



## Glacial Landforms, how distorted is our view of them?

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Concurrent with the dramatic resurgence in geomorphological mapping over the last decade there has been a progression towards finding more objective, and sometimes automated, techniques and procedures for mapping. Yet manual, interpretive, techniques remain effective and commonly used. By definition manual mapping is subjective and it is therefore important that criteria are developed, and agreed upon, in order to facilitate inter-comparability of mapped outputs and assess the reliability of these data.

To this end we have compared glacial geomorphological mapping by different interpreters. An EGU funded workshop was attended by 24 academics, ranging from undergraduates to faculty. All had an interest in geomorphological mapping, but there was a mix of expertise, from those with many years experience in mapping from satellite imagery and DEMs, to those with almost no background.

In order to robustly compare mapping by individuals, a real landscape containing statistically representative 'synthetic' drumlins (Hillier and Smith, 2012) was utilised. To create these synthetic DEMs, observed drumlins were removed from a measured DEM and replaced by elongate 3D Gaussian ones of equivalent dimensions positioned randomly with respect to the 'noise' (e.g. trees) and regional trends (e.g. hills). Five variations were generated, each containing 173 drumlins (known *a priori*), and for each DEM mappers asked to map the outline, ridge crest and highpoint of each identifiable drumlin prior to the workshop. In total 20,760 landforms were presented to the 24 mappers and 11,687 were mapped, of which 8,288 were coincident. Drumlins mapped per individual ranged from 198 to 989 out of 865 present. Overall 'accuracy' (i.e.  $n_{coincident}/n_{total}$ ) was 40%, however the 'reliability' of mapping (i.e.  $n_{coincident}/n_{mapped}$ ) ranged from 41% to 100% depending upon the mapper.

This presentation summarises the results of the mapping, gives insights into the drivers of accuracy (e.g. experience, mapping philosophy), and presents initial suggestions for mapping protocols.

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