

Title: **Assessment and analysis of river bank erosion and channel braiding of the Brahmaputra River by object oriented classification of optical satellite imagery**

Autorship: **P. Selsam¹, B. Böhm¹, C. Böhm², W. Flügel³, C. Busch⁴, H. Kakati⁵, A. Mitra⁶**

¹ Friedrich-Schiller-University of Jena, Dept. Geoinformatics, Hydrology and Modelling, Germany – (peter.selsam, bettina.boehm)@uni-jena.de

² GDS GmbH, Jena, Germany – c8boch@googlemail.com

³ Bonn, Germany – wa.fluegel@gmail.com

⁴ codematix GmbH, Jena, Germany – cbusch@codematix.de

⁵ Water Resources Department, Govt. of Assam, Guwahati, India – harenkakati@yahoo.com

⁶ Assam Water Research and Management Institute, Water Resources Department, Govt. of Assam, Guwahati, India – akmitra48@gmail.com

Keywords: water resources management, object oriented classification

Theme: Water Cycle

Subtopic: Water resource management

The Brahmaputra River System in NE-India is a worldwide unique basin comprising one-of-a-kind environment, biodiversity and landscape. Its hydrological and hydraulic system dynamics is complex and driven by the seasonal distribution of snow melt and monsoon precipitation with significant floods in summer (Mai until August/September) and consequent low flow during the winter dryness (October until April). The Brahmaputra River has a braided river channel system that has been subject to continuous change and expansion during the last 60 years. As a consequence of this uncontrolled flow dynamics the river has destroyed large areas of valuable farm land either by bank erosion or deposition of thick layers of unfertile sand.

Diverse land use and land cover (LULC), distributed wetlands and forests as treasures of biodiversity, geologic strata, agriculture, rural and urban settlements comprise the basin heterogeneity. Implementing effective integrated land and water resources management (ILWRM) and river training measures to protect against river bank erosion thus demands a holistic methodological approach integrating innovative techniques from geoinformatics, e.g. remote sensing and GIS, and interlinked hydrological-hydraulic modelling.

Such a holistic approach is applied in the „Guwahati Field Trial“ project funded by the Government of Assam, a modelling based field trial carried out in a 100 km river stretch west of the city of Guwahati for validating river training options to mitigate bank erosion and reclaim new land from the river. Object oriented classification of optical satellite imagery is applied for a) assessment of present erosion dynamics and analysis of river development in the historical past, b) LULC classification and change detection analysis, and c) validation of infrastructure effectiveness in terms of river bank protection, consolidation of sediment deposition and land reclamation.