WATER QUALITY MONITORING OF THE GUIERS LAKE
SENEGAL

Project
Guiers Lake Integrated Water Resources Management

Project Progress
The Guiers lake is an important drinking water supplier of Dakar, so timely information about the spatial distribution of water quality parameters is important for managing the lake. The project was started with a positive test of an ENVISAT/MERIS Level 1b image of April, 27, 2007 processed with FUB algorithm to retrieve the spatial distribution of SPM, CHL-a and CDOM concentrations in Lake Guiers waters. Results were presented at the 2nd MERIS/(A)ATSR User Workshop, Frascati, Italy, 22-26 September 2008.

Then, about forty MERIS full resolution (FR) level 2b images covering the period of 2003-2010 (with at least 4 images per year: cold dry season, hot dry season, early rainy season, late rainy season) were acquired by the project under the TIGER Initiative. The temporal coverage of the data is representative of the seasonal variability of the hydrological conditions of the Lake (at least one image per season, dry or rainy).

Data were processed and analyzed at ITC in the framework of TCBF. Image processing is supported with fieldworks with the following tasks:
• Environmental observations
• In situ measurements
• Collection of water samples for chemical and bacteriological analysis

Multitemporal optical images from USGS and microwave ASAR data from ESA are processed for various themes:
• landuse/landcover mapping
• aquatic vegetation monitoring,
• lake extent mapping, etc..

Results and further steps
Current thematic studies of the project provide the basis of the following results and outputs: (i) comprehensive mapping of the hydrological system of the Guiers Lake. Thematic maps will serve for monitoring the quantitative and qualitative evolution of water resources as well as assessing environmental factors; (ii) assessment of climate change impacts on the lake with digital processing and analysis of a multitemporal set of aerial photographs and satellite data, taken over a period of 50 years; (ii) design of a geospatial information system dedicated to the integrated management of the Guiers lake water resources; (iv) capacity building in the field of data collection, laboratory analysis, Earth observation data processing and analysis, GIS designing; (v) awareness raising on the potential negative impacts of anthropogenic activities on Guiers lake water resources, through discussion forums involving the main stakeholders.

First analysis results: Spatial distribution of SPM, CHL-a and CDOM concentrations in the Northern and Central sections of the Guiers Lake, based on FUB algorithm retrieval from the April, 27, 2007 MERIS image.

PI
Dr. Souléye Wade, Institute of Earth Sciences, Cheikh Anta Diop University of Dakar, Senegal

Team
• Cheikh Anta Diop University (UCAD), Senegal
• Polytechnical High School (EPT), Senegal
• National Water Authority (EPT), Senegal
• Senegal River Water Authority (DMVS), Senegal
• Guiers Lake Water Authority (OLAG), Senegal
• Ecological Surveying Centre (CSE), Senegal
• Marne la Vallée University (UMLV), France
• Faculty of Geo-Information Science and Earth Observation, University of Twente (ITC), the Netherlands

THE TIGER INITIATIVE • 2009-2012 REPORT