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Fungus-growing termites as geological agents transforming savanna landscapes

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This research aims at evaluating the biogeochemical, mineralogical, and physical impacts of fungus-growing termites in soils covering savanna landscapes. In 1990, Julia Allen Jones was the first to earmark the concept of "ecosystem engineer" in tropical and sub-tropical savanna ecosystems, referencing to the role of fungus-growing termites. Fungus-growing termites (subfamily Macrotermitinae, Isoptera) share an exosymbiosis with fungi belonging to the Termitomyces genus. In order to maintain the symbiosis possible, Macrotermitinae must maintain specific hydric and thermic conditions. Therefore, fungus-growing termites build large biogenic structures as large epigeal mounds, easily visible in sub-tropical areas of Africa and Asia. By doing so, fungus-growing termites are able to increase by an order of magnitude of 3 to 4 the alkalinity of soils. They also increase their carbonate contents, the C/N ratios and concentrate nutrients such as potassium and phosphorus. Through the process of selection and transportation of sand grains in their bucal cavity and their mixing with saliva, fungus-growing termites modify the chemical compositions and the mineralogical propreties of clays. They also act as accelerating agents of clay alteration and chemical weathering in tropical ecosystems. The activities of fungus-growing termites tend to slightly raise locally the land surface providing some recolonization advantages.They concentrate nutrients, forming a pattern of fertile lands, and enhancing the growth of vegetation by creating islands of fertility.The selection of very fine sands, in order to meet the construction requirement for their mounds, create patches of clayey sands that have the property to retain water for long periods of time, producing scattered pockets of water in semi-arid regions.

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