

Ungauged wetlands: How to estimate large fluxes with Remote Sensing data: case Study, Sudd wetland, South Sudan.

Many wetlands in the world, in particular in developing countries are not gauged. The Sudd wetland is one of Africa largest wetlands (30,000 to 40,000 km²) and is characterized by extremely scarce information, hampering conservation of the ecosystem as well as any development of the wetland natural resources. The harsh condition of the Sudd and long instability of the region (1983 to 2005) halted any ground measurement within the wetland.

This study attempted to investigate the seasonal variability of the wetland area -as a proxy of the ecosystem services, using remote sensing data. Monthly rainfall data from TRMM satellite during three years (1995, 1999, and 2000) have been calibrated against ground measurements. The actual evaporation (evaporation + transpiration) have been computed using SEBAL algorithm. Inflow and outflow are obtained from ground measurements. The seasonal variability of the Sudd wetland area has been computed using a monthly water balance. The computed area has been verified with delineated area from MODIS images.

The results of the water balance could show the (monthly) pattern of both the seasonal and permanent swampy area of the Sudd. Variability of wetland area among the three years (dry, wet, average) has been assessed.

The water balance could be used as a robust tool to assess the impact of interventions on the Sudd wetland area, e.g., upstream development in the Equatorial Nile, or local development (e.g., Jonglei canal). This study shows that RS data can be instrumental to provide essential information for wetland management.