

Soil has greater energy storage per unit than air

How does soil organic matter affect heat conductivity and capacity?

Soil organic matter has the direct effect on the bulk density, which later affects heat conductivity and capacity of the soil. Mostly increase in the soil organic matter decreases the thermal conductivity and the wet soils have higher heat capacity and require a lot of heat to raise its temperature.

What is the heat capacity of soil?

The heat capacity of soil is a weighted quantity, representing the relative proportions of water, mineral and organic matter. It is a function of the respective specific heat capacities (C), the density of the constituent (ρ) and the volume fraction in the soil (ϕ):

$$C_s = \phi_w C_w + \phi_m C_m + \phi_o C_o$$

How does the soil environment compare with the atmosphere?

The soil environment contrasts vastly with the atmosphere. It is a porous medium. Air flow in the soil is laminar or diffusive. And it has a greater heat capacity and density than air, so it alters how heat is transferred between the biosphere and atmosphere.

How much energy is released from soil organic matter decomposition?

The energy released from the soil organic matter decomposition is in the form of heat and the heat losses from 1 hectare is nearly equal to the heat value of 1 metric ton of coal and the highly productive organic matter soil releases heat of about 12 megagrams of coal annually.

What happens if soil temperature is higher than air temperature?

If soil temperature is then higher than air temperature near the land surface, this heat is released from the soil to the atmosphere as sensible heat, since latent heat flux is constrained by soil moisture deficits.

Can soil heat extremes outpace air temperature extremes?

García-A., Cuesta-Valero, F.J., Miralles, D.G. et al. Soil heat extremes can outpace air temperature extremes. *Nat. Clim.*

Soil organic matter alters the thermal properties of soil because of its black dark nature. The albedo of soil gets reduced by the potential increase of dark color and more heat ...

Water storage and redistribution are a function of soil pore space and pore-size distribution, which are governed by texture and structure (Childs 1940). Generally speaking, clay-rich soils have ...

units. Soil gas concentrations also can be expressed in terms of mass per unit volume of soil air. Here, since mass per unit volume is lower than for solids and liquids, convenient units are ...

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Results For barley, maize, and faba bean, we found that roots in the top 15 cm had significantly greater water uptake rates per unit length than roots in the bottom 30 cm. For ...

Fine textured soil has more pore space than coarse textured because you can pack more small particles into a unit volume than larger ones. ... Bulk density of a soil is the mass per unit volume including the pore space. ...

The coastal wetland study sites other than the Pristine Mud Flat are expected to have lower soil carbon storage per unit area than terrestrial ecosystems. CO₂ storage and economic value The mean potential CO₂ ...

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MAOM stored 1.7 times more energy per unit of C (42 kJ·g⁻¹·C) than did the free and occluded POM fractions (25 kJ·g⁻¹·C). fPOM was the dominant energy pool for labile C in ...

The unsaturated soil produced higher energy outputs than the saturated case for an intrinsic soil permeability between 1.5 · 10⁻¹² and 1.5 · 10⁻⁹ m² due to the delayed ...

We thus state that the product of the well-known soil hydraulic potential, $\psi+z$, and the soil water content corresponds to the volumetric density of free energy of soil water per unit weight. The free energy of soil water for a larger volume is the ...

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Soil specific heat capacity was measured via differential scanning calorimetry. The influences of clay, organic matter (OM), and tightly bound water on specific heat capacity ...

Forests are an important part of the global carbon (C) cycle (Six et al., 2002), owning the largest soil C pool in terrestrial ecosystems (Lal, 2004), accounting for about 40 % of the global soil C ...