Report for Lab 6

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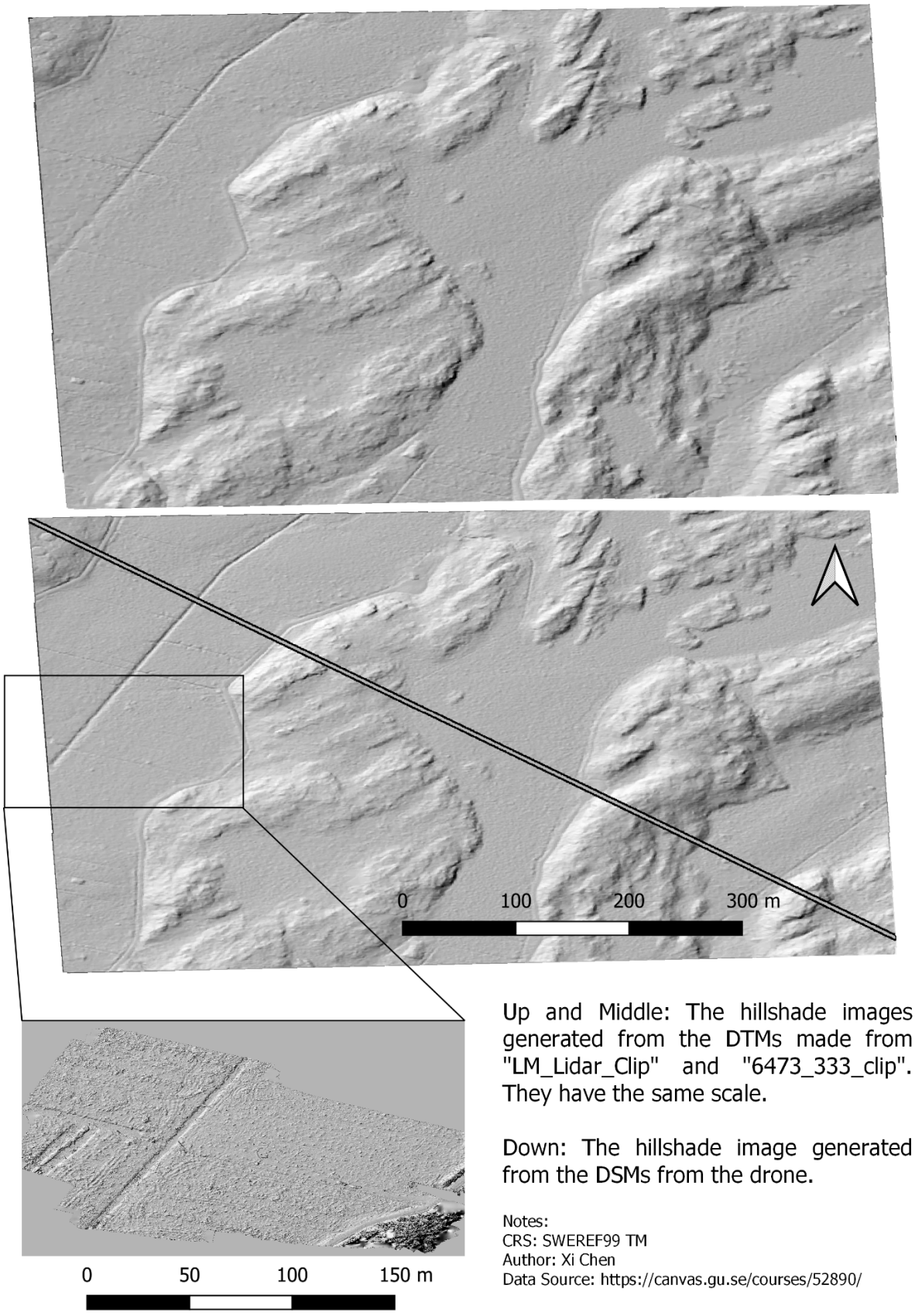
1. According to the image (see p.2), the DSM from the drone has much more “details”, i.e. more small hillshades; while the DTMs from the two Lidar files are more smooth. This is because the DSM from the drone records all kinds of detected first visible surfaces from above, therefore all kinds of vegetation, stones, roofs, etc were recorded; while the DTMs record only the bare ground elevation without any vegetation, which was more smooth.

