Data Article

Physiognomy datasets across two sub-montane tropical forests: Bakossi National Park and Mt. Nlonako in the continental Cameroon mountains

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ABSTRACT

The submontane forests in the Congo Basin have not been studied sufficiently in terms of floristic diversity, biomass, and geographic distribution. The region's lack of resources and rugged terrain are among the barriers to sampling biodiversity. This study focuses on two understudied submontane forest areas, Bakossi National Park (BNP) and Mt. Nlonako (MN), which form part of the continental Cameroon Mountains and are believed to have high species diversity and endemism. However, significant gaps exist in biodiversity data across the continental Cameroon Mountains. This study is the first detailed quantitative survey of forests in the BNP and MN through permanent plot sampling. The results of this study can be used to guide policies for managing montane ecosystems in Cameroon and enhancing conservation efforts.

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The study also provides an opportunity for long-term monitoring of forest health and REDD+ status.

Specifications Table

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Subject	Plant Science
Specific subject area	Forestry, Botany, Plant conservation
Type of data	Table, Raw
Data collection	Field survey of plants
Data source location	Data on tree diversity across two sub-montane tropical forests, Bakossi National Park and Mt. Nlonako, in the continental Cameroon Mountains, were collected from permanent plots established as part of this study.
	Institution: Cape Peninsula University of Technology
	City/Town/Region: Cape Town, Western Cape
	Country: South Africa
Data accessibility	Repository name: Figshare
	Data identification number: https://figshare.com/s/5da2a246cf3113fe5a9a
	Direct URL to data: https://doi.org/10.25381/cput.25287550.v1
	Instructions for accessing these data: Easily accessible by clicking on the link

1. Value of The Data

- Key baseline data on plant species richness and diversity can close major gaps in biodiversity documentation across the continental Cameroon Mountains.
- Data coming from permanent plots, providing a solid foundation for long-term monitoring in the Cameroon Mountain chain at the key sites: Bakossi National Park (BNP) and Mount Nlonako (MN)
- Data provide useful support for Cameroon's government as efforts towards better forest management.
- Baseline data for understanding the influence of climate change and anthropogenic activities on species diversity over time.

2. Background

The submontane forests in the Congo Basin have not been studied sufficiently in terms of floristic diversity, biomass, and geographic distribution. The region's lack of resources and rugged terrain are among the barriers to sampling biodiversity. This study aimed to provide baseline data for long-term, comprehensive monitoring of tree diversity and species richness in two relatively understudied yet important montane forests in Cameroon. The continental Cameroon Mountains (CCM), also known as the western Cameroon Mountains, represent one of the most diverse mountain ecosystems in Central Africa. Furthermore, the data could be used to investigate the effects of anthropogenic activities and climate change over long periods.

3. Data Description

Data presented were obtained from 24 1-ha permanent plots established in two submontane forests in the Bakossi National Park (BNP) and Mt. Nlonako (MN), with an elevational range of
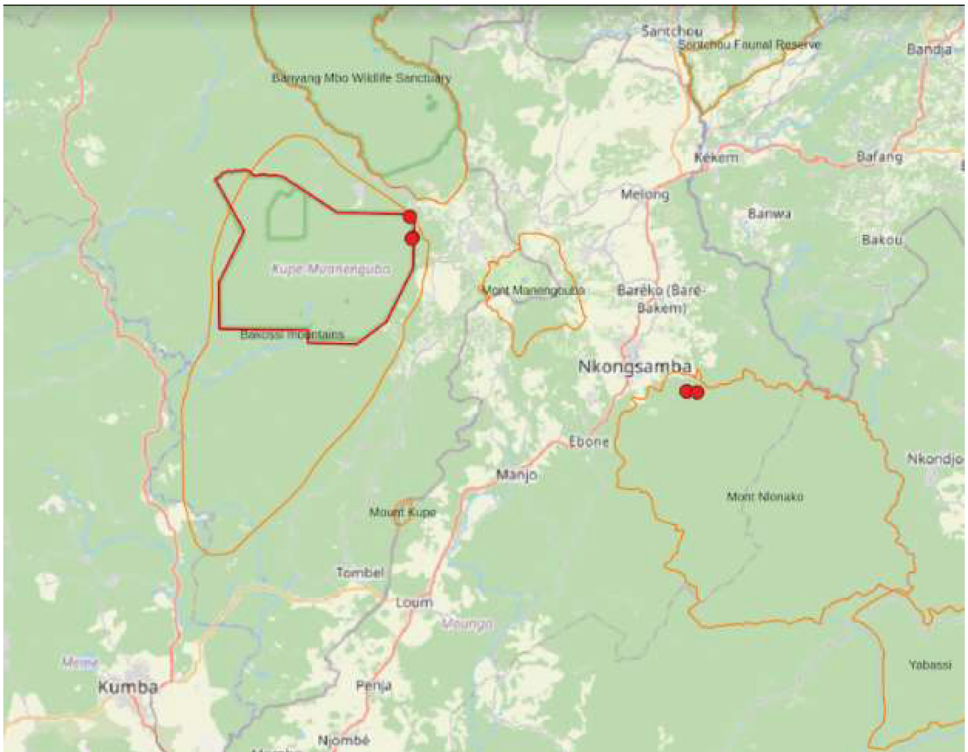
Fig. 1. Sample locations in red in the Bakossi National Park and Mont Nlonako, Cameroon.

Table 1

Summary of tree composition and diversity in different vegetation types in Bakossi National Park (BNP) and Mount Nlonako (MN), Cameroon.

