



Monitoring and Estimation of Reservoir Water Volume using Remote Sensing and GIS

Nagaraj Bhat (1), Krushna Chandra Gouda (2), Manumohan Vh (3), and Reshma Bhat (2)

(1) Shri Madhwa Vadiraja Institute of Technology and Management, Computer Science, Udupi, India (nagakallare@gmail.com), (2) CSIR Fourth Paradigm Institute, Bangalore-37, India, (3) Karnataka State Remote Sensing Application Centre, Bangalore-01, India

Water Reservoirs are the main source of water supply for many settlements as well as power generation. So the water volume and extent of the reservoirs needs to be monitored at regular time intervals for efficient usage as well as to avoid disasters like extreme rainfall events and flood etc. Generally the reservoirs are remotely located so it is difficult to well monitor the water volume and extent. But with growing of Remote sensing and GIS in HPC environment and modeling techniques it is possible to monitor, estimate even predict the reservoir water volumes in advance by using the numerical modeling and satellite Remote sensing data. In this work the monitoring and estimation of the volume of water in the Krishna Raja Sagar(KRS) water reservoir in Karnataka state of India. In this work multispectral images from different sources like Landsat TRS and Digital Elevation Model(DEM) using IRS LISS III (IRS- Indian Remote Sensing, LISS- Linear Imaging Self-Scanning) and ASTER(Advanced Spaceborne Thermal Emission and Reflectance Radiometer) are being used .The methodology involves GIS and image processing techniques such as mosaicing and georeferencing the raw data from satellite, identifying the reservoir water level, segmentation of waterbody using the pixel level analysis. Calculating area and depth per each pixel, the total water volume calculations are done based on the empirical model developed using the past validated data. The water spreaded area calculated by using water indexing is converted in to vector polygon using ArcGIS tools. Water volume obtained by this method is compared with ground based observed values of a reservoir and the comparison well matches for 80% of cases.