Mapping vegetation extent in the Antarctic oasis using Multispectral Remote Sensing data

Vegetation forms the active foundation of all terrestrial ecosystems. Vegetation mapping of plant communities at fine spatial scales is increasingly supported by remote sensing technology in cryospheric regions. A robust monitoring of the changes in the distribution and density of cryospheric plant species requires accurate and high-resolution baseline maps of vegetation. Mapping such change at the landscape scale is often problematic, particularly in the remote Antarctica/Himalayas and Arctic. Less frequent imaging with high-spatial resolution satellite sensors enable more detailed analyses of vegetation change frequently. This study uses high-resolution satellite imagery to map vegetation as an imperative indicator for environmental change. Multispectral imagery and panchromatic imagery from very high-resolution satellite data have been used for mapping of vegetation. A range of supervised and unsupervised classification methods have been executed using pan sharpened data. This study statistically and comparatively evaluates the vegetation mapping results using supervised and unsupervised classification methods to extract vegetation in Schirmacher oasis, east Antarctica. We also focused on the use of supervised pixel-based classifiers and textural measures, in addition to standard multispectral information, to improve the classification of Antarctic vegetation communities. Classification results were validated with independent reference datasets. The present research indicates that the overall accuracy of mapping vegetation using high resolution imagery and semiautomated target extraction methods exceeded 90%.

Full-capacity operation of heavy equipment during the construction will reduce pollution and advance the time of construction. The water supply required was calculated to be 150ℓ/day per person, which includes water needed for cooking, washing and personal hygiene. While the water may continue to be drawn from the Priyadarshini Lake, a tank inside the station complex should have sufficient water storage capacity for 7 days to deal with emergency situations. In view of large distance of sea from the station, the disposal of liquid and degradable waste has to be planned. A large capacity bio-treatment and incineration plant will be required for waste treatment. The station design will largely depend upon all above criteria and may have to be different from existing Maitri or Bharati Stations.