Geophysical Research Abstracts
Vol. 16, EGU2014-10199, 2014
EGU General Assembly 2014

Silviculture of eucaliptus plantations in the Paraiba do Sul basin, Brazil, and its potential implication on the basin ecohydrology.

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Silviculture of eucaliptus plantations is an important driver of the Mata Atlântica biome conversion into another land use in the Paraíba do Sul basin, in the southeastern of Brazil. This region is located in one of the most developed areas in Brazil, between Rio de Janeiro and São Paulo, the most important cities in Brazil, linked by Presidente Dutra highway. Between both cities there are another cities that produce a variety of goods - from meat to planes, cars and mobile phones. This area is, at the same time, one the most important hot spot for the Mata Atlântica biome. Here we have a large Mata Atlântica fragment protected by law and others fragments being conversed to pasture, agriculture, silviculture and urban areas. Paraiba do Sul river drains the region and runs into Rio de Janeiro State. The basin is highly anthropized, with multiple approaches of its waters resources. Its waters also serve Rio de Janeiro metropolitan area. Because land use and land cover changes impact the water yield in a basin, the study of its dynamic its of great importance for water resources management. We study the land use and land cover change in the region between 1986 and 2010, focusing in the development of silviculture of eucaliptus plantations. We used the HAND (Height Above Nearest Drainage) approach that uses the height above the nearest water body, acquired from SRTM Data and transformed into a Terrain Numeric Mode, to classify the landscape into three different ecohydrological environments: floodplain, mountain top and hillslope. This classes were intersected with 1986 and 2010 land use and cover change classification obtained from Landsat imagery. Results show that silviculture has increased in the region from 1986 to 2010. In both years, silviculture areas are mainly located at the hillslope (47%), while floodplain and mountain top share 28 % and 23 % respectively. Available census data from the Brazilian Institute of Geography and Statistics, IBGE, for 1995 and 2006 years, show an increment in the number of small farmers, from 27 to 196, that are planting eucalyptus sp in the region and also an increase in the whole silvicuture production. Silviculture of eucaliptus plantations is recognized to be a great water consuming and a driver of water pollution by pesticides and fertilizers. The study carried out combines a landscape descriptor with land use and land cover changes mapping to provide an important database for ecohydrological studies, regarding the water resources management.