

## **Abstract**

### **Snowpack energy balance in forest environment: spatial and temporal variability of shortwave and longwave radiation**

Assessment of the role of forest on snowmelt processes and snowpack attributes contributes to the accuracy of spring floods forecasting. An importance of the coniferous forest consists in change of the snowpack energy balance. Forest reduces the total amount of solar radiation, however trees cause emitting of longwave radiation, both factors are fundamentally reflected in time of snowmelt in forest environment. Master thesis focuses on temporal and spatial variability of shortwave and longwave radiation depending on the structures of vegetation cover. Individual site types were defined as an open area, a forest affected by the bark beetle (*Ips typographus*) and a healthy coniferous forest, based on the hemispheric images of vegetation and its Leaf Area Index (LAI). Moreover, repeated manual measurements of the snow depth and snow water equivalent (SWE) were done in plots during winter period 2016/2017 in the Ptačí Brook catchment in the Šumava Mountains, and an analysis of shortwave and longwave radiation data the radiometers in plots was performed. Radiation fluxes in different plots were described in daily and seasonal scale, including the calculation of total heat from shortwave and longwave radiation sources, which participate in snowmelt process. Shortwave solar radiation is a major source of the energy, while longwave radiation often constitutes a negative component of the snowpack energy balance in a open area, especially during radiation weather conditions, there is a significant energy consumption. On the contrary, longwave radiation is the primary source of energy in forest during snowmelt, besides the vegetation structure, meteorological conditions play an important role as well. A total of shortwave radiation in forest environment is only 6 % of the amount observed in a open area due to shading effect of the trees, in a affected forest it is reduced to 30.5 % compared to an open area.

#### **Key words:**

Snowpack energy balance, forest, shortwave radiation, longwave radiation