

CONTRIBUTIONS FOR THE EXTRACTION OF ROCK EDGES FROM AIRBORNE LASER SCANNER DATA - CASE STUDY OF ELBE SANDSTONE FORMATIONS IN THE NATIONAL PARK SAXON SWITZERLAND

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ABSTRACT:

Introduction

Traditional methods of **topographic modelling** meet their limits if applied to rock formations in **forested areas**. Airborne laser scanning collects densely distributed data of the reflecting surfaces with highest spatial accuracies. Forest canopies as well as ground surfaces can be detected. Airborne laser scanning meets its limits, if the terrain is covered by very dense forest stands, as penetration of the canopy will not be possible even under very high laser pulse frequencies. On the other hand, similar surface heights of forest canopies and adjacent rock surfaces create problems of classification in particular when using the Robust Hierarchic Filtering approach (SCOP software).

Test site

The region of the limestone landscapes along the Elbe river, protected by the National Park Sächsische Schweiz, represents the perfect real-world example of these various terrain conditions. As one of many other multi thematic activities in the frame of a complex transnational project, the presented study focused on the analysis of possibilities to **extract rock formations** from laser scanner data by applying methods, which take into account the specific constraints and at the same time allow for highest accuracies of the digital documentation of the rock formations.

Instruments/ Data

Airborne Laser Data acquired using Optech Laser Scanner (TopScan, flight in April 1997). The point density of laser data is 1 point in a grid cells with 3 by 3 meters dimension. Registered data includes the Last- Pulse- measurements only.

Processing methods

It was learned that semi- automatic approaches to laser data specification and representation supported by topographic information systems digital image analysis show quite remarkable results. Especially the application of methods of digital image filtering proved for a high efficiency in extracting edges of rock formations, which can then be integrated with over-all topographic modelling.

Applications

In a continuous project funded through the EU INTERREG IIIA initiative this approach will be worked out with data collected over the whole cross- border national park region (planned flight in 2004).