230$^{\text{th}}$ Regular Open Seminar（2018 January 31）

Title：Analyzing long-term growth trend of forest biomass in the circumpolar boreal forest using stand reconstruction algorithm and *s-w* diagram

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Related RISH mission : Mission 3（Sustainable Space Environments for Humankind）

Abstract :

  Boreal forests, the world largest forest ecosystem play a key role in the planet's climate and biodiversity. However, it is threatened and is likely to be strongly affected by global environmental changes such as increase in air temperature, drought intensity, which have several consequences on tree growth rate, increment of burned areas etc. Assessing the potential impact of environmental changes on boreal forest requires examination and analysis of long-term data set, which is relatively rare and limited in geographical scope in many parts of the circumpolar boreal region. Therefore, we often lack information on stand development in the past and studies on long-term changes of forest structure have been few.

It is also emphasized that history of stand level changes of aboveground biomass over decades in the arctic region has never been examine due to lack of appropriate data. Meanwhile, the stand reconstruction algorithm, which utilizes information of present stand structure (*DBH*, tree height *H*), and detailed data of tree rings from selected sample trees has enable to estimate stand structure in the past and their annual changes (i.e. stand biomass, annual growth, and stand density).

Therefore, in this research, such algorithm was used to estimate past development of several stands in the boreal region (Alaska, Canada, Scandinavia). To identify and describe the growth pattern that stands have been following over years include growth-shift events, reconstructed development of aboveground biomass were analysed with the *s-w* diagram.
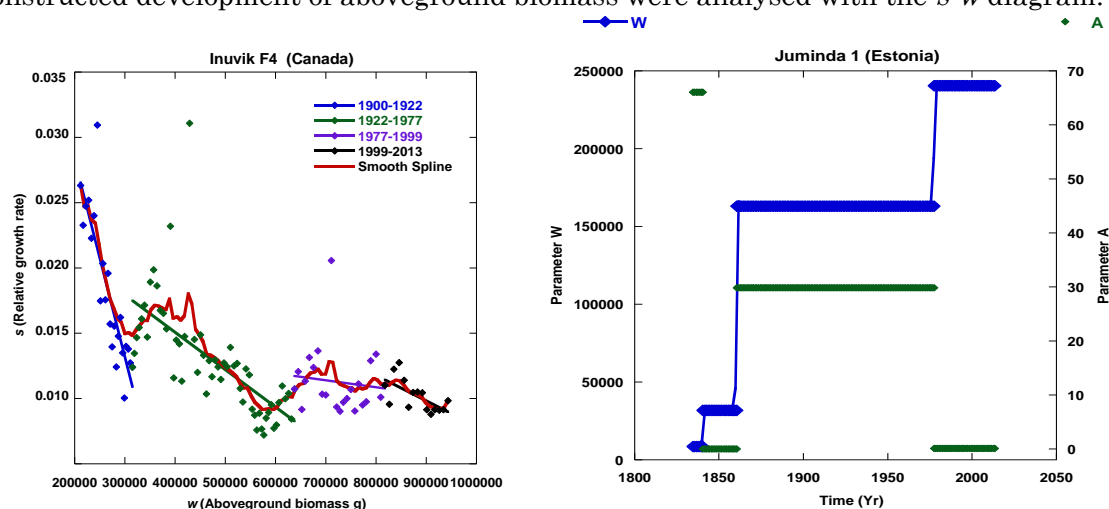
Fig. 1 Left）Growth trend of a stand in Canada with *s-w* diagram, Right）Changes in the growth parameters during growth-shift events.