Sample sites	Vegetation type	Mean species richness/ha	Mean tree stand density/ha	Shannon index/ha	Species evenness	Alpha diversity	Chao1
Bakossi National Park	Old disturbed submontane	91.8±6.2	510±23.8	3.91±0.13	0.87±0.02	36.9±4.8	145.9±19.8
Bakossi National Park	Primary submontane	72.5±9.8	460±116	3.72±0.1	0.87±0.02	28.3±2.4	108.2±17.7
Mt. Nlonako	Young disturbed submontane	90±6.7	381±15	3.92±0.1	0.86±0.01	39.6±6.6	127.3±16.6
Mt. Nlonako	Old disturbed submontane	90.5±6.5	507±21	3.7±0.08	0.82±0.07	34.8±3.5	143.1±26.3
Mt. Nlonako	Primary submontane	95.5±4.9	516±64	3.85±0.02	0.84±0.01	41.8±5.8	150.1±29.6

750–1500 m (Fig. 1). Species richness, diversity (Fisher alpha and equitability), and Shannon-Weiner index were used to estimate floristic composition and structural diversity in RStudio. The presence/absence matrix was analyzed using EstimateS version 9.1 [1]. The datasets on species occurring in the two forests can be found in the repository (https://doi.org/10.25381/cput.25287550.v1). The summaries of tree composition, vegetation types, species diversity, and dominant species in Bakossi National Park (BNP) and Mt. Nlonako (MN) Cameroon are presented in Tables 1 and 2.

Table 2

Dominant and important species in the submontane forest of Bakossi National Park and Mount Nlonako, Cameroon.

Bakossi National Park Species	IVI	N	NP	BA	Mt. Nlonako Species	IVI	N	NP
Pycnanthus angolensis	39	284	12	11208.7	*Pycnanthus angolensis*	48.2	462	12
Pseudospondias microcarpa	20	238	12	4421.2	*Elaeis guineensis*	21.1	243	12
Strombosia grandifolia	14	243	12	2439.1	*Strombosia grandifolia*	20.2	383	12
Trichilia welwitschii	11	177	12	1883.6	*Pseudospondias microcarpa*	17.4	266	12
Garcinia mannii	10	210	12	1296.3	*Tabernaemontana brachyantha*	14.9	333	12
Pentadesma grandifolia	10	194	12	1662.4	*Coelocaryon preussi*	9.6	197	12
Sorindeia sp.	7.8	192	12	614.9	*Oncoba glauca*	8.8	166	12
Cylicomorpha solmsii	7.7	125	12	1522.5	*Albizia zygia*	7.6	119	12
Turraeanthus africanus	7.3	122	12	1009.2	*Lophira alata*	7.4	95	12
Santiria balsamifera	6.2	110	12	762.8	*Hylodendron gabunense*	7.1	141	12

IVI = Important Value Index, N = Number of individuals per species, NP = Number of plots in which species occur

4. Experimental Design, Materials and Methods

4.1. Experimental Design

This study focused on two submontane forests in the continental Cameroon Mountain chain: Bakossi National Park (BNP) and Mt. Nlonako (MN). BNP is a classified protected area of 293.2 km^2, located at 5.05° N, 9.57° E, and covering an elevational range of 600–1900 m [2]. BNP ranges 4.92°–5.5° N, 9.52°-9.73° E, and holds six vegetation types [2]. Mt Nlonako, with a size of only 35 km^2, is located at 4.88° N, 9.92° E, with a peak at 1825 m. It is not a classified protected area but holds four vegetation types [2–4].

Both mountains have a short dry season from mid-November to mid-March and a rainy season from mid-March to October [5]. They have a mean annual temperature of 20–26 °C and annual rainfall of 3000 mm at Mt. Nlonako [6] and 4891 mm at Bakossi; both have fertile volcanic soil [3,7]. Permanent sampling plots were established in the two submontane forests, and data on tree species occurrence, tree diversity, and plant biomass were collected.

4.2. Sample Design

In the study sites, 500 m x 20 m transects were subdivided into 25 quadrats of 20 m x 20 m. Because the topography of all plots was not flat, we measured latitude, longitude, elevation, and transect distances at the beginning and the end of each transect and at the four corners of the plots using Garmin GPSmap 60Cx. Elevational variation within plots was less than 100 m. Plants with flowers and fruits were collected to aid in identification. Plant samples were identified in the field by two botanists and a parataxonomist; samples from unidentified species were collected, pressed, dried, sorted, and later identified at the National Herbarium of Cameroon, Yaoundé, using existing samples, floras, and monographs. A species list was generated for each plot, integrated and compared by site and vegetation type. Species names were based on the Angiosperm Phylogeny Group [8].

Limitations

The sampling of the plants was concentrated in small sections of the forest because many areas of the forest could not be accessed because of the rugged terrain and steep slopes.

Ethics Statement

Research permits were received from the Ministry of Scientific Research and Innovation (MIN-RESI), number 0000025, on 3 March 2016, and the Ministry of Forestry and Wildlife (MINFOF), number 1281, on 27 March 2016.

Data Availability

Datasets on tree diversity across two sub-montane tropical forests: Bakossi National Park and Mt. Nlonako in the continental Cameroon Mountains (Original data) (FIGSHARE).

CRediT Author Statement

Moses Nsanyi Sainge: Conceptualization, Methodology, Data curation, Writing – original draft, Visualization, Investigation, Writing – review & editing; **Ngoh Michael Lyonga:** Conceptualization, Methodology, Data curation, Writing – original draft, Visualization, Investigation, Writing – review & editing; **Felix Nchu:** Conceptualization, Methodology, Visualization, Investigation, Supervision, Writing – review & editing; **A. Townsend Peterson:** Conceptualization, Methodology, Visualization, Investigation, Supervision, Writing – review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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