Report as of FY2007 for 2006AK50B: "Watershed Response to Forest Fires in Cold Regions: Channel Development and Suspended Load Variation in Streams in Interior Alaska"

Publications

- Conference Proceedings:
  - Toniolo, H., Kodial, K., Hinzman, L. and Yoshikawa, K. Climate change and its effects in Interior Alaska, USA. Proceedings of XXII Latin-American Congress of Hydraulics; Latin-American Region of the IAHR. Guyana city, Venezuela, (2006)
  - Toniolo, H. and Kodial, P. Suspended sediment load variation in a sub-arctic watershed in Interior Alaska. 4th IAHR Symposium on River, Coastal and Estuarine Morphodynamics, Urbana , IL . 2005.
- Other Publications:
  - Kodial, P., Toniolo, H., Hinzman, L. and Yoshikawa, K. Thermokarst evolution in sub-arctic Alaska : A study case. ASCE Water Resources Congress. Anchorage , AK . 2005.
  - Duvoy, P.X. & H.A. Toniolo. 2006. Watershed Response to Boreal Forest Fires in Interior Alaska. Conference presentation for American Geophysical Union, Fall Meeting 2006.

Report Follows

Watershed response to forest fires in cold regions:
channel development and suspended load variation in streams in Interior Alaska

Horacio Toniolo

Summary of activities

Instruments including pressure transducers, dataloggers, and autamplers were installed in the streams after spring breakup. Water samples were collected every day. Suspended load concentrations were determined at UAF's laboratories. Topographical surveys were conducted in an area where a small channel is developing. These tasks were carried out by graduate student Paul Duvoy. Results from his work were presented at 2006 AGU Fall Meeting. Main results and findings are described below.

Figure 1 shows a rest area created by the firefighters in the Caribou Poker Creeks Research Watershed (CPCRW) in the summer of 2004. Soil erosion and subsequent channel formation as a consequence of summer rainfalls are ongoing processes in the area. Figure 2 shows the temporal evolution of a channel development on August 2005 after rainfall events and June 2006. An initial topographic survey was conducted in early summer 2006 (Figure 3). A second survey was conducted at the end of summer.

Figure 1. *Panoramic view of a "rest area" created by firefighters inside the watershed. Distance from left to right is approximately 200 m.*

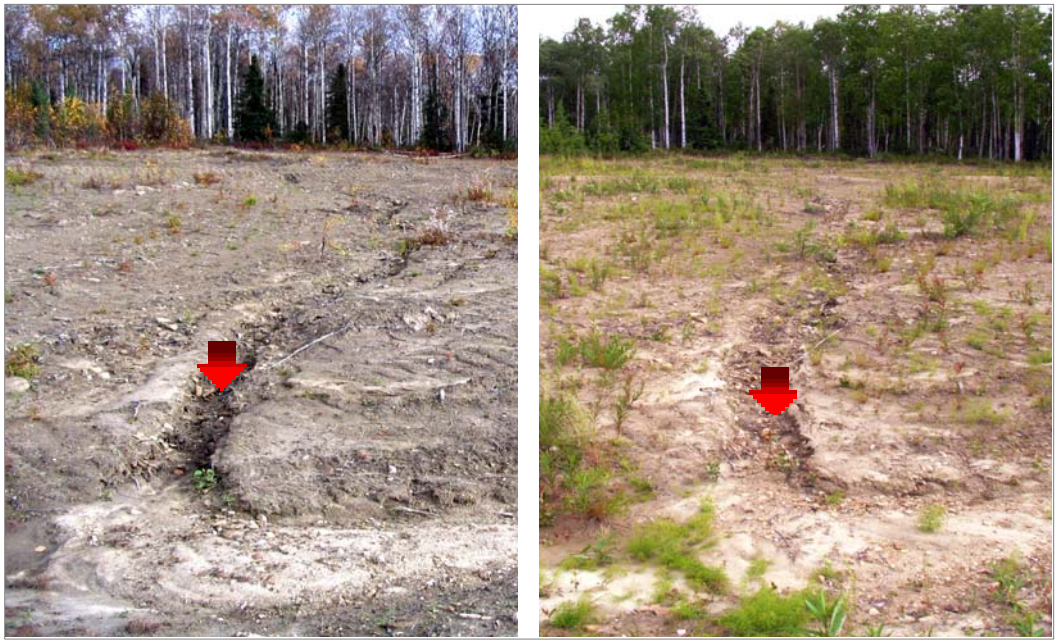

Figure 2. *Landscape evolution in the area indicated in Fig. 1; channel developed in August 2005 after rainfall events (left), Channel in June 2006 (right). Channel widening is evident.*

