This edge effect discussion calls for another comment. FACETS segments point clouds into planar objects with algorithms that cluster elementary planes into larger objects using a complanarity indicator and a roughness criterion. The outcome is bound to have an infinity of realizations. This algorithmic approach is however valid for reaching an interpretation consensus, as all field experts may agree easily on what makes a planar facet core area. Early work of Dewez 2003 presented in Dewez & Stewart, 2015 focused on this mapping consensus issue. Finding edges that reach a broad consensus is near to impossible. Every expert will apply a different rule, and true geological facets often blend into another feature seamlessly. While some facets have clear and sharp edges (see the work of Vasuki at al., 2014), many do not. The plugin FACETS implements one possible realization of point cloud segmentation and makes it available to the community.

Geologists should not turn a blind eye to field outcrops, nor fear that 3D cloud will replace fieldwork. There are situations where a compass/clinometer cannot be replaced. When the planar features of interest are not expressed as measurable surface, point clouds do not contain any relevant information. Stratification planes in shallow dipping monocline settings often occur as thin elongated ledges. Point clouds may not represent them well firstly because their width are not well sampled by points, and secondly because the points of view to acquire them adequately may not have been chosen when surveying, possibly even for field good reasons. Virtual outcrop geology is a very advantageous tool for many applications but does not replace fieldwork.

5. CONCLUSION

FACETS is plugin for planar facet extraction available in CloudCompare as of v2.6.2 http://www.cloudcompare.org/doc/wiki/index.php?title=Facets_%28plugin%29. It implements elementary planar object recognition with minimal user input. Elementary planar Facets recognized either through Kd-Tree or Fast Marching algorithms are grouped into planes and families. FACETS provides a graphical user interface to represent stereograms of objects with normals attached, be them planar vectorial facets or even point clouds with normals. The stereogram dialog box offers both numerical and interactive query functionality to see selected objects in 3D space. Beyond strict geological application, these queries prove very practical for segmenting architectural and underground mine/quarry point clouds.

This paper presents a test where field structural geology data was collected on a scan line and compared with digitally processed 3D point clouds. A scan line turns out to reduce the amount of geological information drastically (too drastically). Structural analysis of 3D point cloud on the other hand will be overwhelmed by the planar facets occupying the largest surface area. Implementation of the interactive stereogram proved very practical to explore the dataset and segment it. Such segmentation is amenable to further computation such as fracture spacing.

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