Biospheric Sciences Branch Highlights for November – December 2004

** Compton Tucker receives Galathea Medal from Danish Royal Court

Compton (Jim) Tucker was awarded the Galathea medal from the Royal Danish Geographical Society on November 2 in Copenhagen, Denmark. His Royal Highness (HRH) Prince Frederik, the Crown Prince of Denmark, presented the award to Tucker in the presence of 120 invited guests.

The Galathea Medal is given to scientists that have contributed significantly to the development of geography, and Danish geography specifically. The use of Earth observation from Space plays an ever-increasing role in geography all over the world. Tucker was honored for his contributions to the geographical sciences--specifically for his pioneering work in the development and use of remote sensing for determining primary production.

"The gratitude expressed towards Professor Tucker and to NASA for a significant contribution to science, specifically the geographical sciences, was warmly sustained by all Danish participants at the awards ceremony," stated Sofus Christiansen, Vice President of the Royal Danish Geographical Society. "This well deserved medal is also a recognition of the American generosity that has allowed our little nation to benefit from NASA's tremendous technical achievements."

** Tom Eck (Code 923) receives Journal of Applied Meteorology Editor's Award

Tom Eck (Code 923) received the Journal of Applied Meteorology Editor's Award from the American Meteorological Society. The citation for his award reads: "For exercising extraordinary diligence and tact in a review that led to profound improvement of an important piece of work."

** Elissa Levine conducts a workshop for teachers on GLOBE Soil Protocols

Dr. Elissa Levine presented a talk entitled "NASA, Earth Science, and Iowa: Research Connections" to a community meeting on the campus of University of Northern Iowa in Cedar Falls, Iowa, and a day long workshop for teachers on GLOBE Soil Protocols. These presentations are part of a monthly visit by a GLOBE scientists participating in the GLOBE ONE USA field campaign which is being conducted in Black Hawk County Iowa. GLOBE ONE USA is a Intensive field campaign performed in collaboration with scientists, teachers, and students to study the effects of different tillage types on carbon, water, and energy budgets. 10 paired sites have been chosen to represent conventional tillage, no tillage, conservation tillage, and native prairie across the county. Automated weather stations have been installed at each of these sites for continuous measurements of weather conditions and soil moisture and temperature. Soil characterization has also been performed at each site. Students from across the county will be making similar measurements at their schools as well as supplemental measurements of atmospheric haze, ozone, hummingbird migration, water quality, and others.

For more information, visit the GLOBE ONE USA web site at www.globe.gov/globeone

**** Elizabeth Middleton participates in 2nd International Workshop on Remote Sensing of Vegetation Fluorescence**

Dr. Elizabeth Middleton (Code 923) attended the the 2nd International Workshop on Remote Sensing of Vegetation Fluorescence, held at the Canadian Space Agency in St.-Hubert, Canada (near Montreal) on Nov. 17-19, 2004. This meeting was sponsored by the European Space Agency and attended by over 50 scientists, mostly from Europe and Canada. Dr. Middleton's presentation covered her joint NASA/USDA research conducted at Beltsville on fluorescence and hyperspectral reflectance properties of vegetation under nitrogen stress across the growing season. Her topic was: "Actively Induced Red/Far-red Fluorescence Emission Ratio's Dependence on Excitation Wavelength: Interpretation for Plant Physiology with Passive Solar Irradiance". After the workshop, a half day session was devoted to discussions on a potential proposal submission to the upcoming European ESSP announcement of opportunity for a satellite to measure chlorophyll fluorescence in the 760 nm O2-A Fraunhofer line for photosynthetic efficiency determinations. Dr. Middleton was asked to participate in that activity.

**** ISLSCP Initiative II Data Collection Complete**

The ISLSCP Initiative II data collection is now complete and can be accessed at http://islscp2.sesda.com. The ISLSCP Initiative II data collection contains 50 interdisciplinary global time series spanning the ten-year period 1986 to 1995 designed to support investigations of the global carbon, water and energy cycle. Selected data sets span even longer periods. The data were acquired from a number of U.S. and international agencies, universities and institutions, then co-registered to equal-angle grids of one degree, one-half and one-quarter degree resolution and reformatted into a common ASCII format. Each data set has been documented. The data and documentation has undergone two peer reviews. Overview and user guidance documentation will be furnished with a final DVD product to be released in May 2005 after a six-month community-wide evaluation of the entire data collection.

