MONITORING DECADAL LAND CHANGE BY COMPARING JERS-1 AND ALOS PALSAR L-BAND SAR

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The Japan Aerospace Exploration Agency has developed a Systematic Observation Scenario for the Advanced Land Observing Satellite (ALOS) Mission. The intent of this observation strategy is to provide for spatially- and temporally-consistent, multi-seasonal, global coverage on an annual basis, through the lifetime of the satellite. This foreground mission aims at the advancement of science as well as support for natural resource management, regional development, and planning. The outcome is a comprehensive and homogeneous global archive of PALSAR, PRISM and AVNIR-2 data, in which a consistent time-series for data can be found for any arbitrary region on Earth. This archive is particularly well suited for monitoring land change over time. In regions undergoing rapid change, such as sub-Saharan Africa, significant land change may be observed over the existing three year ALOS archive. But for many studies, it is beneficial to consider a longer temporal baseline.

For a multi-decadal time base, it is beneficial to compare the ALOS PALSAR results with those of the Japan Earth Resources Satellite (JERS-1) Mission. Although the mission was planned to last only two years, its L-band SAR instrument continued to collect data for 6.5 years (Feb 1992 to Oct 1998). The JERS-1 goal was to monitor disasters, resources, and the environment. The extended campaign permitted the completion of the Global Forest Mapping Program, in which boreal and tropical forests were radiometrically-corrected and merged into continental-scale mosaics. In Africa, mosaics were produced for the regions of West, Central, and East Africa, as well as Madagascar.

The intent of this paper is to address the opportunities for studying multi-decadal land use change through a comparison of JERS-1 and ALOS PALSAR data. Specific examples include urban growth, deforestation, and desertification. The paper also addresses the enhanced capabilities of modern multi-polarized data (ALOS PALSAR) compared with traditional single-polarized data (JERS-1), and highlights the potential for the various applications. In addition to presenting technical results of interest, the paper will address approaches and open-source tools that can be used to analyze change. SAR accessibility has evolved greatly in the past few years, with the introduction of tools such as ASF MapReady that converts SAR imagery to terrain-corrected GeoTIFFs. The availability of free software tools, coupled with the temporally- and spatially-comprehensive JERS-1 and PALSAR datasets, suggest that SAR can become an important tool for addressing the unique geospatial challenges of Africa.