AvH8-44
8th Alexander von Humboldt International Conference
Cusco, Peru, 12 – 16 November 2012

Features of snow accretion damages caused by heavy snowfalls to Japanese cedar plantations in December 2009 and 2010 in the Niigata area, central Japan

T Iyobe, K Kawashima, and K Izumi
Research Institute for Natural Hazards and Disaster Recovery, Niigata University, Niigata, Japan (iyobe@gs.niigata-u.ac.jp)

In Japan, snow damage to forest stands is observed in the coastal regions of central Honshu facing the Sea of Japan, where heavy monsoon-type snowfall frequently occurs. In December 2009 and 2010, Niigata Prefecture and the surrounding areas in central Honshu facing the Sea of Japan suffered from localized heavy snowfall. The Japanese cedar (Cryptomeria japonica D. Don), which is a major species and planted widely in Japan, was damaged severely by these 2 heavy snowfalls. The damages caused by the snowfalls resulted in a large economic loss in Japanese cedar plantations, and the risk of disturbances caused by heavy snowfall is expected to increase in the future, leading to declination in forest management. To specify the detailed spatial distribution and the trigger of the snow damages that occurred during the heavy snowfalls in December 2009 and 2010, we investigated the geographical distribution (number, location, aspect, and elevation) of the damaged trees and analyzed meteorological data from various meteorological observation networks. Almost 12,000 trees were sampled in Niigata Prefecture and the surrounding areas after each of these 2 events, and various snow accretion damages (top tree, crown and stem breakage, and uprooting) were found. Both snow accretion damages in 2009 and 2010 were associated with elevation. Air temperature near the elevation where the damaged trees were found decreased below freezing, followed by transition between 0°C and +2°C during the heavy snowfalls. This suggests the possibility that the snow accretion damages were attributable to the accumulation of a large amount of dry snowflakes after a load of wet snowflakes accreted on the tree crown. Furthermore, the quantitative relationship between wet and dry snowfall determined from air temperature and precipitation intensity data during the heavy snowfalls was found to be suitable for estimating the number of damaged trees.