Shifts in coral-assemblage composition do not ensure persistence of reef functionality

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Coral communities are changing rapidly worldwide through loss of coral cover and shifts in species composition. Although many reef-building corals are likely to decline, some weedy opportunistic species might increase in abundance. Here we explore whether the reshuffling of species can maintain ecosystem integrity and functioning. Using four common Caribbean reef-building coral genera we modeled rates of reef construction and complexity. We show that shifting coral assemblages result in rapid losses in coral-community calcification and reef rugosity that are independent of changes in the total abundance of reef corals. These losses are considerably higher than those recently attributed to climate change. Dominance patterns of coral assemblages seem to be the most important driver of the functioning of coral reefs and thus, the future of these ecosystems might depend not only on reductions of local and global stressors, but also on the maintenance of keystone coral species.

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