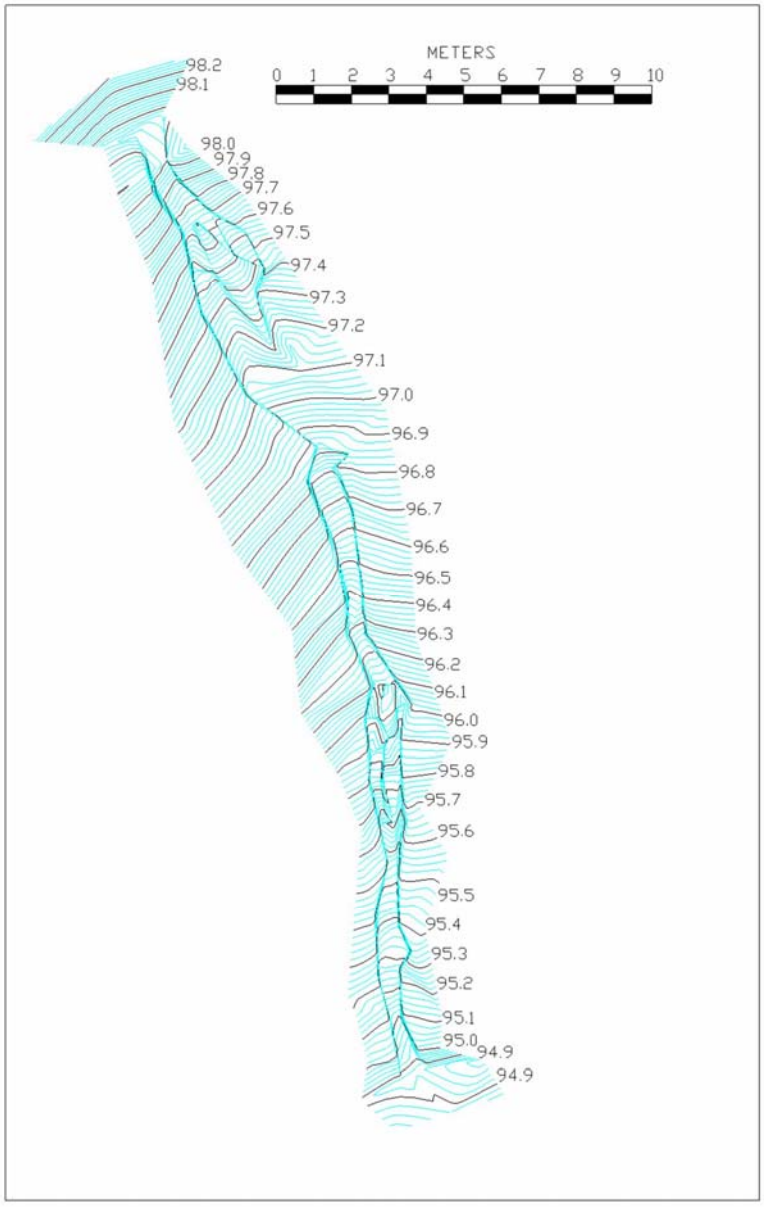

Figure 3. *Channel topography. Survey conducted in July 2006. Datum elevation is 100 m (arbitrary).*

Initial work on suspended load in streams in the CPCRW (C4, fire-free; P6, partially burned) and Boston Creek (severely burned) was conducted by Kodial and Toniolo during the summer of 2005. Figure 4 shows the temporal variation in concentration in different streams during 2005 and 2006. Available data suggest that suspended load concentrations in the unburned and partially-burned streams were somewhat higher in 2006. Concentrations in the totally-burned stream were similar during the last two summers.

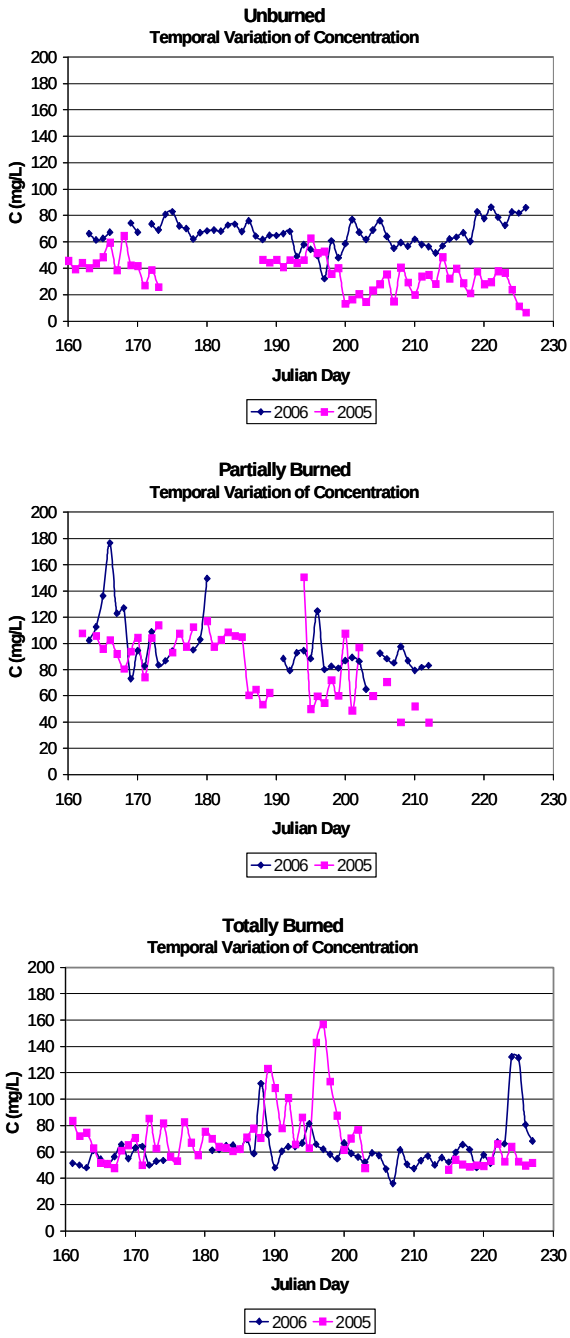

Figure 4. *Concentration variation during 2005 and 2006.*

Future work

Field and lab work will continue in 2007. Instruments will be deployed in the streams; a topographical survey will be conducted at the end of summer. Concentrations will be obtained at UAF's labs. Comparison between existing data and future data will be carried out.