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The spring and autumn phenophases of the broadleaves trees indicate the extension of growing season in the boreal forest environment

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The long-term historical data since 1752 shows an advancement in the timing of flowering by five days per century in *Prunus padus*. The onset of flowering in *Sorbus aucuparia* has become correspondingly earlier in Finland at the rate of three days per century. The results of the Finnish National Phenological Network fit well in the historical data.

The Finnish National Phenological Network was established in 1996 in collaboration with research institutes and universities. The phenomena being studied by trained observers using a standardized manner are flowering and flushing of trees, yellowing and shedding of leaves, height growth and flowering of conifers, flowering of *Vaccinium vitis*-idaea and *Vaccinium myrtillus* and the ripening of berries. The monitoring covers eight tree species: *Betula pubescens, Betula pendula, Pinus silvestris, Picea abies, Populus tremula, Juniperus communis, Prunus padus* and *Sorbus aucuparia*. The observations are made repeatedly of the same tree individuals at least twice per week. The real time results are visible in the form of animations and charts (*http://www.metla.fi/metinfo/fenologia/index-en.htm*). The green wave from south to north and yellowishing from north to south will be presented in the conference. The onset of downy birch leaves occurred in northernmost Lapland about a month later compared with southern Finland and began to turn yellow already at the beginning of September.

The onset and progress of growth are primarily dependeing on air temperature. The results of the network confirm that spring phenophases have especially in northern Finland advanced with respect to climatic conditions. For autumn phenopases we found in several sites delaying trend, but not as strong as in spring phenopases. *Downy birch, Betula pubescens*, has been found to leaf on average when the effective temperature sum has reached 54 dd. in the southern part of the country, but in the north only 38 dd. is needed. The less temperature sum requirement within the boreal zone in the north compared with south is not reported earlier. In the north less temperature sum was also needed for the flowering of bird cherry.

Phenological monitoring by using field observations is nowadays more important than ever especially in arctic and boreal regions, where spring temperatures are elevated. Compilation and documentation of observations on plant phenophases play a key role in working out the rate of global climate change. There occurs however great variation of phenophases between the years and sites causing uncertainty for the use of data. The observation term of the Finnish National Phenological Network, seventeen years, starts to be long enough for recent responses, but it is still too short to tell whether the advancement of spring or delaying autumn is a constant phenomenon or a consequence of normal climatic variability. The timing of especially autumn phenophases and onset of leafing with respect to temperature sum will be discussed in the conference.