Geophysical Research Abstracts
Vol. 19, EGU2017-18278-1, 2017
EGU General Assembly 2017

Developing ecological fingerprints for ecoclimatic zones in Australian drylands to inform land restoration

Miriam Muñoz-Rojas (1,2), Paula Escribano Velasco (3), and Monica Garcia (4)

(1) University of Western Australia, Plant Biology, Crawley, 6009, WA, Australia, (miriammunozrojas@gmail.com), (2) Kings Park and Botanic Garden, Kings Park, Perth 6005, WA, (3) CAESCG, University of Almeria, 04120, Almeria, Spain, (4) Department of Environmental Engineering, Technical University of Denmark, 2800, Lyngby, Denmark

With more than 25% of the global surface affected by land degradation processes, there is an urgent need to restore disturbed ecosystems worldwide. Increased arid conditions in projected scenarios of climate change need to be acknowledged in restoration programs; this is particularly critical in dryland ecosystems where significant changes are expected in their structure and functioning worldwide. Australia is the driest inhabited continent in the world with 70% of the country classified as arid or semi-arid (average annual rainfall of 250 mm or less). Moreover, Australia has undergone massive land-use changes in the last decades and the landscape is highly degraded and fragmented. These conditions position the country as one of the climate change vulnerable “hot spots” globally. In this research, we aim to evaluate a broad range of ecological indicators in natural Australian dryland ecosystems (both disturbed and undisturbed) that allow us to i) identify those areas most vulnerable to potential and environmental changes and ii) tracking the effectiveness of restoration practices. The most relevant indicators will be selected to inform decision-making in the design of management strategies to address the potential negative effects of climate change and further land degradation. These ecological indicators will be measured in 10 Australian ecoclimatic units that combine the main vegetation functional types and climate zones based on the aridity index as follows: hum¬mock grasslands in the hyper-arid zone; acacia shrublands, hummock grasslands and tussock grasslands in the arid zone; chenopod shrubs, hummock grasslands, mallee woodlands and tussock grasslands in the semi-arid zone and eucalyptus and acacia forest in the dry sub-humid zone. A set of fingerprints will be created to diagnose each ecoclimatic unit using a wide range of ecological indicators related with the ecosystem’s composition, structure and function. We will combine novel technologies and methodologies on remote sensing data acquisition of the land surface (e.g. high spatial resolution hyperspectral imaging), satellite and climate time series, biophyisical models and field measurements of soil physicochemical and microbiological properties, plant ecophysiological parameters and biogeochemical processes. This multidisciplinary approach will allow us to establish the fingerprints more sensitive to degradation processes and recovery. The outcome of this research will provide a valuable tool to stakeholders and managers on conserva¬tion and restoration that will allow integrating adequate measures of climate change adaptation and mitigation in environmental planning.