

Products from LTER/GTOS Workshop

1. Web page that includes links to PowerPoint presentations given at the meeting, list of attendees, and meeting summary (see below).

http://www.fsl.orst.edu/larse/bigfoot/gtos_home.html

2. A paper in the peer-reviewed literature reporting results of the meeting (see abstract below).

Turner, D.P., Ollinger, S., Smith, M.L., Krankina, O., Gregory, M. 2003. Scaling Net Primary Production to a MODIS Footprint in Support of Earth Observing System Product Validation. *International Journal of Remote Sensing*. In Press.

3. A pending proposal to NASA (see abstract below).

Organizing a GTOS Net Primary Production Assessment Network. NASA. 1/2004-12/2006, \$700,366 (PI:Turner, CoPIs: Cohen, Gower, Running)

4. A planned proposal to NSF

Organizing a GTOS Net Primary Production Assessment Network. NSF. 1/2004-12/2006, (PI:Turner, CoPIs: Cohen, Gower, Running)

5. A follow-up special session at the 2002 AGU Fall meeting. Application and Validation of MODIS Land Products (Organized by David Turner and Steve Running).

Summary Report and Recommendations

The workshop was held at the H.J. Andrews LTER site near Blue River Oregon on May 21 and 22, 2001 with support from the LTER Network Office. Twenty people attended, including participants from Brazil, Hungary and Korea. The workshop was intended to promote data exchange between the remote sensing community -- which has begun to produce global land cover, leaf area index, and net primary production products -- and the field sites where relevant validation data is being produced. Specifically, the workshop was aimed at fostering participation of a variety of field sites in the LTER sponsored NPP Demonstration Project. The more general context was the evolution of the Global Terrestrial Observing System which will ultimately provide policy makers with assessments of status and trends for variables such as global NPP.

Initially, a review of the 1 km resolution gross primary production and net primary production products from the satellite-borne MODIS sensor was given. There followed a series of site reports from locations where NPP data layers, with potential to serve in a validation capacity, are being generated. The biomes represented included the arctic tundra, boreal forest, temperate deciduous forest, temperate conifer forest, cropland, and

tropical moist forest. The minimum requirement for participation in the NPP Demo Project is a well-georeferenced, 3 x 3 km, NPP data layer, and a number of valid approaches to developing these data layers were reported.

After the site reports, a session was devoted to data transfer from the remote sensing community to the sites. At present, near real time MODIS data is available on the Internet in the form of 1100 x 1100 km "tiles" from the EROS Data Center. For sites which participate in the NPP Demo Project, it is planned that regular 11 x 11 km cutouts of selected MODIS products will be provided beginning summer 2001 by the ORNL DAAC. Potential applications of the MODIS products include regional estimation of wood or crop production, tracking of drought effects, and evaluation of snow cover.

Recommendations

The workshop concluded with a discussion of how to promote wider participation in the NPP Demonstration Project. Recommendations include: 1) developing and distributing specific instructions for participation, 2) getting several sample NPP data layers in the preferred format on the NPP Demo Project web site now (this will be done for some of the BigFoot sites), 3) encouraging GTOS to provide an ETM+ scene to participating sites on request so that a land cover map could be readily generated, 4) encouraging the collection of the 250 m resolution MODIS products for the NPP Demo Project sites, 5) encouraging continued support for the NPP Demo Project, perhaps with involvement of FAO and/or the ORNL Mercury System for database management, 6) planning a workshop for early 2002 to do an assessment of the first year of MODIS NPPs, and 7) continuing support for sites and projects involved in the development of the validation data sets.

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The abstract for the paper is as follows:

Turner, D.P., Ollinger, S., Smith, M.L., Krankina, O., Gregory, M. 2003. Scaling Net Primary Production to a MODIS Footprint in Support of Earth Observing System Product Validation. *International Journal of Remote Sensing*. In Press.

Release of an annual global terrestrial net primary production (NPP) data layer will soon begin in association with the Moderate Imaging Spectroradiometer (MODIS) sensor, a component of the NASA Earth Observing System. The task of validating this product will be complicated by the mismatch in scale between ground-based NPP measurements and the coarse resolution (1 km) of the NPP product. In this paper we describe three relevant approaches to scaling NPP from the plot level to the approximately 25-km² footprint of the sensor, and discuss issues associated with operational comparisons to the MODIS NPP product. All approaches revealed considerable spatial heterogeneity in NPP at scales less than the resolution of the MODIS NPP product. The effort to characterize uncertainty in the validation data layers indicated the importance of treating the combination of classification error, sampling error, and measurement error. Generally,

the optimal procedure for scaling NPP to a MODIS footprint will depend on local vegetation type, the scale of spatial heterogeneity, and available resources. In all approaches, high resolution remote sensing can play a critical role in characterizing land cover and relevant biophysical variables.

The abstract for the NASA proposal is as follows:

Organizing a GTOS Net Primary Production Assessment Network

David P. Turner (Oregon State University), Warren B. Cohen (USDA Forest Service), Stith T. Gower (University of Wisconsin), Steven W. Running (University of Montana)

Satellite-borne sensors such as MODIS are now beginning to operationally produce global NPP estimates at relatively high spatial resolution. Year-by-year assessment of these global NPP products will be a vital contribution to the emerging Global Terrestrial Observing System (GTOS). Current validation efforts are sporadic and often fail to address critical issues – notably the mismatch in scale between NPP measurements on the ground and the spatial resolution of the global NPP products (~1km). Here we propose to organize an international network of NPP validation sites that would accomplish three objectives: 1) develop and promote protocols for field measurement and scaling of NPP, 2) assemble relevant ground-based NPP data for use in evaluating satellite-based global NPP estimates, and 3) perform an annual assessment of the status and trends in global NPP. This network will contribute to the GTOS goal of “facilitating access to information on terrestrial ecosystems so that research and policy makers can detect and manage global environmental change”.