iLEAPS-OzFlux joint conference Abstract 2023

Title

Ecosystem responses to climate-induced stress in Australia – piloting an integrated monitoring system

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Session preferences (3 max)
3.3 - Ecosystem response to climate extremes (**Conveners**: Cate Macinnis-Ng, Xianhong Meng, Tamir Klein)
4.1 - Effects of climate extremes on water and gas exchange (**Conveners**: Luitgard Schwendemann, Jiming Jin)
4.2- *OzFlux* — New insights from tower flux measurements (**Conveners**: Jamie Cleverly, Dave Campbell)

Abstract
Continuous long-term terrestrial ecosystem observation sites provide critical measurements to monitor ecosystem health, and their response to climate change. Environmental Research Infrastructures (ERIs) provide the support resources needed to monitor global ecosystem change. However, gaps exist within these ERIs that need to be addressed. These include the need for better stress detection systems that link with ecosystem productivity, reducing temporal gaps in plant structural measurements, increasing biodiversity monitoring over spatial gradients, improving understanding of sunlight movement through the plant canopy, and better scaling from sites to region using remote sensing. This presentation details recent activities in Australia's TERN ERI to improve ecosystem monitoring in at three sites in Western Australia - all part of the OzFlux component of FLUXNET: Boyagin Wandoo Woodland, the Great Western Woodlands, and Gingin Banksia Woodland. The new instrumentation includes fixed terrestrial laser scanners to capture daily changes in vegetation structure, hyperspectral sensors to calculate vegetation indices and measure sun-induced chlorophyll fluorescence, and quantum sensor nodes to record variability of photosynthetically active radiation scattering and absorption through the canopy. These measurements will improve our understanding of vegetation stress and structural change as climate variability increases and provide synergies for greater integration with novel satellite technologies.