

Effects of climate change on flowering phenology of montane plants: a case study for a spring ephemeral and alpine plants

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Plant phenology, seasonal and periodic behavior shown by plants, is though to be largely affected by global climate change. Most studies on plant phenology have been carried out on the low-elevation sites in and/or near the urban area. Phenological observation has been rarely conducted in the montane area, especially in the alpine region, where global climate change would have a strong impact. In this presentation, I will show seasonal and yearly variations of flowering phenology in montane plants inhabiting in a secondary forest and alpine ecosystems having a snowy climatic regime. Target species are *Erythronium japonicum*, *Diapensia lapponica* var. *obovata*, and *Sieversia pentapetala*. I and co-researchers observed these flowering phenology from 2010 to 2015, and also measured air and soil temperatures, and recorded directly or estimated indirectly dates of snowmelt. According to an analyzing technique reported by Kimball et al. (2014), we could express temporal changes of the flowering rate as a logistic curve, using degree-day accumulations based on air and soil temperatures, day of year, and day from snowmelt as explanatory variables. I will show the species specific difference of significant variables against the flowering phenology, and the effectiveness using a logistic model for describing and predicting flowering phenology of montane plants.

Keywords: phenology, alpine plants, climate change