Kolloquium Boden und Wasser

18. Januar 2018, 16 ct – 18 Uhr
Hörsaal S 01 007, Hermann-Herder-Straße 6

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Testing the influence of vegetation coupling to the atmosphere on catchment-scale hydrological processes in Australia

In south-east Australia, a large proportion of the water supply to millions of people is sourced from mountainous catchments, forested with mixed-species native eucalypts, where stream flow is strongly leveraged to tree water use given that most of the incoming rainfall is turned to the atmosphere via transpiration. In the context of climate change, rising temperature and increasing frequency of high intensity bushfires, an improved understanding of how plant structure and physiology control water use, is necessary for assessing the consequences of climate change on the terrestrial water cycle.

In this study we investigated species-specific response to the environment at the leaf, tree, and stand scale at different stages of growth and under natural conditions. We found those species growing on less water-limited parts of the catchment to display greater conservative, lower-risk strategies in their physiology and leaf structure, compared to drought tolerant species growing on a range of elevations and aspects. Eucalypt water use in the high country was largely governed by the atmospheric environment, mainly vapour pressure deficit and radiation, compared to soil moisture, with species-specific sensitivity to atmospheric drought that were supported by species distribution patterns within the landscape. At the catchment scale, biological constraints of transpiration were included to describe variations in stream flow, within a conceptual framework, and based on empirical data and theory.