



CLustre: semi-automated lineament clustering for palaeo-glacial reconstruction

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Palaeo glacial reconstructions, or "inversions", using evidence from the palimpsest landscape are increasingly being undertaken with larger and larger databases. Predominant in landform evidence is the lineament (or drumlin) where the biggest datasets number in excess of 50,000 individual forms. One stage in the inversion process requires the identification of lineaments that are generically similar and then their subsequent interpretation in to a coherent chronology of events.

Here we present CLustre, a semi-automated algorithm that clusters lineaments using a locally adaptive, region growing, method. This is initially tested using 1,500 model runs on a synthetic dataset, before application to two case studies (where manual clustering has been undertaken by independent researchers): (1) Dubawnt Lake, Canada and (2) Victoria island, Canada.

Results using the synthetic data show that classifications are robust in most scenarios, although specific cases of cross-cutting lineaments may lead to incorrect clusters. Application to the case studies showed a very good match to existing published work, with differences related to limited numbers of unclassified lineaments and parallel cross-cutting lineaments.

The value in CLustre comes from the semi-automated, objective, application of a classification method that is repeatable. Once classified, summary statistics of lineament groups can be calculated and then used in the inversion.