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Title: **Advanced Solid-State Array Spectrometer (ASAS) Data Sets from the 1990 Field Season: A Unique Look at Two Forested Ecosystems**

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MI 915766  
NC 999967  
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Discipline: Land

Calibrated data sets, especially in digital image format, of forested canopies exploiting both the spectral and bidirectional domains of remotely sensed information are limited. The difficulties of getting instrumentation above the canopy necessitate the use of airborne scanners to provide this type of data. For these reasons the Advanced Solid-state Array Spectrometer (ASAS) was flown aboard the NASA C-130 during the 1990 summer field season as part of the Oregon Terrestrial Transect Ecosystem Research (OTTER), and Forest Ecosystems Dynamics (FED) Multi-sensor Aircraft Campaigns (MAC's). ASAS was used as the priority imaging device aboard the C-130 for both OTTER, which was conducted along a forested transect in West Central Oregon, and FED, which was conducted at the International Paper Northern Experimental Forest near Howland, Maine. Both OTTER and FED utilized several concentrated study sites within the larger study areas. ASAS was used to provide bidirectional multispectral image data of these sites at a variety of solar angles coincident with ground-based and other airborne measurements.

ASAS is a pointable imaging spectrometer which uses a solid-state array to acquire imagery of terrestrial targets in 29 spectral bands from .4 to .8  $\mu\text{m}$ . ASAS is unique in that it can be pointed at off-nadir angles up to 45 degrees fore and aft along the track of the aircraft. As the aircraft flies over a target, the instrument is moved to seven preset angles along the ground track. Data is usually collected along and perpendicular to the solar principal plane. Calibration is performed using a laboratory setting prior to and following the data collection season. In-flight calibration checks are possible with a built in shutter for dark current checks, and in-field checks are possible using a



portable calibrated lamp when the platform aircraft is not flying.

The ASAS data sets obtained during the 1990 MACs provide a unique look at forest canopies from two different northern forest regions of the North American continent under varying temporal, spectral, and bidirectional conditions. These data sets will be used to study such parameters as the albedo of forest canopies, and the dynamics of scene radiation due to factors such as canopy architecture, moisture stress, leaf chemistry, topography, and understory composition. Additionally, these data sets will provide inputs to models dealing with the physics of the interaction of light with forest canopies, and ecosystem changes. Insights from the results of these analyses will provide new tools for inventory and monitoring of global forest ecosystems using data sets from sensors like the proposed EOS HIRIS and MODIS systems. New calibration and correction procedures will be developed which will allow further interpretation of existing image data sets, thus moving closer to the creation of long term data sets for monitoring global changes.

The development and partial implementation of a dedicated ASAS data processing system have allowed a shorter turn-around of ASAS data to investigators. A number of the ASAS image data sets from the 1990 MACs have been processed and distributed to the investigators involved in OTTER and FED. Several example data sets are presented from both the OTTER and FED missions.