Data Article

Data on the thermal properties of soil and its moisture content

K.D. Oyeyemi [a],[*], O.A. Sanuade [b], M.A. Oladunjoye [c],
A.P. Aizebeokhai [a], A.A. Olaojo [d], J.O. Fatoba [e], O.M. Olofinnade [f],
W.A. Ayara [a], O. Oladapo [a]

[a] Department of Physics, Covenant University, Ota, Ogun State, Nigeria
[b] Department of Geosciences, King Fahd University of Petroleum & Minerals, Dhahran, Saudi Arabia
[c] Department of Geology, University of Ibadan, Nigeria
[d] Department of Earth Sciences, Ajayi Crowther University, Oyo, Nigeria
[e] Department of Geophysics, Federal University Oye-Ekiti, Ekiti State, Nigeria
[f] Department of Civil Engineering, Covenant University, Ota, Ogun State, Nigeria

A R T I C L E   I N F O

A B S T R A C T

The dataset contains thermal properties of soil such as thermal conductivity, thermal diffusivity, temperature and specific heat capacity in an agricultural farm within the University of Ibadan, Ibadan, Nigeria. The data were acquired in forty (40) sampling points using thermal analyzer called KD-2 Pro. Soil samples taken at these sampling points were analyzed in the laboratory for their moisture content following the standard reference of American Association of State Highway and Transport Officials (AASHTO) T265. The data were acquired within the first and second weeks in the month of April, 2012. Statistical analyses were performed on the data set to understand the data. The data is made available publicly because thermal properties of soils have significant role in understanding the water retention capacity of soil and could be helpful for proper irrigation water management.

* Corresponding author.
   E-mail address: Sheunsky@gmail.com (K.D. Oyeyemi).

Specifications Table

Subject area	*Earth, Environment and Planetary science*
More specific subject area	*Thermal Physics*
Type of data	*Tables and figures*
How data was acquired	*KD-2 Pro thermal Analyzer using SH-1 thermal sensor was used to determine the thermal properties at each sampling point, moisture contents of soil samples were equally determined in the laboratory.*
Data format	*Raw and Analyzed*
Experimental factors	*The top of the ground was scooped before measuring thermal properties to mitigate the effect of top layer. The thermal sensor was calibrated using a two-hole Delrin block, the thermal sensor was then correctly placed into the soil and the dual needle was maintained parallel to each other during insertion into the ground.*
Experimental features	*Thermal properties including thermal conductivity and diffusivity, and specific heat of soil were measured. Moisture contents were also measured in the laboratory*
Data source location	*Agricultural farm in University of Ibadan, Ibadan, Nigeria. The study area for the data acquisition is within latitude 7°26'.8020'' – 7°26'.9320'' and longitude 3°53'.7230'' – 3°54'.0000''*
Data accessibility	*The Data are available within this article*

Value of the data

- The dataset can be used to monitor soil moisture content.
- The knowledge of the dataset can help to improve irrigation scheduling in the area.
- The knowledge of the irrigation scheduling would help to optimize water usage for improved crop productivity.
- The dataset would help farmers to save cost.
- The dataset could also be used for academic purposes to understand the applications of thermal properties of soil(s). Several similar Researches to this data article can be found in [1–13].

1. Data

The dataset contains thermal properties of soil and their moisture contain in an agricultural farm within University of Ibadan, Ibadan, Nigeria. These thermal properties include thermal conductivity, thermal diffusivity, temperature and specific heat capacity. The data also contain moisture contents that were measured in the laboratory following the standard reference of American Association of State Highway and Transport Officials (AASHTO) T265 [14] and are shown in Table 1. The understanding of these properties would help in proper irrigation planning for water management which in turn would help to optimize water usage in improving crop productivity. The statistical analyses to further understand the statistical distribution of the data are shown in Table 2.

2. Experimental design, materials and methods

The understanding of the thermal properties of soil is very important in agricultural science. This is because there is exchange of heat at the soil surface. The availability of the dataset on soil thermal properties would help in the improvements of wider applications of the heat of soil and modelling of the water transport in the soil. The availability of these dataset would also help in the understanding