Hillshades and high drama

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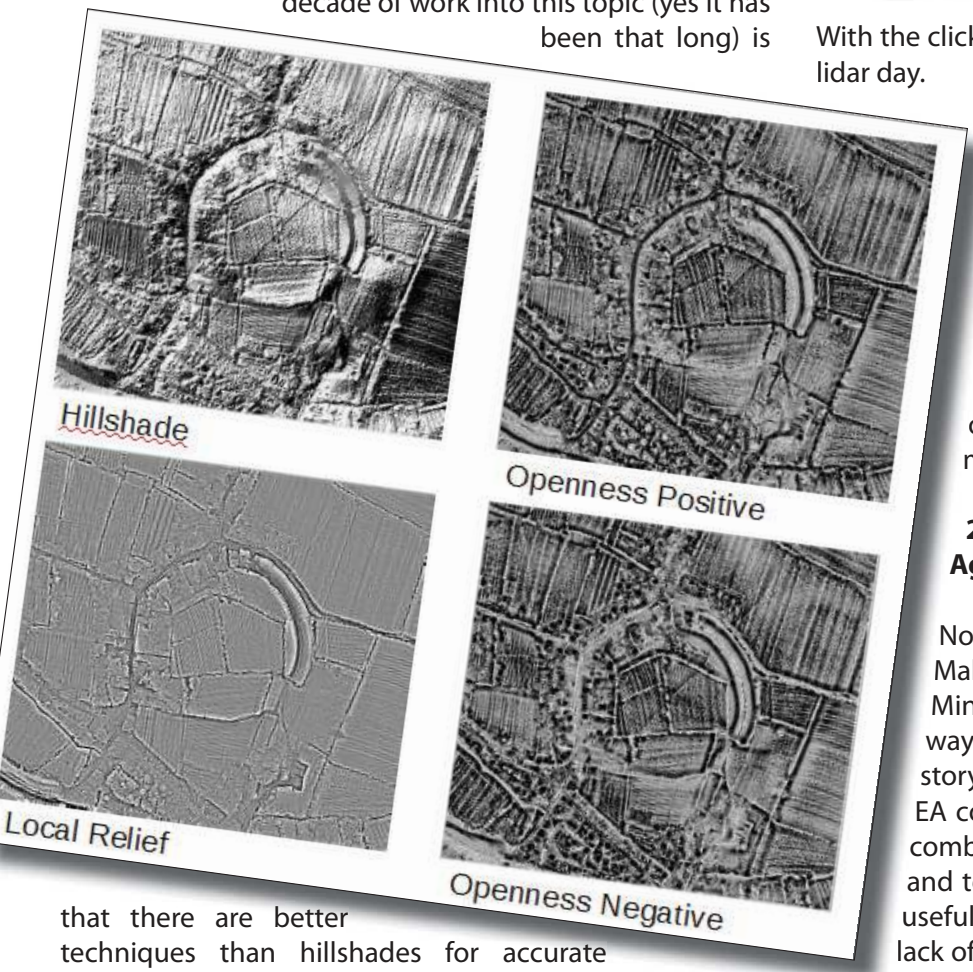
Firstly a confession - I am on a mission, a mission to curb the terrible misuse and abuse of lidar data. It's not a terribly exciting one but it keeps me busy and so to follow on from Roger and Armin's introductory piece on lidar in ISAP News 46 I'd like to share with you my three top tips for getting more out of your data, especially if it comes from the Environment Agency (EA).

1) Everytime you make a single direction hillshade a kitten dies

I know they are everyone's favourite, quick to make, easy on the eye and exactly how you and everyone else expects lidar survey to look. But when it comes to identifying microtopography they have so many problems that I'll run out of words here if I explain them all in detail. We can talk about feature mis-location, mis-representation, inverted topography, shadows, infinite duplication of effort and pointless profiles some other time (or you can check out the references below), but trust me the sum of the last decade of work into this topic (yes it has been that long) is that there are better techniques than hillshades for accurate visualisation and detailed mapping of microtopographic features.



Fortunately people far cleverer than I have published devious ways to get more out of your model without ever making another hillshade. Each visualisation has in common an unappealing name, such as sky-view factor, openness or local relief, and a complex mathematical formula but by Gods do they work wonders on your microtopography. And you don't just have to take my word for it (see refs again), though I have included some darling shots to whet your appetite (**fig. 1, below left**).

Best of all making these visualisations is a doddle thanks to the incredible folks at the Institute of Anthropological and Spatial Studies, ZRCSAZU Slovenia. You can download their stand-alone processing genie, the Relief Visualisation Toolbox, along with a detailed manual and even a powerpoint presentation about the visualisation techniques from this link:

