Impacts of Large Storms on Vermont Lakes: A case study from Lake Rescue, Ludlow, VT

Abstract

Option 1

Lake Rescue is a natural, but artificially controlled lake near Ludlow, VT that was profoundly impacted by Tropical Storm Irene in August 2011, causing turbidity for several weeks due to the influx of sediment during the storm. Prior to this event, two sediment cores were collected from Lake Rescue in May 2011 to address concerns of eutrophication and increased sediment/nutrient influx into the lake. These cores, along with new ones collected in February 2012, provided an opportunity to compare the pre- and post-Irene conditions within Lake Rescue.

In 2012 six short cores (up to 45 cm in length) and one long core (81.5 cm in length) were collected from the ice surface. Visual logs of each were made prior to sediment extrusion and a distinct "Irene Layer" was identified in each. Two of the short cores were ^{210}Pb dated to determine an age model and sedimentation rates within the lake system. Organic carbon and nitrogen content of the sediment was determined at a resolution of 1 cm and carbon to nitrogen ratios were calculated to identify episodes of increased input of material from the watershed, and provide information on nutrient sources and productivity levels. Subsets of samples from the short cores were selected to undergo a series of analyses, including particles size, stable isotope, biogenic silica and XRD. The data from these analyses provided information on runoff intensity, the source of organic material within the sediment, the productivity of diatoms within the lake system, and the mineralogy of the inorganic detritus in the sediment and whether or not its source is local, respectively. Altogether this data provided a unique view into the conditions of a lake system pre- and post- an extreme hydrological event, furthering our overall knowledge of the occurrence and magnitude of such events.