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Land use land cover change studies in Madre de Dios, Peru: Monitoring tools for detecting climate change impacts

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Estimating the accuracies of deforested areas and of deforestation rates has become a key factor for quantifying environmental services of tropical rain forests, particularly those linked to the reduction of greenhouse gas emissions from deforestation and forest degradation (REDD). In the trinational Madre de Dios, Peru - Acre, Brazil - Pando, Bolivia (MAP) region in southwestern Amazonia, accelerated changes in land cover are foreseen as a result of infrastructure projects, such as the Inter-Oceanic road in Southeastern Peru and other projects in Bolivia and Brazil. Currently, the region is experiencing the paving of the Inter-Oceanic Highway, the first road that will link the region to Brazil's southern industrial zone and Pacific ports and to numerous large Asian markets, exposing the region to powerful economic forces. In addition to inevitable changes composed by a set of direct and indirect impacts along and across the road axis, changes in climatic fluctuations represent an immediate threat, such as increased forest susceptibility to fire. Drastic climate change fluctuations have been observed through fire and drought regimes such as the presence of abnormal drought and low records level of major rivers in 2005 and in 2010. This presentation focuses on land use land cover change studies of deforestation rates and field site visits performed during 2010 in the Peruvian region of Madre de Dios. Landsat satellite images from 2008, 2009, and 2010 were used to classify forest and non-forest areas and the software CLASlite to monitor fire exposed as well as timber extraction areas. Results show that reliable estimates of land-cover change are important since deforestation rates have considerable increased in 2010. More robust monitoring systems are needed to estimate greenhouse gas emissions from the MAP Region stemming from timber extraction and/or other socio-economic activities and prepare the region for unpredicted increases in fire and drought regimes. The region is crucial for monitoring global change based on climate variations and deforestation.