controls, the acidic mesocosms produced less dimethyl sulphide[3] — a gas that helps to form clouds, which reflect sunlight and can counteract climate warming. Riebesell is not sure what causes the change; he thinks that the plankton in the mesocosm might be making less of the gas, or the acidic water could be affecting its stability.

Picophytoplankton, the smallest photosynthetic organisms, turned out to grow better in the acidic mesocosms[1]. But at the same time, diatoms — larger algae that are among the most important producers of ocean biomass — suffered. The change could mean that more nutrients are cycled among the picophytoplankton rather than reaching larger animals such as fish. Indeed, preliminary results from the latest experimental run indicate that larvae of sea urchins and Strombidae conches are barely surviving in the acidic mesocosms. However, the scientists think that food quality may not be the main reason for their demise; pathogens and problems making shells could also have a role.

Adina Paytan, an oceanographer at the University of California, Santa Cruz, says that Riebesell's work "fills an important niche between lab work and field studies" and has "advanced the field considerably". She takes a different systems approach to acidification, studying 'natural mesocosms': underwater springs off Mexico that enrich zones in CO_2.

Riebesell says that these regions are a good lab for studying immobile seagrasses, but not organisms that can move freely. Paytan notes that there are problems with Riebesell's mesocosms: for example, the plastic walls filter out some ultraviolet light, removing a natural stressor for photosynthetic organisms. And the tubes are impermeable, so nutrients in the water become exhausted, and experiments last only a few months. Nevertheless, Paytan says, "we still learn a great lot from these experiments".

This year's run, in the Swedish Gullmar Fjord, uses five control mesocosms and five in which acidity is boosted to levels associated with the atmospheric CO_2 concentrations predicted for the year 2100. The experiment will end next month after a 6-month run — the longest yet — during which the researchers have monitored a natural plankton bloom.

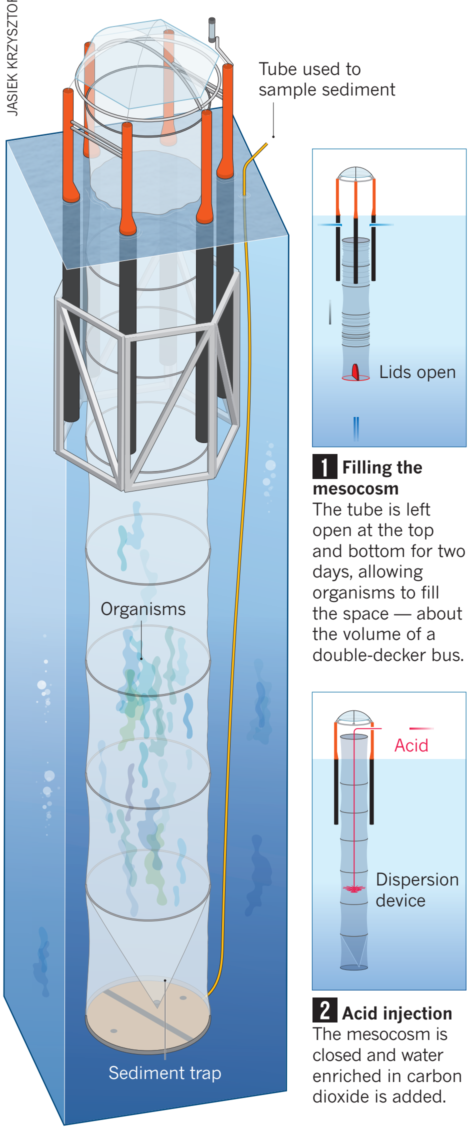
Riebesell and his team seem comfortable with using their mesocosms as a hybrid between a controlled laboratory environment and a natural one. They have introduced fish eggs into the ecosystems for the first time, and Matias Scheinin, a marine biologist at GEOMAR, is using the sacs to explore natural selection. By tracking the abundance of individual strains of diatoms — which can undergo hundreds of generations in a few months — he hopes to identify those that flourish in acidic environments. He will screen them for the genes responsible, to investigate rates and mechanisms of adaptation.

Oceans have gone through major acidification events during climate change in the ancient past. By accelerating evolution, Scheinin wants to get a glimpse of their future. "I have some hope that evolution can help marine life deal with acidification," he says. "It's not the first time it has had to go through it." ■ SEE COMMENT P.429

1. Brussaard, C. P. D. *et al. Biogeosciences* **10,** 719–731 (2013).
2. Riebesell, U. *et al. Biogeosciences* **10,** 1835–1847 (2013).
3. Archer, S. D. *et al. Biogeosciences* **10,** 1893–1908 (2013).

SEA LAB

Scientists are testing the ecosystem-wide effects of ocean acidification in 55-cubic-metre plastic mesocosms.



JASIEK KRZYSZTOFIAK/NATURE; SOURCE: REF. 2

CORRECTION

The News story 'Space rovers in record race' (*Nature* **498,** 284–285; 2013) wrongly stated that the Russian scientists used laser mapping from the Lunar Reconnaissance Orbiter to make a three-dimensional representation of the Moon's topography. In fact, they used processed images from the orbiter's narrow-angle camera.