How robust are vital effects for coral calcification and pH up-regulation?

CHALK T.B[1], LEI F.[1,2], FOSTER G.L.[1], D'ANGELO, C.[1]
WIEDENMANN J.[1]

[1]Ocean and Earth Science, National Oceanography Centre Southampton, Univeristy of Southampton, Waterfront Campus, European Way, Southampton, SO14 3ZH, UK
[2]School of Geographic and Oceanographic Sciences, Nanjing University, Nanjing 210093, PR China

Corals and coral reefs are both an important bellwether of continued anthropogenic climate stress, as well as an unparalleled archive of well-resolved ocean chemistry change. There a variety of factors affecting the health of corals worldwide, with temperature stress being the most well publicized key, however factors such as acidicfication, eutrophication and sediment accumulation also affect reef health. Here we use a series of laboratory experiments to provide a mechanistic understanding of how, via the pH of the calcifying fluid, changing nutrient content and food supply influence the rate/nature of skeleton building in two reef-building coral species (*Montipora foliosa* and *M. australensis*). We will present $\delta^{11}B$, $\delta^{18}O$, $\delta^{13}C$ and metal:calcium ratios determined on the skeletons of coral cultured in a range of high, low and unbalanced NO_3^- and PO_4^- that act as an analogy to different coastal environments subjected to anthropogenic stressors. These experiments allow us to explore the impact of changing nutrients conditions on the ability of the coral to upregulate pH, and crucially to determine whether variations in nutrient availability influence the $\delta^{11}B$ of the coral skeleton independently of the pH of the water.