Ice sheets flowing across a sedimentary bed usually produce a landscape of blister-like landforms streamlined in the direction of the ice flow and with each bump of the order of 10^2 to 10^3 m in length and 10^1 m in relief. Such landforms, known as drumlins, have mystified investigators for over a hundred years. A satisfactory explanation for their formation, and thus an appreciation of their glaciological significance, has remained elusive. A recent advance has been in numerical modelling of the land-forming process. In anticipation of future modelling endeavours, this paper is motivated by the requirement for robust data on drumlin size and shape for model testing.

From a systematic programme of drumlin mapping from digital elevation models and satellite images of Britain and Ireland, we used a geographic information system to compile a range of statistics on length L, width W, and elongation ratio E (where $E = L/W$) for a large sample. Mean L, is found to be 629 m (n = 58,983), mean W is 209 m and mean E is 2.9 (n = 37,043). Most drumlins are between 250 and 1000 metres in length; between 120 and 300 metres in width; and between 1.7 and 4.1 times as long as they are wide. Analysis of such data and plots of drumlin width against length reveals some new insights. All frequency distributions are unimodal from which we infer that the geomorphological label of 'drumlin' is fair in that this is a true single population of landforms, rather than an amalgam of different landform types. Drumlin size shows a clear minimum bound of around 100 m (horizontal). Maybe drumlins are generated at many scales and this is the minimum, or this value may be an indication of the fundamental scale of bump generation ('proto-drumlins') prior to them growing and elongating. A relationship between drumlin width and length is found (with r^2 = 0.48) and that is approximately $W = 7 L^{1/2}$ when measured in metres. A surprising and sharply-defined line bounds the data cloud plotted in E–W–L space, and records a scale-dependent maximum elongation limit (approximated by $E_{max} = L^{1/3}$, when L measured in metres). For a given length, for some reason as yet unknown, drumlins do not exceed the elongation ratio defined by this scaling law. We also report and compare our statistics to an amalgamated sample (25,907 drumlins) of measures derived from around 50 published investigations. Any theory must be able to explain the drumlin statistics and fundamental scaling properties reported herein and they thus provide powerful tests for drumlin modelling.