



Runoff and suspended sediment transport after plantation interventions in experimental catchments with contrasting rainfall conditions, Chile

A. Iroume (1), P. Schuller (2), A. Bronstert (3), P. Carey (4), H. Palacios (4), and H. Ulloa (5)

(1) Universidad Austral de Chile, Institute of Forest Management, Valdivia, Chile (airoume@uach.cl), (2) Universidad Austral de Chile, Institute of Chemical Sciences, Valdivia, Chile (pschulle@uach.cl), (3) Institute of Earth and Environmental Sciences, University of Potsdam, Potsdam, Germany (axelbron@uni-potsdam.de), (4) Universidad Austral de Chile, Institute of Forest Management, Valdivia, Chile (pcarey@uach.cl, hpalacios@uach.cl), (5) Universidad Austral de Chile, Faculty of Forest Sciences and Natural Resources, Graduate School, Valdivia, Chile (ulloacontreras@gmail.com)

Experimental catchments located in sites with contrasting annual rainfall (Nacimiento, 37° 28" S, 72° 42" W, long term mean annual rainfall ~ 1,200 mm, and Los Ulmos, 40° 02" S, 73° 06" W, long term mean annual rainfall ~ 2,500 mm) are being monitored to study the long term effects of different forest plantation practices on runoff and suspended sediment transport.

In each site, one control and one treatment catchment (12.6 and 7.7 ha in Nacimiento and 19.8 and 7.7 ha in Los Ulmos) are monitored. All the catchments are controlled by purpose-built V-notch weir gauging stations equipped with continuous water level recorders and suspended sediment is quantified in these stations from automatically collected integrated water samples.

After a calibration period the plantation of one paired catchment in each site was clearfelled. Treated and control catchments will be from now on identified as NT and LUT and NC and LUT respectively.

The *Pinus radiata* plantation in NT was clearfelled during the first half of April 2010, while the *Eucalyptus globulus* plantation in LUT was partially clearfelled in November 2009 and then completed in April 2010. After clearfelling runoff increases were observed in both harvested catchments as compared with the pre-treatment runoff trend between treatment and control catchments.

In the Nacimiento site, mean monthly values for suspended sediment loads registered for the pre, during and post-treatment periods are not much different for NT and NC. For the pre-treatment period (April 2008 to March 2010), mean monthly suspended sediment loads were 12.8 kg/ha in NC and 16.2 kg/ha in NT, and 0.9 kg/ha in NC and 2.7 kg/ha in NT during the harvesting operations (April 2010). Mean monthly suspended sediment loads during the first year of the post-harvesting period (May to December 2010) were 69.9 kg/ha in NC and 59 kg/ha in NT and 0.9 kg/ha in NC and 6.2 kg/ha in NT during the year after clearfelling (January to June 2011). Year 2010 was extremely dry in Nacimiento and this fact could explain the minor differences in suspended sediments transport between the control and treatment catchments.

In Los Ulmos mean monthly suspended sediment loads for the pre-treatment period were 63.9 kg/ha in LUC and 165 kg/ha in LUT. Then, mean monthly suspended sediment loads during the first year of the post-harvesting period (May to December 2010) were 70 kg/ha in LUC and 203 kg/ha in LUT and 38 kg/ha in LUC and 103 kg/ha in LUT from January to August 2011.

Low soil disturbances associated to the summer logging operations in NT and the very dry year following clearfelling could explain the similarities among suspended sediment transport in the two Nacimiento catchments. Major differences were registered in the LUT catchment, probably associated to higher erosive processes in this rainy site.

This research is supported by the Chilean Government through projects FONDECYT Project 1090574 and CONICYT/BMBF 243-2010. The authors acknowledge the support of Forestal Mininco S.A. and the Forest Research Centre of Universidad Austral de Chile.