

Abstract template for the conference “A century of national forest inventories – informing past, present and future decisions”

Dear author. This is a two-page template that in the first page will ask for information on presenter name, topic, and preferred presentation form.

On page two, you are asked to fill in your abstract in the format and font size indicated. Please remember to include authors affiliation information in the footer section of page two. The length of the abstract may not be more than one page including references.

Abstract title:		Application of bio-geophysical methods in precise forestry
Take-home message:		<i>Application of complex open field applicable methods allows to find the stimulating factor and results of its action in tree physiological activity</i>
Presenter name:		Majewski Robert
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General topic, see website: <small>(please double click on the check box and activate the relevant one)</small>	<input type="checkbox"/>	Improving future NFIs by learning from the past
	<input type="checkbox"/>	NFIs today and in the future
	<input checked="" type="checkbox"/>	Cutting edge and futuristic inventory techniques and technologies
Preferred presentation form:	<input type="checkbox"/>	Oral presentation
	<input checked="" type="checkbox"/>	Poster
<i>Abstracts will be reviewed by members of our scientific committee and you will be given information on decisions in due time after the submission deadline has passed.</i>		

Application of bio-geophysical methods in precise forestry

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Introduction: Four types of sap flow and water content sensors were developed at Mendel University based on thermodynamic, acoustic and electric principles. Utilization of such a open field applicable methods in national parks, stands, agroforestry and horticulture brings tangible benefits for habitat, landscape and industry. These complex studies allow deeper insight into the complicated situations like calamities, diebacks, windfalls etc. Wide range of methods applied early enough to prevent or at the last moment in the greatest need may deliver the answers and important data from many perspectives and save the valuable habitat (Čermák et al., 2014). The aim of the study was to obtain more precise and relevant information about environment along with the parallel measurements of the physiological activity of the trees.

Materials and methods: This paper concerns experiment with the selected plots with many variants of spacing. We carried out our research beginning from solitary and semi-solitary tree, short rotation copies, sapling and overmature stands were investigated by geophysical imaging methods. Main measurements were carried out using the following techniques: Electrical resistivity tomography, Dipole electromagnetic profiling, Ground penetrating radar, Sap flow sensors, Stem decay investigation by non-destructive acoustic testing, Gas exchange - meter measuring *ad hoc* each hour. For root system analysis we used the Modified earth impedance, sap flow pattern and Airspade. The precise physiological activity measurements were performed on young and solitary trees, due to accessibility of the low crown base. In parallel, we measured environmental conditions: soil moisture and water potential. Physical parameters of the air were measured every 10 minutes by a meteorological monitoring station. (Mareš et al., 2004, Aubrecht et al., 2006, Čermák et al., 2014).

Results: The geophysical methods are able to detect and illustrate tree and stand root system. The effect of different spacing and water uptake is visible. The seasonal changes in physiological activity were observed along with stand density variations.

Conclusion: Application of complex open field applicable methods allows to find the stimulating factor and results of its action in tree physiological activity.

References:

Aubrecht et al., 2006, *Tree Physiology*, 26, 1105–1112

Čermák et al., 2014, *iForest*: e1-e53,

Mareš et al., 2004, *Conference proceedings: Near Surface 2004 - 10th European Meeting of Environmental and Engineering Geophysics*, P049

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