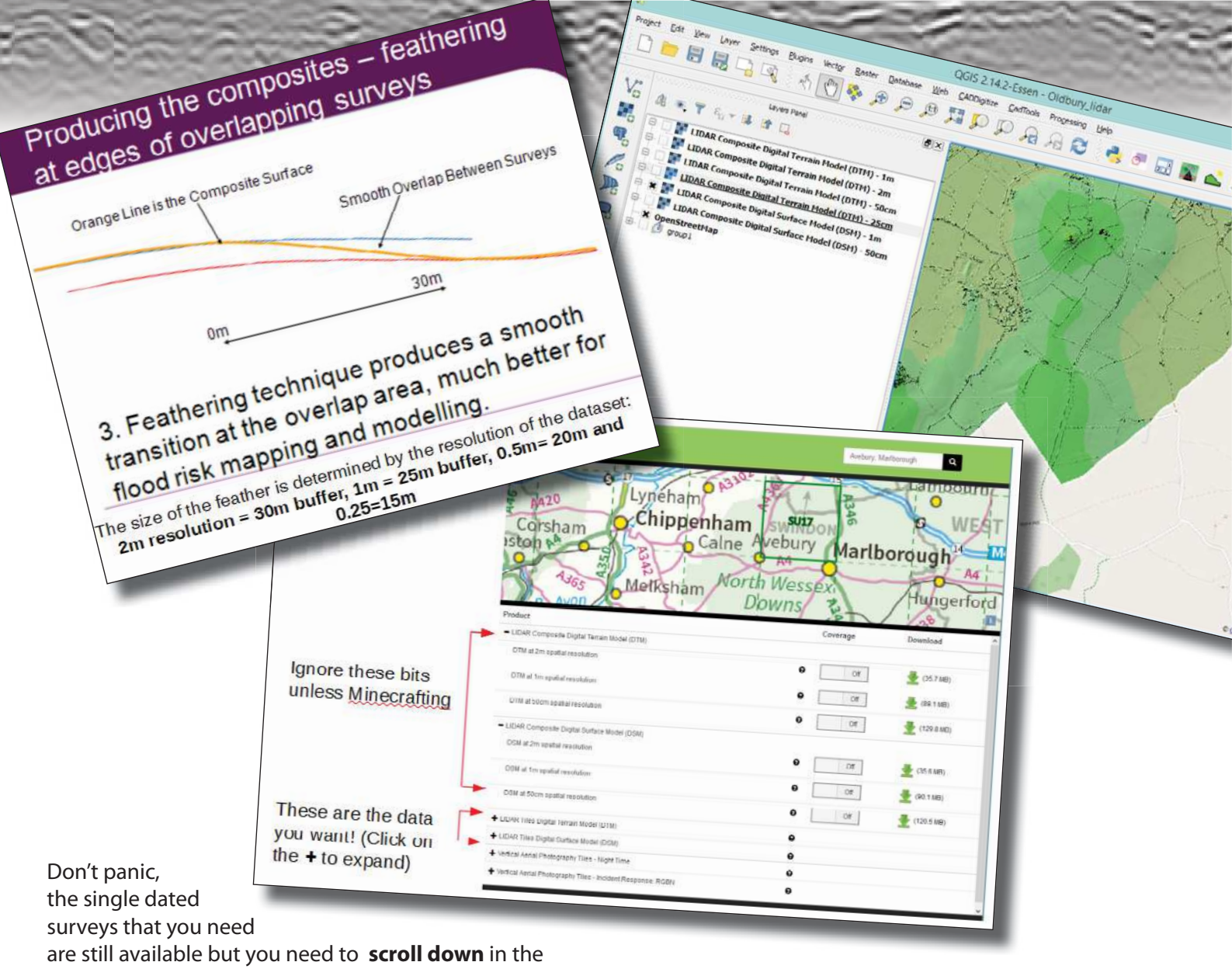
RVT
http://iaps.zrc-sazu.si/en/rvt#v

With the click of a button you'll be on your way to a better lidar day.

One final and important word of caution: as ever with data processing, an **understanding of the processing** you are doing, along with its **advantages and disadvantages** is a must, otherwise we are just making a selection of pretty pictures! (By the way the title of this section isn't true but if it makes you stop and think twice about your options for visualising lidar then that's OK by me.)

2) Not all the data from the Environment Agency are the same

No doubt you all saw the headlines 'England Makes 3D Data of the Entire Country Free After Minecrafters Ask For It' (entirely untrue by the way but why let that get in the way of a good story?). The data they are referring to here is the EA composite coverage, a neat little product that combines data from multiple surveys into a surface and terrain model for each resolution model. Very useful for minecraft and 3D visualisation but due to lack of date / resolution information and the way in which they must 'blend ' the data from surveys of different dates to account for intersurvey error, this layer is not suitable for prospection of microtopography. I've stolen a diagram from EA's metadata file to demonstrate (**fig. 2 overleaf, top left**).



Don't panic, the single dated surveys that you need are still available but you need to **scroll down** in the downloader to view them as the composite layers are shown first (**fig. 3 above**).

3) Downloading Drama

The EA downloader is rubbish so if you want to try before you 'buy' (or at least spend a while faffing around) why not link in to the highly-underpublicised WMS service in your GIS? You'll need to search for 'lidar' here:

http://environment.data.gov.uk/ds/catalogue/index.jsp#/catalogue

to get the links, then you can check out the coverage of each resolution for your site of interest. Easy like a Sunday morning. (**fig. 4, top right**)

4) Where did the Welsh data go?

I know I said three tips but if you are wondering where the Environment Agency for England and Wales' data for Wales went take a look here:

http://lle.gov.wales/Catalogue/Item/LidarCompositeDataset/?lang=en

5) Got stuck? Ask!

(Sorry I just couldn't help myself – this will be the last point I promise!) As lidar is definitely not a new idea, we have some whizz kids around in the heritage sector who can and will help you if you get stuck or don't understand. Don't feel like you are alone with your model mayhem!

Selected References

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Kokalj, Z., Zaksek, K., Ostir, W., 2013. Visualisations of lidar derived relief models, in: Cowley, D.C., Opitz, R. (Eds.), Interpreting Archaeological Topography: Lasers, 3D Data, Observation, Visualisation and Applications. Oxbow Books, Oxford, pp. 225–239.