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The global termite functional diversity anomaly: are there ecological consequences?

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Termites have a long-established role as ecosystem engineers, modifying environments at a number of different scales. This effect is perhaps most clearly seen in species of *Macrotermes*, whose mounds are important providers of environmental and ecological heterogeneity, particularly in savannah environments. More perhaps than any other ecologically-important major lineage, however, the distribution of key termite clades has been determined by biogeographical factors. This has led to a large functional anomaly, with the global distribution of functional traits (and synthetic functional groups) being far from uniform. In this talk I will concentrate on two subfamilies that display some of the most striking of these anomalies: the Macrotermitinae and the Cubitermitinae (both in the Termitidae). The Macrotermitinae are fungus-growing termites, known, in concert with their mutualistic fungi, to have the most efficient lignocellulose degradation systems on the planet. The Cubitermitinae, in contrast, are true soil-feeders that break down soil organic matter, predominantly by the alkaline hydrolysis of recalcitrant protein residues. Both lineages have their highest biomass densities in Africa, in both rain forests and savannahs, and are absent from South America, Australia and Madagascar. I hypothesise that these absences cause between-continent differences in ecosystem process, particularly in plant decomposition rates and nitrogen cycling. I will examine the evidence for the existence of these predicted differences in a functional trait context. Finally, I will discuss the key experiments that will be required to test these predictions fully.