Self-organization, self-similarity and entropy of *Azorella selago* – banked terraces, Marion Island

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Complex systems theory is increasingly applied to ecological and geomorphological problems to address the shortcomings of traditional reductionist approaches. While many examples exist of ecological and geomorphological phenomena described in terms of self-organization, this is rare for interactive ecological-geomorphological systems. Here we analyze the geobiological interactions of *Azorella selago*-banked terraces in terms of their self-organizing behaviour. Self-similarity across spatial scale of the landforms is tested by means of measurement of terrace morphometry at three different locations. The degree of order of the landscape at the sites in which the terraces are found, is estimated by means of Shannon's entropy index. Based on available data and theoretical considerations, we develop a theoretical model for terrace development, viewed as a self-organizing system, in which repeated small perturbations (frost cycles) on a randomly distributed substrate (non-sorted glacial till), lead through several feedback loops (particle size sorting and *Azorella* stabilization and growth dynamics) to a self-organized landscape (non-random terrace distribution), where terrace morphology can be viewed as an emergent property of the system. The morphometrical analysis suggests that terraces show a certain degree of self-similarity but that terrain factors, such as slope angle, play a role in the specific organization of the landforms. As all slopes have had ample time to develop terraces, self-organization cannot be tested through time by means of entropy analysis. However, the three different sites each display as a distinct cluster of entropy values. We conclude that approaching the study of turf-banked terraces and the interactions between ecological and geomorphological systems from the perspective of self-organization theory can lead to promising new perspectives and insights.