

Type of Report: Quarterly, January to March, 1997.  
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NAS5-31364

## OBJECTIVES

1. Complete version 2 of the vegetation index code delivery.
2. Finish processing the data sets acquired in Chile and Brazil (SCAR-B) for use in validation of the vegetation indices.
3. Continue level 3 BRDF integration into the level 3 compositing algorithm, and progress toward the AVHRR, daily, 1km data stream.

## TASK PROGRESS

Much progress is being made in meeting coding delivery requirements, setting the quality control flags, and constructing a global validation data set. Requirements for the Version 2 synthetic data sets were submitted to SDST in Jan. 1997. The HDF file specifications of (MOD13) the vegetation index product (MODIS Version 2 software) were submitted to SDST in March, 1997. We are currently adjusting the MODIS vegetation index compositing software and algorithms to test and evaluate the AVHRR PATHFINDER II data sets to aid in the MODIS vegetation index compositing research. We are amassing biophysical and radiometric data sets from major field campaigns and utilizing such data in the design of the MODIS validation plan.

1. La Jornada meeting '97

Continued work and preparations were made for the Jornada prototype field campaign in May near Las Cruces, New Mexico. Our primary purpose in this field campaign is to validate the MODIS vegetation indices. The objectives include:

- \* Measure surface reflectance in space and time to evaluate the response of vegetation indices to sun and view angle effects for different vegetation types and evaluate sensitivity of VIs to fAPAR and LAI

A preliminary meeting was held in Las Cruces, N.M. on January 13-15, 1997. Wim van Leeuwen and Faiz Rahman attended the meeting on behalf of our lab. After this preliminary visit to La Jornada, two sites were chosen for intensive measurements:

- \* a grassland site and a 'mixed', transitional site made up of both grasses and shrubs.

The University of Arizona will coordinate the low aircraft radiometry, ground radiometry and fAPAR transects and would like to coordinate these measurements with the LAI measurements (destructive and with LAI-2000) already planned by the USDA/ARS (Las Cruces, NM) represented by Kris Havstad. We propose that a short but reasonably intensive data collection effort be conducted collaboratively among MODIS, MISR, ASTER, USDA-ARS and LTER personnel in May, 1997. In this effort, we would collect remote sensing data over different spectral, angular and spatial ranges with AirMISR, MAS, AVIRIS, and an Exotech radiometer (small aircraft). These data sets could be collected over most of the Jornada area, and should adequately address issues of scaling, etc. Finally, ground-collected LAI, fAPAR and surface reflectance data (with Exotech radiometer) along transects at the two study sites can be used in combination with the aircraft and tower data to help validate sampling and scaling strategies.

## 2. Chile - Validation Exercise

We continued our work in analyzing and writing up the results of the field campaign last fall in both the southern and northern parts of Chile, South America. David Gonzalez of the Universidad de Concepcion visited our lab for 2 weeks in early April to help us with the interpretation of the aircraft reflectance and Landsat TM data over the forested sections of southern Chile. The region analyzed included coastal and Andean- temperate evergreen broadleaf forests as well as transformed coniferous forests. We are investigating some of the saturation related problems with the vegetation indices in these high biomass areas to establish ranges of sensitivity of the vegetation indices for monitoring of the Earth's vegetative cover. We are also finding distinct patterns of vegetation index responses over grasslands vs. Forests in the humid regions and will continue to explore this. We expect a paper to be ready shortly on the Chile field campaign. David Gonzalez is also preparing a proposal for continued field work and cooperation with our lab.

## 3. Visiting Scholar

Mario Caetano of the Universidade Tecnica de Lisboa is visiting our lab for a 2 month period in order to explore mixing models in Mediterranean coniferous forests. The mixing model aims to separate understory and background reflected signals from the that of the forested canopy for purposes of fuel loading estimates and fire behavior prediction.

## 4. Meetings

Alfredo Huete and Wim van Leeuwen attended the "Workshop on Multi-Angular Remote Sensing Progress and Advancing BRDF Usefulness in the EOS era and Beyond", January 29-31 at the University of Maryland Conference Center. Alfredo Huete gave a presentation entitled "Vegetation indices and their limitations for biophysical parameter retrieval". Wim van Leeuwen also presented a poster at this workshop entitled: "Exploiting BRDF for global compositing of vegetation indices".

Alfredo Huete and Wim van Leeuwen attended the MODIS land team SDST meeting, February 18-20 at NASA/ GSFC.

## 5. Presentations

Two posters were presented at the 7th International Symposium on Physical Measurements and Signatures in Remote Sensing, Courchevel, France, April 7-11,1997:

1. "Bioclimatic and vegetation index based derivation of biophysical parameters: a Chilean example" Huete,A., Santibañez,F., de Lira,G., van Leeuwen, W., Morales,L., De la Fuente,A., Uribe,J.
2. "Modeling bi-directional reflectance factors for different land cover types and surface components to standardize vegetation indices", van Leeuwen, W.J.D., Huete, A.R., Didan, K., and Laing, T.

## 6. Next Quarter Activities

- i. Preparation of for the American Geophysical Union meeting in Baltimore, May:
  - "Vegetation detection through smoke-filled AVIRIS images at SCAR-B: an assessment using MODIS bandpasses" by Miura, T., Huete, A.R., van Leeuwen, W.J.D., and Didan, K.

- ii. Preparation of two presentations for the IEEE-IGARSS'97 Symposium in Singapore, August.
  - "Quality assurance of global vegetation index compositing algorithms using AVHRR data" by Wim J.D. van Leeuwen\*, Trevor W. Laing, Alfredo R. Huete.
  - "The use of vegetation indices in forested regions: issues of linearity and saturation" by Alfredo R. Huete, Wim J.D. van Leeuwen and Huiqing Liu.
- iii. Finalizing the experimental plan for the La Jornada validation campaign in May.
- iv. Continued processing of the AVIRIS data over the SCAR-B field campaign for the AGU presentations.
- v. Start processing 1km AVHRR daily data sets to test and refine the compositing algorithm.
- vi. Finalize the quality control flags and parameters.

## 7. References

Huete, A.R., Liu, H.Q., Batchily, K., and van Leeuwen, W., 1997, A comparison of vegetation indices over a global set of TM images, *Remote Sens. Environ.* 59:440-451.

Huete, A.R., 1996, Extension of soil spectra to the satellite: atmosphere, geometric, and sensor considerations, *Photointerpretation*, 2:101-118.