly** period:

Starting Date March 1, 2006 Ending Date March 30, 2006

Section I. Accomplishments *(Please provide a bulleted list of project accomplishments as well as a description of their importance to the project.)*

The project involves the collaboration of two University of Texas at Austin research centers: the Center for Space Research (CSR) and the Center for Energy and Environmental Resources (CEER). The CSR team is led by Melba Crawford (Co-PI), Gordon Wells (Co-PI) and Teresa Howard. The CEER team is led by Elena McDonald-Buller and David Allen.

Accomplishments in March by the two research teams include the following:

- As part of the process documentation described under Task 2.1, CSR continued to compile a narrative summary of the land cover classification methodology and to develop comprehensive metadata for the New Eastern Texas Land Use Land Cover (LULC) Classification datasets.
- CSR compared the New Eastern Texas Land Use Land Cover (LULC) Classification dataset for the Houston-Galveston-Beaumont-Port Arthur subdomain with the land cover dataset previously assembled by Wiedinmyer to fulfill Subtask 2.1.1.1.
- CEER extracted meteorological data for temperatures and wind fields for use with GloBEIS from existing MM5 output for August-September 2000 to cover the interval of the modeling episode. The CEER team created a PAR file from the MM5 shortwave radiation output file using an approach developed by LADCO and NCAR. The GloBEIS simulation with the new Eastern Texas Land Use Land Cover (LULC) data for the Houston-Galveston-Beaumont-Port Arthur subdomain is ongoing. Although not funded under the current grant, CEER is also working with NCAR to transfer the appropriate meteorological data sets for estimating biogenic emissions using MEGAN.
- The CEER team is developing LULC databases using a number of different scaling factors for current representations of tree cover in Eastern Texas based upon NASA's MODIS Vegetation Continuous Fields (VCF) product. To do this for the entire 12-km grid region, a LULC database for the area outside of Texas needed to be joined with the data for Texas. CEER is working to extract data for areas outside of Texas from existing LULC data sets used by TCEQ and attempting to resolve issues with the merging of the data sets near the Texas-Louisiana-Oklahoma borders.

- As part of Subtask 2.3.1, CSR acquired regional MODIS-derived Leaf Area Index (LAI) data from the NASA Landcover Distributed Active Archive Center (DAAC). The data products were acquired for the months of August and September for the years 2000, 2001 and 2002. The MODIS Reprojection Tool was used to convert the raster data sets from NASA's Integerized Sinusoidal Grid projection into the Albers Equal Area Projection used for this project. The quality assurance flags for each pixel within the LAI/fPAR product are currently under review. The bit-code summary definitions are: 00 = highest quality (76-99 percent quality), 01 = good quality (49-75 percent quality), 10 = poor or questionable (26-50 percent), 11 = unacceptable (below 25 percent quality). There may exist data quality issues particularly in the 2000 data set during the early operational phase of the Terra MODIS instrument.
- In support of Subtask 2.4.1 designed to enhance GloBEIS, monthly median Normalized Difference Vegetation Index (NDVI) images were generated that represent the median NOAA-14 NDVI for each 1-km pixel for each month beginning on March 16, 1995, through November 21, 2001. The next step in this methodology is to compare the variations from the median with concurrent PDSI values to understand how regional drought stress estimates could be scaled to reflect equivalent PDSI values for vegetation stress over domains of 1-km grid cells.
- As part of subtask 2.4, CSR completed development of a GeoProcessing script to generate 250-meter, 500-meter and 1-km MODIS Normalized Difference Vegetation Index (NDVI) composites in grayscale floating point format and color Tagged Image File Format (TIFF). The script will support the work conducted to develop a methodology that will translate MODIS NDVI measurements into appropriate PDSI values for use in GloBEIS. In addition, the script will be easily portable for ArcGIS 9.0 users.
- Significant effort was devoted to update the MODIS processing algorithms in support of Subtask 2.5.2 that apply the aerosol optical depth product to examine the spatial extent of pollutant transport from fire activity. The new algorithms result in a product with better correlation to the emissions estimates. The continuing work under this task will include regenerating the AOT product for 2004, which has been the focus of our correlation analysis.
- The CSR team has identified multiple test areas for evaluation of the AMSR-E soil moisture measurements as part of the investigation described in Task 2.6. The test areas include sites near Uvalde and Lubbock, where the USDA collects field measurements of soil moisture. Additional test areas include homogenous areas throughout Texas, where daily precipitation records are available and can be compared with AMSR-E products.

**Indicate which part of the Grant Activities as defined in the grant agreement, the above accomplishments are related to:**

As noted, the accomplishments are primarily related to Tasks 2.1, 2.2, 2.3, 2.4, 2.5 and 2.6, with specific Subtasks 2.1.1.1, 2.3.1, 2.4.1 and 2.5.2 receiving particular attention.

## Section II: Problems/Solutions

No problems were encountered during the month of March that would require special effort to resolve or circumvent.

**Section III. Goals and Issues for Succeeding Period:** *(Please provide a brief description of the goal(s) you hope to realize in the coming period and identify any notable challenges that can be foreseen)*

In the near future, CEER expects to complete the analysis of the biogenic emissions estimates from GloBEIS using the New Eastern Texas Land Use Land Cover (LULC) classification data for the Houston-Galveston-Beaumont-Port Arthur (HGBPA) area and will soon complete the assessment of the air quality impacts using CAMx.

To aggregate the LAI products to a 4-km cell, CSR will weight the LAI contribution based upon the fractional land cover at the 4 km level (calculated as part of Tasks 2.1 and 2.2) and the resolved quality assurance flags. LAI values will need to be scaled by 0.1 to retrieve the real value. Only LAI data having a highest or good quality will be considered in the investigation. The internal weights for each contributing 1-km pixel will be determined for an aggregate 4-km pixel. The internal weights will then be normalized such that they produce a sum of 1 prior to the computation. Once the data are aggregated to a 4-km cell, a script to output the data into the ASCII file format required by the modeling software will be written.



Date: April 15, 2006

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*Authorized Project Representative's Signature*