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Perspective

Significance of Lidar Data Acquisition and its Uses

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DESCRIPTION

Light Detection and Ranging (LIDAR), also called as Airborne Laser Scanning (ALS), is an emerging remote sensing advanced technology with promising ability to assisting mapping, monitoring and assessment of forest resources. Compared to traditional analog or digital passive optical remote sensing, LIDAR offers tangible advantages, which includes almost perfect registration of spatially distributed data and the ability to penetrate the vertical profile of a forest land cover and quantify its structure. LIDAR has been used in lot of components of the world to successfully verify height and size of individual trees or at the stand level, to estimate canopy closure, volume and biomass of forest stands to assess natural world habitat, to quantify stand susceptibility to fire. Continuous technological advancement and competition among vendors in the United States have resulted in substantial reductions in data acquisition cost and have enabled acquisition of spatially complete laser data over entire states and regions. The U.S. Geological Survey has recently introduced a plan to coordinate the acquisition of LIDAR data at a national scale. Laser scanning data are regularly acquired over several national forests in Western States. These developments have caused an explosion of interest in LIDAR technology. Despite a growing body of peer-reviewed literature documenting the merits of LIDAR for forest assessment, management and planning, there seems to be a void in information describing problems related to the acquisition and processing of laser data. In the past year alone, the authors have received numerous requests for guidance on the technical specifications of planned data acquisitions, on instructions on how to carry out data quality evaluation, and on whether scanning data can be used to meet particular objectives.

A LIDAR system working from an airborne platform contains a set of devices the laser device an Inertial Navigational Measurement Unit (IMU), which constantly records the aircraft's attitude vectors (orientation); a high-precision airborne Global Positioning System (GPS) unit, which records the 3-dimensional function of the aircraft and a computer interface that manages communication among devices and data storage. Considering that the selection of LIDAR systems, acquisition protocols and processing methods have to be set therefore to site characteristics, Ameri Flux would advantage from building expertise on LIDAR acquisition and processing strategies especially suitable for flux research needs.

CONCLUSION

Strengthen collaboration with NSF funded companies mandated to promote the use of LIDAR technology in scientific research, NCALM for ALS work and UNAVCO for TLS work. Both enterprises have state of the art instruments and competent permanent staff skilled in working with scientists from diverse fields. Collaborative links with NEON, which operates ALS systems, should also be considered. Support a global LIDAR working group with a mandate to develop LIDAR acquisition protocols, advice on information processing techniques, and broaden data and products sharing policies. The working group must have strong ties with flux site researchers to promote a mutual understanding across the disciplines. Several scientific questions require data on finer scale provided by TLS and it is our opinion that making such information available to researchers will improve capacities for addressing ecosystem questions at the appropriate scales. We thus advise a multi-scale approach to LIDAR data acquisition over Ameri Flux sites, using the special currently available LIDAR systems.

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