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Confirmation of Attendance

We confirm that **Adel Sepehr** has attended the Biogeomon Conference taking place from Juli 13th-17th, 2014 in Bayreuth (Germany) and presented the poster **P 2.46: Chaotic and Nonlinear Behavior of Arid Ecosystems to Outgoing Drivers**.

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Prof. Dr. Egbert Matzner
Conference Host, Chair of Soil Ecology

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8th International Symposium on Ecosystem Behavior

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The 8th BIOGEOMON Symposium on Ecosystem Behavior is taking place from July 13th to 17th 2014 at the University of Bayreuth. Host of the conference is the Bayreuth Center of Ecology and Environmental Research (BayCEER).

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The abstracts of over 100 oral and approximately 270 poster presentations have been compiled in this “Book of Abstracts”, together with a list of authors and participants. The respective authors are responsible for the contents of this booklet. Editorial deadline: 24th June 2014.

The book is also available for download on the conference web site for all registered participants.

www.bayceer.uni-bayreuth.de/biogeomon2014

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December 2013; bi-weekly/monthly) using the closed-chamber method. Others parameters measured included: tree size, litter fall, root biomass, organic layer depth, soil organic carbon, soil temperature and soil moisture. An index of local contribution (I_c), based on the trunk cross section area and distance from the measurement point, was calculated for each tree to determine the spatial variation in soil CO_2 efflux. Summer rainfall in 2013 was only 1/3 of the volume that fell during the same period in 2012 resulting in considerably lower soil moisture contents during summer 2013. Soil CO_2 efflux (collar depth: 10 cm) was seasonally variable with larger fluxes during summer (3.6±0.2 µmol m^{-2} s^{-1}) than winter (2.5±0.3 µmol m^{-2} s^{-1}). However, soil CO_2 efflux during wet and dry summers were not significantly different. The major abiotic factor explaining temporal variations in soil CO_2 efflux was soil temperature (r^2 = 0.32). Surface collar CO_2 efflux, which provides an approximate estimate of root respiration, was on average 1 µmol m^{-2} s^{-1} higher than the efflux measured at a collar depth of 10 cm, except during the dry summer. Litter fall biomass increased substantially during the summer drought but given the slow decomposition rate of kauri litter no effect has been observed on soil CO_2 efflux. Long litter residence times and considerable spatial heterogeneity may explain the lack of significant differences between soil CO_2 efflux in the vicinity of healthy and PTA infected kauri trees.

P 2.46: Poster Session 2 on Tuesday, 16:30-18:00

Chaotic and Nonlinear Behavior of Arid Ecosystems to Outgoing Drivers

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Based on the second law of thermodynamics, an open system shows a stable state where receives minimum energy or maximum entropy. Changes in input of the system leads to the new output, where system shows a new equilibrium point or new landscape, although emerging new landscape are consequence of crossing critical transitions. Intrinsic and extrinsic thresholds can lead to effects that cascade among systems. The nonlinear response of ecosystem to environmental perturbation identifies by bifurcation points in the mathematical curve indicates bistable zone in the ecosystem. In systems subject to gradually changing conditions abrupt and sometimes irreversible shifts between two stable states can take place if a certain threshold (critical point/bifurcation point) is exceeded. Before the critical transition from a vegetated state to a barren state takes place, regular spatial patterns appear. A transition in a system is induced by an external forcing, so changing conditions. Catastrophic transitions can be the result of changing conditions, but may as well be caused by perturbations in system state that force it out of its basin of attraction. Semi arid and arid ecosystems are fragile environments and have low resilience range to respond perturbations and maintain equilibrium. Un-vegetated or vegetated states depend on environmental perturbations (soil degradation, climatic variations, etc.) which cause a critical ecosystem transition. The vulnerability of a system refers to instances where neither its robustness, nor its resilience enables a system to survive without structural changes. In such cases, either the system adapts structurally, or it is driven to chaos (non-equilibrium status). In this article has been discussed formation of vegetation spatial pattern as chaotic responses outgoing pressures in the bistable zone or non-equilibrium status. The results of this article can be useful for ecosystem management in relation to climate changes and human pressures.

Keywords: *chaos, nonlinear behavior, arid ecosystems, bifurcation, pattern*