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| **Development status of Spaceborne Lidar MOLI** |
| Global forest biomass (AGB) observation by remote sensing is practical for estimating the effects of climate change caused by human activities, future climate projections, biodiversity, and resource abundance. One of the AGB monitoring methods is the radio wave observation method, which includes the ALOS/PALSAR series (Phased Array type L-band Synthetic Aperture Radar). This method has a problem: the observed signal is saturated, and the accuracy is degraded when forest biomass exceeding 100 t/ha is observed. Unlike radio wave observations, space-based LIDAR observations are spatially discrete but can measure tree height and biomass with high precision.  JAXA is planning to launch the Multi-Sensing Observation Lidar and Imager (MOLI) mission aboard the ISS Kibo Exposed Section in 2028. This mission will perform waveform-recording lidar observations using lasers with a power output of 5W or more and panchromatic band imager observations in addition to Green, Red, and NIR. Panchromatic band observations can record characteristic textures not only in daylight but also in urban areas and artificial objects at night so that the imager observation data and the reference image with coordinates will be used for image matching to correct the lidar observation coordinates and to measure the forest canopy term and AGB with high accuracy. In addition, analysis using observation data from the previous GEDI mission and Aerial Laser Survey (ALS) data revealed that the accuracy of ground surface estimation from LIDAR waveforms is affected by the accuracy of forest canopy height and AGB estimation, and we are developing a ground surface estimation algorithm using deep learning to solve this problem.  In this presentation, we will report on the current MOLI mission equipment, the specifications of the products to be released, the development status of the ground surface estimation algorithm currently under development, and the correction of the accuracy of lidar observation location determination by image matching. |