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It will take more than seaweed to deal with ocean acidification.

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Ocean acidification causes biodiversity loss, alters ecosystems and may impact food security, since calcareous organisms dissolve easily in corrosive waters. There is hope that photosynthetic organisms could be used to mitigate ocean acidification on local scales, for example through seagrass habitat protection or seaweed cultivation, as net ecosystem organic production raises the saturation state of carbonate, making seawater less corrosive to calcified shells/skeletons. Here, we used a natural gradient in carbonate saturation, caused by shallow water CO_2 seeps in the Mediterranean Sea, to assess carbonate dissolution in the calcified seaweeds *Acetabularia acetabulum* (Chlorophyta, Polyphysaceae) and *Padina pavonica* (Phaeophyceae, Dictyotales). We found that although they were resistant to acidification both seaweeds were much less calcified in high CO_2 conditions. There was a dramatic reduction in the number of species of foraminifera living on *P. pavonica* as carbonate saturation levels fell and the community assemblage shifted from one dominated by calcareous species at reference sites (pH ~8.19) to one dominated by agglutinated Foraminifera at elevated CO_2 (pH ~7.71). As the same pattern has been found in sediments along carbonate saturation gradients, this raises serious concerns for the survival of small calcified organisms such as bivalve spat as the oceans continue to acidify. Although the seaweeds did not prevent adverse effects of ocean acidification, high biomass stands of seagrass or seaweed farms might be able to. Nevertheless, reducing CO_2 emissions remains the primary solution to avoiding the risks posed by ocean acidification.