2. According to the raster images (see p.3), except the areas of great difference which could be caused by deforesting or logging, the raster from the Single Photon Lidar data is generally brighter than the raster from the National Lidar data, and also it seems that it has higher contrast between the areas of higher vegetation density and the areas of lower vegetation density. Since the Single Photon Lidar has a more sensitive sensor and higher point density, more signals have returned to the sensor when detecting, i.e. more points were recorded per unit when trees were detected, which leads to a brighter pixel on the raster. Thus, the Single Photon Lidar data is more accurate and precise than the National Lidar data.

3. We can use the vegetation density metrics in order to monitor a forest area where special treatment or management has been implemented. For example, if a logged forest has been re-planted, then we can after a while measure the vegetation density to see if the replanting is successful or not.

4. Since the drone data does not give us a DTM, but a DSM which ONLY contains the height values of the first visible surfaces from above (the light sended by the sensor does not penetrate any object), it is impossible to separate the ground, vegetation, or other categories from the height values without the help of other data. Therefore it is not appropriate to run the classification process with drone data. I have verified this by trying to classify the drone data and then visualize it in “lasview”, but the result of “ground” turned out totally empty.



Up and Middle: The hillshade images generated from the DTMs made from "LM_Lidar_Clip" and "6473_333_clip". They have the same scale.

Down: The hillshade image generated from the DSMs from the drone.

Notes:
CRS: SWEREF99 TM
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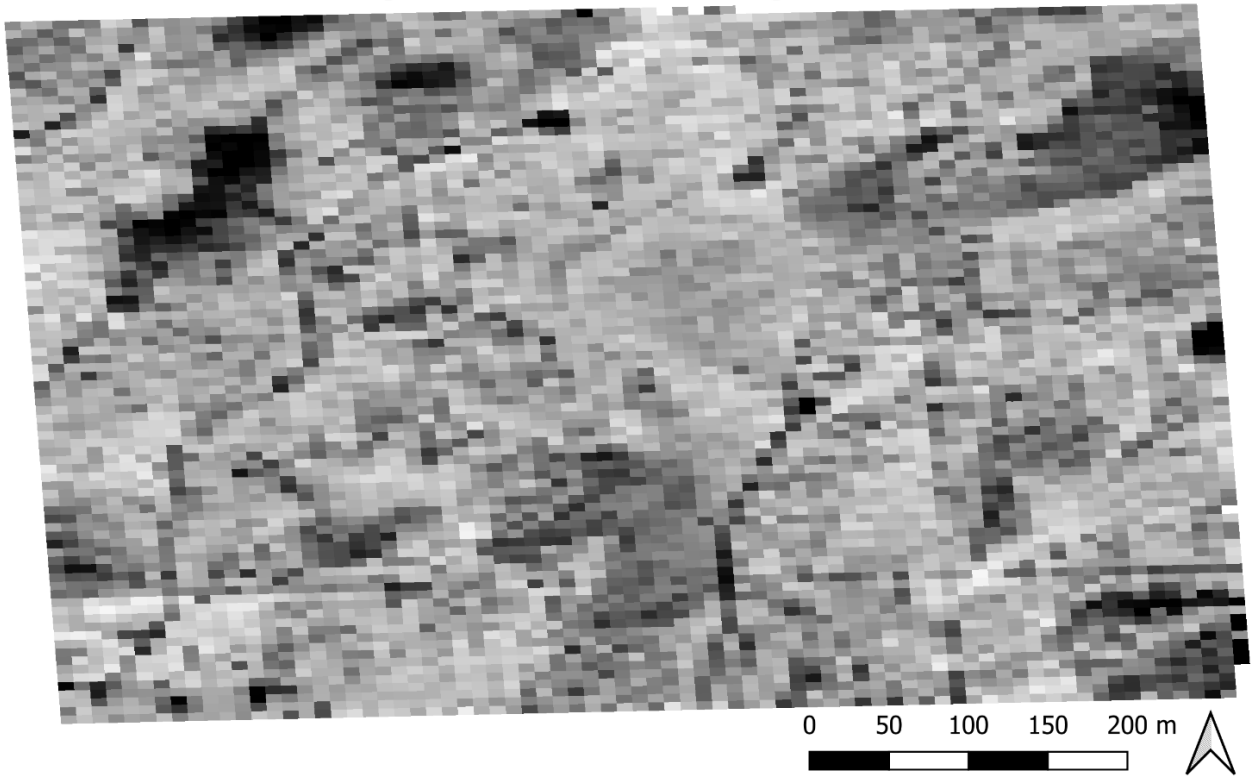
Data Source: https://canvas.gu.se/courses/52890/

Raster of Vegetation Density from the Lidar Source: National Lidar Data (©Lantmäteriet, 2010)



Raster of Vegetation Density from the Lidar Source: Single Photon Lidar Data (2017)