

Helmer, E.H., Brandeis, T.J., Wunderle, J., Kwit, C., Ruzycki, T. and Lefsky, M. 2006. **Cloud-free Landsat image mosaics for monitoring tropical forest ecosystems, proposal for Federal Government Member of the Landsat Science Team.** IITF Study Plan #2584, June 9, 2006, Río Piedras, Puerto Rico.

Research in the USDA Forest Service Caribbean Forest Inventory and Analysis (FIA) program uses Landsat imagery to monitor Caribbean forests, relating field data from forest inventory plots, lidar and other ecosystem variables to satellite imagery. Our contribution to the Landsat Data Continuity Mission (LDCM) will continue this work by testing and developing the use of cloud-free Landsat image mosaics in applications that use Landsat imagery or image mosaics for monitoring land cover and forest ecosystem variables in persistently cloudy landscapes. The two main research foci are: 1) for mapping forest canopy variables in Eleuthera, The Bahamas, comparing classifications that use time series of cloud-free Landsat image mosaics assembled with regression tree matching against classifications assembled with atmospheric correction, or atmospheric correction plus normalization; and 2) test time series of mosaics for mapping forest ecosystem variables (e.g. growth, biomass), and for mapping urbanization over several time steps simultaneously.

Previous Study Plans:

Helmer, E.H. and B. Ruefenacht. 2002. **Detecting land-cover change to urban/built-up lands through an automated approach to image spatial and spectral co-registration.** IITF Study Plan #2572, April 5, 2002, Río Piedras, Puerto Rico.

This research resulted in the following publications:

Helmer, E. H. and B. Ruefenacht. 2007. A comparison of radiometric normalization methods when filling cloud gaps in Landsat imagery. *Canadian Journal of Remote Sensing* 42(3):325-340. <http://www.treesearch.fs.fed.us/pubs/30282>

Helmer, E. H. and B. Ruefenacht 2005. Cloud-Free Satellite Image Mosaics with Regression Trees and Histogram Matching. *Photogrammetric Engineering & Remote Sensing* 71(9):1079–1089. <http://www.treesearch.fs.fed.us/pubs/30086>.