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Title: First assessment of deforestation rate and resultant carbon emissions in the Central Karakoram National Park, Pakistan.

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Subtheme: 1.2 Deforestation and forest fragmentation

Abstract of the paper: Reducing emissions from human induced deforestation and forest degradation in developing countries is one of the issues included in the Bali Action Plan. Policy approaches and incentives should be based on common agreement on the technical guidelines for measuring and monitoring the rates of deforestation. The EVK2CNR Committee promoted, under the KHHK Partnership and the Karakoram Trust initiative, a project aimed to assess the recent deforestation rate, the forest degradation and the related carbon emissions in the Central Karakoram National Park (CKNP, Pakistan). Indeed, quantitative information on land cover change in the Karakoram range are particularly lacking. A representative pilot area (Bagrot Valley) was selected and 150 measurement plots were randomly distributed over the whole valley following a stratified sampling. In each plot (1250 m²) coordinates, elevation, slope, orientation, tree height, diameter of all trees with height 1.30 m, number of tree rings in the last 1 cm and numbers of seedlings were recorded. By means of allometric equations the total biomass were estimated in each plot. Field data of total biomass were used to calibrate the remote sensing data of different sources. ASTER data were chosen and a large set of images were acquired with a cloud cover 30%. The data acquired from ASTER sensor are distributed by the Land Processes Distributed Active Archive Centre (LP DAAC), located at the U.S. Geological Survey (USGS) Centre for Earth Resources Observation and Science (EROS) <http://LPDAAC.usgs.gov>. In order to assess the rate of deforestation a multitemporal analysis was planned by using four sets of MSS, TM & ETM+ of 1977, 1992, 2000 and 2001 which were acquired and geometrically corrected on an international grid in WGS84 system. Forests in the CKNP are mainly composed by: *Picea smithiana*, *Pinus wallichiana*, *Betula utilis* and different *Juniperus* species. Excluding the sparse juniper forests, 35% of the plots have a biomass (dry weight) between 60 and 120 Mg ha⁻¹ and about 16% have a biomass higher than 240 Mg ha⁻¹. The annual percentage increment in *Picea* and *Pinus* is above 2%. A threshold of total biomass related to a crown cover higher than 10% was defined in order to estimate the total forested area and, consequently, the forest cover change. The correlation between ASTER responses and aboveground biomass data was used to estimate the amount of carbon stocked in the forests as well as the cover change and the carbon losses.

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