Geophysical Research Abstracts
Vol. 14, EGU2012-965, 2012
EGU General Assembly 2012

Monitoring wildfire impacts on surface water–groundwater interactions in a Coho salmonid stream habitat

T. Russo and A. Fisher
University of California, Santa Cruz, Earth and Planetary Sciences, United States (trusso@ucsc.edu)

We are conducting a study of stream morphology and surface water – groundwater interactions within the Scott Creek watershed, a 4th order catchment in central coastal California, United States. The primary goal of this project is to assess the impacts of fire on adjacent hill slopes to channel and riparian conditions. In August 2009, a wildfire burned 40% of the Scott Creek watershed, which provides valuable spawning habitat for Coho salmon and Steelhead trout. We hypothesized that the fires could result in enhanced delivery of fine grained hill slope sediments to the stream channels. The delivery of additional sediment to the stream channel in years following a fire could change the nature of hyporheic exchange downstream from burned areas; changes in hyporheic processes may influence survival rates of Coho and Steelhead redds (egg nests), which are dependent on surface water – groundwater exchange for regulation of water temperature and nutrient content. The overall project includes a combination repeated cross-channel surveys of selected experimental reaches, tracer discharge testing to assess fluid transient storage and exchange metrics at a reach scale, and deployment of thermal and pressure instruments in the streambed in select locations to assess changes in local seepage conditions and streambed hydraulic conductivity. Data collected and analyzed so far suggest that there was relatively little large scale change in stream channel geometry in the 2010 and 2011 Water Years, but there appears to be more temporal variability in local streambed seepage rates and in the hydraulic conductivity of streambed sediments receiving water from burned areas relative to a "control" reach that receives water from unburned areas. Wildfires are generally considered to become more likely under future climate change scenarios, and studies such as this one are important for understanding, anticipating, and mitigating the hydrologic response to sediment delivery due to fires and other events.