

EARTH OBSERVATION SYMPOSIUM (B1)
Enhancing Earth Observations Through Space Radar (6)

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MONITORING OIL-PALM AND OTHER THREATS TO TANJUNG PUTING NATIONAL PARK,
INDONESIA, WITH SYNTHETIC APERTURE RADAR

Abstract

Tanjung Puting National Park, Borneo, Indonesia, is a protected area for an indigenous orangutan (*Pongo pygmaeus*) population, a species endangered by human activities. One major threat is the spread of oil-palm plantations which have encroached on park borders. In addition to oil-palm development, the park is also under threat from other human activities, including logging, mining, and expanding human settlements. The Orangutan Foundation International (OFI) has been monitoring and protecting the park against these activities in cooperation with the Indonesian government. Monitoring has included using space-based remote sensing to assess orangutan habitat and monitor land-cover changes. Optical sensors have been the preferred method for monitoring changes, but the high levels of cloud cover year-round have limited their use. In this study, the performance of various microwave-based Synthetic Aperture Radar (SAR) sensors were evaluated to understand which modes and methods are best suited to monitoring deforestation caused by oil-palm, urban and mining threats to Tanjung Puting National Park. JERS-1, ERS-1 and 2, and ASAR data were evaluated. We found that ASAR polarimetric modes provide the best data for monitoring oil-palm expansion, but single polarization sensors such as JERS-1 and ERS-1 and 2 data can provide additional information. Urban and mining areas are detectable, but less understood and more study is needed. In addition to evaluating sensors, SAR visualization and classification techniques were explored. Object-based classification provides suitable results with the limited information available in ASAR polarimetric data. This study measured significant changes within 10 km of the park border over the last twenty five years. Recent data indicates that the northeastern border has been breached by the spread of the oil-palm plantations. As of January 2008, there are approximately 366 km² of oil-palm fields within the 10-km park buffer zone designated for managed forest use, and 26 km² of new oil-palm within the park border. OFI is currently working to secure conservation easements on land around park borders to prevent more oil-palm from being established. Data collected in this study will immediately benefit the organizations attempting to protect the park and the endangered orangutan.