A new view of the forest: Linking tree functional traits to drought resilience across a rainfall gradient in Ghana

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Introduction

One of the most important questions in ecology and ecosystems science today focuses on how communities of organisms respond to global environmental change and local anthropogenic pressure, and how such changes in community composition affect ecosystem properties and services. African forests remain particularly understudied in terms of ecosystem function and its links to ecosystem composition and diversity. In this project we are conducting the first detailed measurements linking tree traits, plant ecophysiology productivity and resilience to drought in African forests. The studies are focussed along a gradient in Ghana ranging from wet rainforest (Ankasa), through semi-deciduous forest (Bobiri) to forest-savanna transition (Kogyae). The intensive field studies started in October 2014 and will continue until Mar 2016, and will be followed by a further year of follow-up studies by the project funded Ghanaian PhD student Theresa Peprah to understand seasonal variation.

Objectives

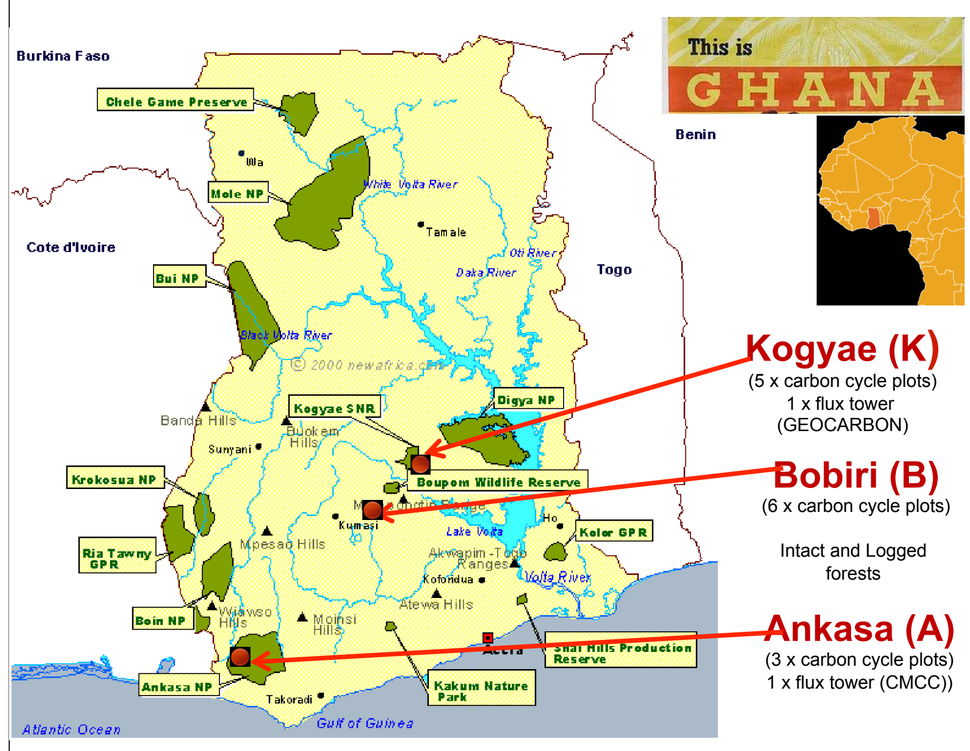
The objectives are to:

1.Characterise the hydraulic and ecophysiological characteristics of diversity of trees along a wet-dry gradient in Ghana, ranging from wet tropical forest through to savannah woodland.

2.Describe the seasonal variation in moisture stress, and tree physiological response to this moisture stress

3.Integrate the data into a modelling framework adapted to related tree functional diversity to ecosystem function.

Project Field Sites:



The project has been named **KWAEEMMA** ("Children of the Forest" in Twi)

Expected Outcomes

1.Quantification of tropical forest ecosystem function and tree functional diversity along a rainfall gradient in Ghana.

2.Description of seasonal variation in plant ecophysiological processes and tree resilience to stress along this gradient

3.Development of capacity in Ghanaian researchers, and extension of this capacity to similar sites in Gabon.

4.First comparison with plant traits in similar environments in South America. Do different environmental histories lead to different traits?

Capacity Building

•The PhD candidate (Peprah) had three weeks' training programme at Wytham Woods, UK

•Field training conducted for 25 young graduates at FORIG and Bobiri Forest Reserve before the commencement of the field work. All trained students are involved in the field work.

•The Ghanaian team will conduct similar training in Gabon.