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Changes in distribution of seasonal snow cover during melting season in Tateyama region, the Japan Northern Alps.

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Studies on snow covers in mountainous regions of Japan have been carried out through surveys at the particular snow patches, pit observations and snow depth monitoring. However, they are conducted at spatially limited areas in general and studies on changes in spatial distribution of snow with frequent observations are still limited. In this study, on the basis of the observation results of observation on areal changes of snow cover around Mt. Tateyama, it is shown and analyzed how snow undergoes spatial and temporal change during melting season. Field observations were performed with both photography and Carrier-phase Differential Global Positioning System, DGPS. Snow distributions obtained for 2007 had been compared to satellite images provided by Advanced Land Observing Satellite (ALOS). Causes which led the disagreement between two procedures are discussed and utilized to improve the accuracies of 200 9 observations.

It was found that snow cover disappearance rate had changed into lower at the end of July in 200 9. This decreasing trend could not be explained by a change of positive degree-day sum of air temperatures (PDD) at the Murodo station directly, but corresponded to the change in snow distribution from the continuous extent to the isolated snow patch.

As the result of spatial analysis with DEM (Digital Elevation Model), the following characteristics between the snowcover distribution and the topography have been found: 1) Snow area on the north and east facing slopes decreased less intense comparing to south and west slope orientations. 2) by the middle of summer, snow remains mainly in hollows, which are represented by deep valleys as well as common shallow depressions less than 10 meters deep. The latter type of terrain is responsible for the lower melting rate of snow. On the other hand, DGPS measurements showed that snow depth on south slope decreased slower than on the north one. Further, although snow melting rate strongly depends on elevations (higher melt at lower elevations) in the early melting season, the terrain curvature gives larger effect in the latter term; again snow tends to remain in hollows. Thus, we can reasonably conclude that these topographical contributions are the most significant factors affecting the decrease of melting rate of snow cover. However, there is still some contradiction remains related to a competition between horizontal (spatial) and vertical (thickness) melting rates at the eastern slope, where a decrease of snow area goes slowly, despite a rapid surface lowering. Probably this could indicate a larger accumulation of snow at the eastern leeward slope of the study area.

Keywords: Snow Cover Distribution, Snow Patch, Seasonal Change