



The use of LIDAR as a potential data source for the creation of digital elevation models and estimation of wetness in northern peat lands

Abdulghani Hasan (1), Petter Pilesjö (1), Andreas Person (1), and Nigel Roulet (2)

(1) Lund University, Physical Geography & ecosystems analysis, Lund, Sweden (abdulghani.hasan@gis.lu.se), (2) Mc Gail University

The main objective of this study is to investigate the potential of using high resolution LIDAR data for the creation of accurate digital elevation models covering peat lands. The secondary aim is to get an indication of the possibility to use these digital elevation models for estimations of wetness in peat lands areas. The scale problem, i.e. the spatial resolution of the DEM, will be discussed for both objectives.

Our hypothesis is that very accurate digital elevation models can be created, that these, by applying an appropriate algorithm reflect wetness in a good way, and that the estimated wetness values are highly dependant on resolution. In DEMs creation, three different interpolation methods are used with four different search radius and six selected cell resolution. We create new MATLAB code program to have full control on the interpolation process. One of the big challenges is how to deal with the huge number of data points. Processing such with computational complexity $O(n^2)$ was very slow. Adding a spatial index key (morton value) speed up the searching process and makes the search in $n \log_2 n$ time. The new code was successful to deal with the huge number of data with a reasonable time. An important outcome from this study is the statistical comparison between different DEMs.