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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: January 16, 2006

Report for the **Monthly** period:

Starting Date December 1, 2005 Ending Date December 31, 2005

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 December by the two research teams include the following:

- CSR continued work on the New Eastern Texas Land Use Land Cover (LULC) Classification project funded by the Texas Environmental Research Consortium (TERC). Draft land cover data for the Texas counties intersecting the USGS-defined NLCD 2001 mapping zones 36 and 37 were generated. An area encompassing the Houston-Galveston-Beaumont-Port Arthur (HGBPA) modeling subdomain was finalized, excluding data from Louisiana. Additional improvements will be made to the areas outside the HGBPA subdomain. Results of the TERC-funded project will be used for the GloBEIS modeling activities of Task 2.1.

- The CSR team provided CEER with AVHRR-derived IGBP land cover input data for the CAMx dry deposition modeling work described in Task 2.2. The CSR team developed a GeoProcessing model and a scripted batch routine that generates gridded datasets of land cover class proportions (percent of total land cover per grid cell) per land cover class for the following domains and grid resolutions:
    - Regional domain (36 x 36 km grid cells)
    - East Texas domain (12 x 12 km grid cells)
    - Dallas/Fort Worth domain (4 x 4 km grid cells)
    - Houston/Galveston/Beaumont/Port Arthur domain (4 x 4 km grid cells)
    - Austin/San Antonio domain (4 x 4 km grid cells)

  The GeoProcessing model and script quickly and efficiently produce CAMx model input data from both the AVHRR-derived and MODIS-derived IGBP land cover datasets. The model will be modified for use with Landsat-derived land cover data. The model and script development constitute the solution to the large file size problem identified in the November progress report.

- The CEER team completed the CAMx simulations using the MODIS and AVHRR IGBP land cover products, respectively, in the dry deposition algorithms. CEER is currently

examining air quality and dry deposition impacts for the August 22-September 6, 2000, Houston SIP episode using the two different datasets. The CEER team is also conducting sensitivity studies focused on the mapping of the IGBP land cover classifications to the CAMx land cover categories.

- The study of the MODIS Aerosol Optical Depth (AOT) product conducted by CSR in support of Task 2.5. made significant progress. In November, it appeared that events involving dust transport may contribute to depressed AOT estimates. After updating the MODIS dataset, many of the previously depressed values were eliminated. Therefore, the issue of depressed AOT values became less critical. To address the issue of erroneously high AOT estimates, CSR conducted additional screening based upon the Differenced Vegetation Index (DVI) algorithm, which was added to the standard AOT algorithm. Multiple runs were performed using different screening thresholds. The results are now under analysis to determine the optimal threshold.

- The CSR team identified a test area and time frame for an initial, qualitative comparison of the NASA AMSR-E moisture results with data from precipitation records as part of Task 2.6.

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, 2.5 and 2.6, with specific subtasks 2.1.1.1, 2.1.1.2, 2.1.1.3, 2.2.1.1, 2.2.1.2, 2.5.2 and 2.6.1 receiving primary attention.

Section II: Problems/Solutions

Problem(s) Identified (Please report anticipated or unanticipated problem(s) encountered and its effect on the progress of the project)	*The rapid completion of the Landsat-derived land cover database to be used for the GloBEIS model is contingent on the availability of the completed USGS National Land Cover Dataset 2001, which is used to supplement and improve the CSR land cover product.*

Proposed Solution(s) *(Please report any possible solution(s) to the problem(s) that were considered/encountered)*	*In December 2005, USGS released data for mapping zones 36 and 37. Unfortunately, only the southern half of mapping zone 37 for Texas was released. The USGS was contacted regarding future data availability, but could not provide a future release date. CSR will continue to pursue the issue of the delivery of the completed datasets with the USGS.*
Action(s) Conducted and Results *(Please describe the action(s) taken to resolve the problem(s) and its effect)*	*The continued delay of the release of the NLCD 2001 for mapping zones 37, 32 and 35 impacts completion of land cover production for the East Texas domain, the Dallas-Fort Worth subdomain and the Austin-San Antonio subdomain, but not for the HGBPA subdomain. Data for Louisiana will be mapped to the Texas land cover schema and merged with the completed Texas data.*

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)*

The CEER team will use the Landsat-based land cover products developed for the Houston subdomain to obtain estimates of biogenic emissions using GloBEIS for comparison with the results obtained using the data from Wiedinmyer et al. (2001) that currently serve as the standard input for modeling performed by TCEQ.

The CSR team will assess the level of effort required for future field data collection that falls within the scope of the land cover and vegetation characterization requirements of the NTRD project.

CSR will share documented tools used to prepare land cover data for ingestion into the CAMx and GloBEIS models with the modeling teams at CEER and TCEQ.

Date: *January 16, 2006*

Authorized Project Representative's Signature

NOTE*: Please attach any additional information that you feel should be a part of your report or that may be required to meet the deliverable requirements for tasks completed during this reporting period.*