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Earth Observation Applications, Societal Challenges and Economic Benefits (5)

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UTILIZING NASA EARTH OBSERVATIONS FOR A SPATIAL PATTERN ANALYSIS OF FOREST
LOSS IN THE MADRE DE DIOS REGION OF PERU

Abstract

The increased availability of satellite-based data has become central to land use land cover change research at regional and national scales, where traditional methods would be costly and time consuming. Over the past decades, the Peruvian Amazon has experienced a rapid change in forest cover due to the expansion of agriculture and extractive activities. This study uses Spectral Mixture Analysis (SMA) in a cloud-computing platform to map forest loss within and outside key land tenure areas in the Madre de Dios Region of Peru. Landsat surface reflectance data were used spanning 2013 to 2018 and spectral unmixing was performed to identify patterns of forest loss for each year. Data up to 5 meters of spatial resolution were used to validate the final maps and identify main drivers. Results show a total of 20,633 ha of forest loss, most of it located in the buffer zones of the protected areas. Forest loss also appears in the Kotsimba Native Community within a 1-km buffer of the Malinowski River, and the Tambopata Reserve. Gold mining seems to be the main driver of forest loss and this activity may not be restricted to the legal mining concession areas, since more than half of the forest loss occurs outside these areas. Overall accuracy obtained was satisfactory. These results illustrate the applicability of a cloud-based platform for accessing and processing multi-temporal datasets; the importance of monitoring deforestation progression in the Peruvian Amazon; and suggests the use of SMA as reliable classification approach.