BayCEER Kolloquium

Lectures in Ecology and Environmental Research

WS 2016/17

UNIVERSITÄT BAYREUTH

Donnerstag/Thursday
24.11.2016
12:00 in H6, GEO

Prof. Dr. Christoph Hinz

Brandenburg University of Technology
Cottbus-Senftenberg

Pattern formation in semiarid landscapes

Self-organised vegetation patterns are a characteristics of semi-arid and arid eco-systems. Their landscape ecological function has been studied for decades and a soil-vegetation feedback has been identified to cause the formation of banded patterns. Vegetation and its associated soil biological activity causes soil properties to increase its storage capacity for water and nutrients leading to water harvesting by runoff and run-on in response to rainfall events. This has led ecologist to formulate the trigger-transfer-pulse framework, which describes resources redistribution and utilisation as discrete events, which depend on the frequency and magnitude of rainfall as the trigger. While water is a limited resource in this context, it is also a geomorphic agent which causes erosion and sediment redistribution. Stability of such landscapes and ecosystems depends therefore on both vegetation distribution and soil surface properties that contribute to the redistribution of water in the landscape preventing frequent and excessive erosion events.

Within this context I will present our findings on modelling and observing vegetation patterns and the development of rock amour on soil surfaces within the context of Australian arid regions in which mining has led to severely disturbed landscapes. One key question concerning the modelling of vegetation pattern is how much process realism is necessary to adequately reproduce the pattern as well as the water balance dynamics, as water redistribution and plant growth occur at different temporal scales.