

## Water Clarity Change Detection in Malili Lakes from MODIS Satellite 2000-2012

Dini Daruati<sup>1)</sup>, Suwarsono<sup>2)</sup>, Hendro Wibowo<sup>1)</sup>, Iwan Ridwansyah<sup>1)</sup>,  
Bunkei Matsushita<sup>3)</sup>, Takehiko Fukushima<sup>3)</sup>

<sup>1)</sup>Research Centre for Limnology, Indonesian Institute of Sciences,  
Jl Raya Jkt-Bogor km 46, Cibinong, [dini@limnologi.lipi.go.id](mailto:dini@limnologi.lipi.go.id),  
[hendro@limnologi.lipi.go.id](mailto:hendro@limnologi.lipi.go.id), [iwanr@limnologi.lipi.go.id](mailto:iwanr@limnologi.lipi.go.id),

<sup>2)</sup>National Institute of Aeronautics and Space, Pekayon, Jakarta, [landsono@yahoo.com](mailto:landsono@yahoo.com)

<sup>3)</sup>Graduate School of Life and Environmental Sciences,  
University of Tsukuba, Ibaraki, Japan, [matsushita.bunkei.gn@u.tsukuba.ac.jp](mailto:matsushita.bunkei.gn@u.tsukuba.ac.jp),  
[fukusima@sakura.cc.tsukuba.ac.jp](mailto:fukusima@sakura.cc.tsukuba.ac.jp)

**Abstract:** The Malili Lakes of South Sulawesi consists of five individual lakes that are connected by a river system. The lakes are Matano, Mahalona, Towuti, Lontua, and Masapi. Matano is a natural lake with a depth of 590 m, it is the deepest lake in Indonesia, and the 10<sup>th</sup> deepest lake in the world. In addition, lake as a component of water resources plays an important role to support agriculture, fisheries, hydropower, domestic, and tourism activities. The high dynamic changes in climatic and anthropogenic can change the clarity of water as part of water quality. The aim of this study is monitoring the change of water clarity using MODIS satellite data to develop faster, accurate, and low cost to anticipate some problems, such as: remote locations, limitation in human resources, and financial support. In this study, we use 3 bands from MODIS image satellite (blue: 0.459-0.479  $\mu\text{m}$ , green: 0.545-0.645  $\mu\text{m}$ , red: 0.620-0.670) with SAMO-LUT (semi-analytical model-optimizing and look-up-table) method for mapping the water clarity change every two years in the two season each year. The result is only small water clarity changes in Malili lakes from 2000 to 2012 with the high correlation between estimation and secchi disk measurement ( $r^2 = 0.8$ ). It was concluded that remote sensing techniques can provide a faster, reasonable as well as low cost method to monitor water clarity in lakes.

**Keywords:** remote sensing, water clarity, MODIS, Malili lakes