ISLSCP Initiative II would not have been possible without the unswerving support of the international Global Water and Energy Cycle Experiment (GEWEX) community and data providers, and with funds from several NASA program elements, including Hydrology, Terrestrial Ecology and Earth Science Information Partners (see web site for more details). The instigator of ISLSCP Initiative I was Dr. Piers Sellers, now of the Astronaut Office, Johnson Space Center in Houston, Texas. However, the real heat and momentum driving the ISLSCP Initiative II data collection has been the perseverance of Drs. Forrest Hall (Code 923) and Blanche Meeson (formerly GSFC), without whom the collection would simply not have been able to generate any precipitation... The PIs for ISLSCP Initiative II are Drs. Hall, Meeson and G. James Collatz (Code 923). The data collection evaluation effort is being led by Drs. Collatz and Lahouari Bounoua (Code 923/UMD). The data collection coordinator is Dr. Eric Brown de Colstoun and the web site/DVD developer is Mr. David Landis, both with SSAI in Code 923. The ISLSCP II collection contains several data sets processed here at GSFC, including the GIMMS NDVI data set (1981-2002) from Jim Tucker's group and the FASIR-NDVI and derived biophysical parameter data sets (1982-1998), processed by Sietse Los, formerly with the GIMMS group in Code 923. In addition, the ISLSCP II staff has processed and/or re-processed a

large number of the data sets in the collection, including the ECMWF near-surface meteorology data set and the global soils data sets. We invite users to visit the ISLSCP web site and to provide feedback on the data sets and the collection.

**** Landsat TM/ETM+ Calibration Working Group held December 1 & 2 in Arizona**

The semi-annual meeting of the Landsat TM/ETM+ calibration working group was held at the University of Arizona on December 1 & 2, 2004. Representatives and affiliated personnel from the Land cover satellite Project Science Office (LPSO) at GSFC, the Landsat Project and Landsat-7 Image Assessment System at the USGS/EROS Data Center (EDC), the vicarious calibration teams at South Dakota State University, Rochester Institute of Technology, University of Arizona and NASA's JPL, and the Canadian Centre for Remote Sensing (CCRS) were in attendance. Landsat-7 calibration trends continued as per previous analyses, with any trends below the sensitivity of the methods employed to track them in both the reflective and thermal bands. Reflective band trends are less than 0.5%/year and the thermal band less than 0.1%/year, with overall accuracy at better than 5% in the reflective bands and circa 1% in the thermal band. Some discontinuities in the reflective band vicarious trends may be related to changes in instrumentation. No changes in the Landsat-7 radiometric calibration were recommended. Landsat-5 TM thermal band calibration is still showing some systematic bias in calibration that has been varying with time that to date has not been traceable to a source. Nighttime acquisitions of Lake Tahoe have been instituted to improve the precision of these analyses and aid in the resolution. Current thermal band accuracy is circa 2%. A change in the post calibration scaling of the Landsat-5 TM thermal data was proposed and will proceed towards implementation. Continued examination of the calibration history of the Landsat-5 TM showed some trends in bands 1 and 2 that are not captured by the current calibration scheme and will continue to be investigated. The Landsat-4 TM reflective band calibration history reconstruction is nearing completion. Issues remain due to the lack of any vicarious calibration data, gaps in the history and limited cross calibration to the Landsat-5 TM. A follow up meeting is planned on Landsat-4 TM.

**** Biospheric Sciences Branch (Code 923) personnel serve as guest editors for special issue of the Geoscience and Remote Sensing Journal**

The December 2004 IEEE Transactions on Geoscience and Remote Sensing journal is a special issue dedicated to Landsat Sensor Performance Characterization. Brian Markham, Landsat Calibration Scientist, (Code 923); Jim Storey of SAIC/USGS, (Code 923); Melba Crawford of U. of Texas; David Goodenough of Natural Resources Canada; and Jim Irons, Landsat Deputy Project Scientist, (Code 923) served as guest editors. The issue contains 14 papers, plus the foreword. Titles for the 14 papers are:

* Landsat Sensor Performance: History and Current Status

* Landsat-5 Bumper-Mode Geometric Correction

* Landsat Thematic Mapper Reflective-Band Radiometric Artifacts

* Landsat-5 Thematic Mapper Outgassing Effects

* Landsat-5 Thematic Mapper Reflective-Band Radiometric Stability

* Landsat-5 TM Reflective Band Absolute Radiometric Calibration

* In-Flight Absolute Calibration of the Landsat-5 TM on Test Site Salar de Uyuni

* In-Flight Validation and Recovery of Water Surface Temperature with Landsat-5 Thermal Infrared Data Using an Automated High Altitude Lake Validation Site at Lake Tahoe CA/NV, USA

* Landsat-5 TM and Landsat-7 ETM+ Absolute Radiometric Calibration using the Reflectance-based Method

* Four Years of Landsat-7 On-Orbit Geometric Calibration and Performance

* Landsat-7 ETM+ On-Orbit Reflective Band Radiometric Characterization

* Landsat-7 ETM+ On-Orbit Reflective-Band Radiometric Stability and Absolute Calibration

* Cross Calibration of the Landsat-7 ETM+ and EO-1 ALI sensor

* Landsat ETM+ and SAR image fusion based on generalized intensity modulation