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Data Article

Characteristics of soils in selected maize growing sites along altitudinal gradients in East African highlands



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ARTICLE INFO

Article history:

Received 16 June 2015

Received in revised form

24 August 2015

Accepted 25 August 2015

Available online 3 September 2015

Keywords:

Soil macro and micro elements

Organic carbon content

Soil texture

Soil pH

Cation exchange capacity

Electric conductivity

Water holding capacity

Leaching

ABSTRACT

Maize is the main staple crop in the East African Mountains. Understanding how the edaphic characteristics change along altitudinal gradients is important for maximizing maize production in East African Highlands, which are the key maize production areas in the region. This study evaluated and compared the levels of some macro and micro-elements (Al, Ca, Fe, K, Mg, Mn, Na and P) and other soil parameters (pH, organic carbon content, soil texture [i.e. % Sand, % Clay and % Silt], cation exchange capacity [CEC], electric conductivity [EC], and water holding capacity [HC]). Soil samples were taken from maize plots along three altitudinal gradients in East African highlands (namely Machakos Hills, Taita Hills and Mount Kilimanjaro) characterized by graded changes in climatic conditions. For all transects, pH, Ca, K and Mg decreased with the increase in altitude. In contrast, % Silt, organic carbon

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content, AI and water holding capacity (HC) increased with increasing altitude. The research provides information on the status of the physical–chemical characteristics of soils along three altitudinal ranges of East African Highlands and includes data available for further research.

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Specifications Table

Subject area	<i>Agriculture and soil science</i>
More specific subject area	<i>Physical and chemical characteristics of soils</i>
Type of data	<i>Graph, Table</i>
How data were acquired	<i>Inductively coupled plasma atomic emission spectrometry, colorimetric analysis, pH meter, conductivity meter, hydrometer method, “European” maximum water holding capacity method</i>
Data format	<i>Analyzed, Interpolated</i>
Experimental factors	<i>Soil samples were collected at two depths of 0–25 cm and 25–50 cm, and at different altitudes</i>
Experimental features	<i>Inverse Distance Weighting (IDW) interpolation was carried out using a spatial analyst tool within a GIS software (ArcGIS version 10.2) to generate interpolation maps showing the soil properties under study in the three regions. In addition, contours were generated from a 30 m resolution ASTER Digital Elevation Model (DEM)</i>
Data source location	<i>CHIESA project (Climate Change Impacts on Ecosystem Services and Food Security in Eastern Africa), icipe, Nairobi, Kenya and KENyan Climate Change and Adaptation research group (KENCCA), IRD, Nairobi, Kenya</i>
Data accessibility	<i>Data are available in this article.</i>

Value of the data

- The data reveal how a combination of temperature and rainfall patterns along an altitudinal gradient modifies edaphic components potentially influencing the amount and quality of maize crops.
- The described research is valuable for improvements of soil characteristics by application of the appropriate fertilizers for maize production in the according plots.
- The data provide information on the status of the physical-chemical characteristics of soils in maize fields along three altitudinal gradients of East African Highlands and includes data accessible for reuse.

1. Data, experimental design, materials and methods

1.1. Data

Information was gathered on the edaphic characteristic of maize-cultivated plots along altitudinal gradients of three East Africa Highlands. Studied highlands are the key maize production in the region. Sampled altitudinal ranges encompass several tropical and subtropical regions and thus

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