UAV & S2 - DTM/DEM Comparisons

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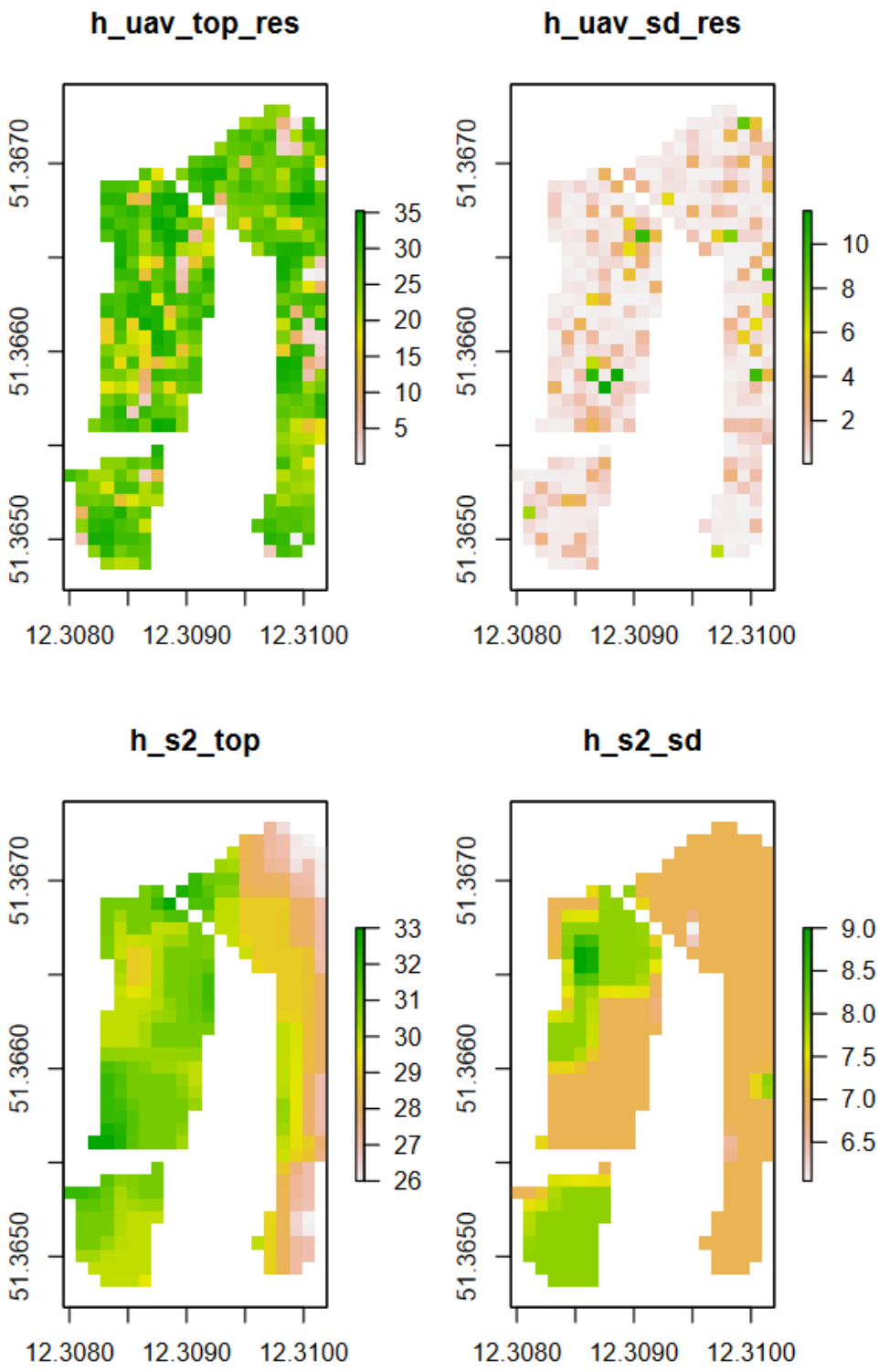
Questions:

1) How well do Sentinel-based height estimates correspond to UAV-based height?

a) Top canopy height per Sentinel-pixel

- As portrayed by the plots in Figure 1, it is clear to see that the UAV estimates are different from those of the S2 data. The UAV top height per pixel shows a scale with a maximum of 35 and minimum of 0. In comparison, the S2 top height per pixel shows only a maximum of 33 and a minimum of 26. This would suggest a much finer spatial resolution resulting in the differences. Of course, this also confirms what we already know, which is that the UAV is able to record at a more refined spatial resolution.



(Figure 1. - Plots showing the DSM for our defined area of interest. Both UAV, unmanned aerial vehicle, and s2, sentinel-2, have been plotted. The standard deviations, sd, are given as well. Code for generation can be found here)

b) Standard deviation of height per Sentinel-pixel

- The standard deviation (SD) of the UAV pixels range from 0 to 10. In comparison, the S2 SD shows a height for the sentinel-pixel ranging from around 6.5 at the lower end to 9m as a top range value.

In conclusion, this exercise shows the differences between UAV and S2 data quality concerning spatial resolution and the increase in information available when increasing spatial resolution with the use of UAV's.

2.d.iii) Compare the Metashape DTM (DJI_202305311408_001_crane-2022-05_dem.tif) with the DTM based on the point cloud without the crane. Did the cleaning solve the problem?

- The problem is not explicitly given here, however from the observations available it appears as though the cleaning and creation of a DTM using the point clouds results in very low spatial resolution. This is what we would expect, given that the DTM created from the LiDAR data using the rasterization tool was set to a resolution of 10 - 30m; in our specific case it was set to 15.