

## **An approach for Identification of Casuarinas by using Markov Random Field-based Method for Super-Resolution Mapping from Satellite Images**

Laxmi Kant Tiwari<sup>1</sup>, A. Valentyn<sup>1</sup> and Tolpekin<sup>2</sup>

<sup>1</sup>*Andaman and Nicobar Space Application Cell/GIS Cell,*

*Department of Environment and Forests, Andaman and Nicobar Islands, India*

<sup>2</sup>*Department of Earth Observation Science, Faculty of Geo-Information Science and Earth Observation, University of Twente, The Netherlands*

### **Abstract**

Casuarinas help to maintain ecological and environmental stability, play a key role in subsistence economy. However, more information about Casuarinas is needed for their proper management and usage. In this study, we aimed to investigate casuarinas at three locations i.e., Butler Bay, Jackson Creek and Ekiti Bay at Little Andaman Island; South Andaman in India by using Markov Random Field (MRF) based Super Resolution Mapping (SRM). In this study ASTER image with spatial resolution of 15 m is used for all experimental tests. Quality of SRM is compared with Maximum Likelihood Classification (MLC) classified map. The results of this study were validated using Google Earth data. Simulated Annealing (SA) parameters were tuned on real data and result is compared with study done on simulated data before. Method parameter of MRF based SRM was evaluated on ASTER data. Accuracy was assessed at fine and coarse resolution using kappa statistics and error measures. It is observed that SRM outperformed MLC in case of fine and coarse resolution. Experimental test was done on the ASTER data to study the optimal neighbourhood system size with respect to various Scale factor (S). It is found that resultant map of SRM was smoother than MLC. This study dealt with high resolution case. Moreover, MRF based SRM is successfully identified Casuarinas at  $S = 2$  by using ASTER image with spatial resolution of 15 m. SRM result was successfully validated using Google Earth data.