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Scale invariant feature identification and quantification, without any *a priori* assumptions about shape

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One, often productive, approach to investigate a geomorphic process is to create a database of a type of topographic feature sculpted by that process. Morphometric quantities (e.g. length, height) associated with these populations of landforms can then be used to characterize regions or constrain models (e.g. statistical or physically based). Perhaps the key danger in such analyses is that systematic biases lie hidden in the data, altering the morphometrics, with the potential to be falsely interpreted as process-related. Biases may arise from subjectivity in manual mapping, or from assumptions built into automated methods, sometimes misleadingly labelled 'objective' (none are). Automated, reproducible and minimally subjective selection of landforms is therefore a common aim, but non-trivial in multi-scale landscapes without imposing a pre-conceived view of landform shape. The SWT algorithm [Hillier, 2008] identifies and quantifies seamounts across size scales without any *a priori* assumptions about shape. Pilot studies tentatively show the SWT algorithm also works on populations of aeolian dunes (Namib) and gorges. I would welcome feedback on the limitations of SWT, and seek interesting collaborations using it on Earth or other planetary bodies.

Hillier, J. K., (2008) Seamount (submarine volcano) detection and isolation with a modified wavelet transform, *Basin Research* **20**, 555-573, doi:10.1111/j.1365-2117.2008.00382.x