evidence for weathering of the basalts where biofilms formed. Second, the substantial enrichment of iron and manganese in the mineral crust could not be accounted for by loss of these elements from the basalts alone — an external source is therefore required.

Based on the above findings, Templeton and colleagues argue that microbial oxidation of iron and manganese derived from hydrothermal venting — rather than minerals derived from basalt — might provide the energetic basis for life on these rocks. This would explain the formation of iron–manganese crusts observed on the basalt surfaces — which would precipitate out of the water column on oxidation. Indeed, manganese-oxidizing bacteria have previously been isolated[10] from seafloor basalts at the Loihi seamount, and iron-oxidizing bacteria have been shown to be prevalent at low-temperature hydrothermal vent sites[11].

The results of Templeton and colleagues[6] call into question the previously held assumption that the seafloor biome subsists on energy largely derived from basalt-alteration reactions, and instead indicates that external hydrothermal sources may be important, at least in the initial colonization of seafloor lavas. However, further investigations are clearly necessary to determine if the observations by Templeton and colleagues are ubiquitous along the seafloor or if they are unique to certain environments, such as the Loihi seamount, which experience considerable fluxes of reduced inorganic chemicals from hydrothermal venting. Spatially and temporally resolved analyses will be instrumental in discerning the energy sources supporting primary biomass production in the ocean crust. For now, however, the mysteries of life on the seafloor remain far from understood. ❐

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OCEAN SCIENCE

Slowing sink?

So far, the oceans have protected us from the full force of anthropogenic climate change. The global ocean is the largest active carbon sink on Earth, and since the industrial revolution it has soaked up around one third of all anthropogenic carbon dioxide emissions. But how this fraction will change in the future is uncertain.

According to Samar Khatiwala and colleagues, the rate of increase in oceanic uptake of CO_2 may have started to decline some decades ago (*Nature* **462,** 346–349; 2009). They reconstructed the history of anthropogenic CO_2 concentrations in the ocean between 1765 and 2008 by analysing the transport and storage of oceanic tracers, such as natural ^{14}C and chlorofluorocarbons, and temperature and salinity. The researchers noted a sharp increase in the oceanic uptake rate since the 1950s, which coincided with an increase in the growth rate of atmospheric CO_2 levels. But from the 1990s onwards, uptake rates appear to have failed to keep pace with ever-rising atmospheric CO_2 concentrations.

A strengthening of the Antarctic westerlies — a product of the 40-year-old regional ozone hole — could be responsible for this slowdown. Specifically, an intense atmospheric circulation around the South Pole is linked to fast oceanic overturning and the movement of carbon-rich waters to the surface. A higher carbon content in surface waters may have reduced the ocean's ability to absorb CO_2.

The impact of changes in atmospheric circulation over a decadal timescale — a geological blink of an eye — on the vast and slow-moving oceans is hotly debated. However, given that the Southern Ocean acted as a conduit for over 40% of anthropogenic CO_2 entering the oceans in 2008, changes in Southern Ocean uptake rates could quite plausibly have noticeable global consequences.

Carbon dioxide emissions from the use of fossil fuels are likely to continue to increase, at least in the medium term. Unfortunately, a gradual saturation of the oceanic carbon sink may already have started to exacerbate the consequences for atmospheric CO_2 levels — and therefore for the Earth's climate.

STEPHANIE BAUDAINS

Correction

In the News & Views 'Slowing sink' (*Nature Geosci.* **2,** 826; 2009), the second and third paragraphs that appear in the print version have been amended to more accurately reflect the paper by Khatiwala and colleagues. The HTML and PDF versions of the text are correct.