Basalt powder restores soil fertility and greatly accelerates tree growth on impoverished tropical soils in Panama

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Acacia mangium seedlings were planted in three soil types spanning a gradient between highly infertile soils and freshly crushed basalt rock powder, which provides slow release of minerals essential for plant growth, including essential elements not included in most chemical fertilizers. The growth rate of the trees was followed for 5 years. Seedlings growing in basalt powder grew 2.17 times taller than in local soils. This corresponds to a tree allometric surface area 4.71 times higher and a volume (or biomass) 10.22 times higher than on local soils. Trees on basalt had noticeably more leaves and branches, and darker colored leaves. Basalt powder was enriched in phosphorus, potassium, calcium, magnesium, manganese, iron, and zinc, but was not appreciably different in pH, organic matter, copper, aluminum, or nitrogen than local soils. These results indicate that highly infertile tropical soils can be made productive with rock powder minerals alone. Benefits depend on local soil fertility and nutrient element deficiencies, the specific mineral needs of each plant, and climate. Even more promising results would be expected if biochar, organic carbon, or nitrogen were also added. A wide variety of rock powders of many kinds are available in most locations needing environmental restoration and soil fertility enhancement for forestry or agriculture. Studies with a wide range of plants, soils, rock powders, biochar, nitrogen, and climate regimes are needed to optimize the productivity and carbon storage benefits and minimize the cost for large-scale applications.

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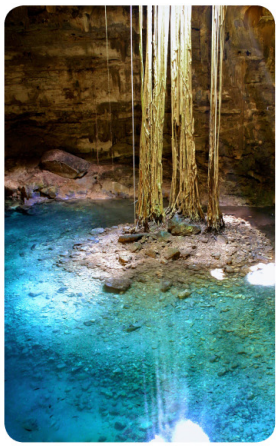


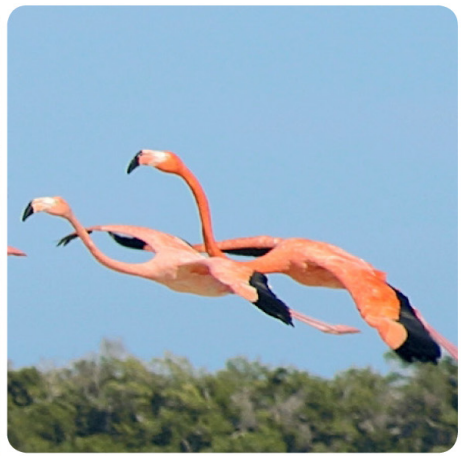

Book of Abstracts

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