

## MARINE LIFE

## Data on mining the deep sea

*Scientists will track damage caused by marine dredging.*

BY OLIVE HEFFERNAN

For decades, mining companies have been eager to extract valuable metals and minerals from the deep sea — a practice that scientists have long warned could damage marine life. Now, the first large test of a major mining technique promises to provide robust data on the impacts of the controversial practice.

Next month, Belgian mining firm Global Sea Mineral Resources (GSR) will use a prototype machine to Hoover up metals, such as copper and iron, that lie in rock deposits — nodules — on the bed of a remote part of the Pacific Ocean. Alongside GSR, an independent team of European scientists will study the effects of the mining method: in particular, how sediment plumes created by the churning could affect vibrant deep-sea communities. The scientists' findings are expected to inform discussions about an international code of conduct that would allow commercial mining to move forwards while minimizing harm to sea life.

"This will, hopefully, help us to close some of the knowledge gaps that we have on the expected impacts of deep-sea mining," says Matthias Haeckel, a biogeochemist at the GEOMAR Helmholtz Centre for Ocean Research Kiel in Germany, who is leading the research expedition.

The International Seabed Authority (ISA) — a 168-member body that promotes and regulates seabed mining and is developing the code — has granted 29 licences that give contractors permission to explore minerals in the deep sea. Sixteen are for the Pacific's Clarion Clipperton Zone (CCZ), one of the world's largest untapped collections of high-value metal ores.

Over eight days, GSR will harvest metal-rich nodules from a small area in the CCZ, as scientists on a research vessel deploy deep-sea cameras and sensors to monitor how the dredging disturbs the soft, sedimentary sea floor.

Researchers fear that mining could create plumes of suspended sediment that extend tens or even hundreds of metres above the seafloor, which could bury, smother and toxify sea animals such as rare, squid-like worms, sea cucumbers and urchins. "It is likely that the CCZ communities are extremely sensitive to sediment plumes," says Smith.

The ISA ultimately plans to award contractors 30-year exploration licences. Kristina Gjerde, a high-seas-policy specialist at the International Union for Conservation of Nature, says that, ultimately, the experiment isn't long enough to gauge mining's long-term effects. ■



## OCEANOGRAPHY

## Sea walls wired to track flood risk

*WireWall device measures waves crashing onto shore.*

BY ALEXANDRA WITZE

Jenny Brown is hoping for really bad weather. She is consulting tide tables, watching forecasts and rooting for strong westerly winds that would push the spring tide over the sea wall at Crosby, on Liverpool Bay in the United Kingdom, in the days around 21 March.

Brown, a physical oceanographer at the National Oceanography Centre (NOC) in Liverpool, wants to help local officials understand how much the ocean is breaching the sea wall — and how much they need to strengthen their flood defences.

To do that, she needs the waves to splash onto a device her team will bolt into the concrete sea wall. It's a box-like frame built of pipes, with wires strung between them like strings on a harp. When seawater slops over the top of the barrier, the wires will measure the volume and speed of the spray.

"We don't have a good understanding of the impact of storms," says Brown. "Offshore, we have wave measurements and tide gauges, but what we don't have is measurements of water coming on land."

Such data are important to make sure that people strolling by the sea aren't swept off their

feet by big waves, and to help communities prepare for coastal flooding during storms. In the United Kingdom alone, at least £150 billion (US\$197 billion) of property and 4 million people are at risk from coastal flooding. "Nobody's going to make the call to shut a four-lane highway unless they're really sure the conditions are likely to be hazardous," says Tim Pullen, a coastal engineer at UK civil-engineering company HR Wallingford.

Brown's team's device, called WireWall, has collected data at Crosby over three particularly high tides since October. Mid-March is their last chance to catch the ocean crashing over the sea wall before they have to start writing up their results. The researchers want to use the information to improve oceanographic models — and perhaps deploy WireWalls in other places, to study topics such as dam safety and the effectiveness of mangrove trees as coastal barriers.

### WAVE OF THE FUTURE

There are hardly any field data on how often seawater splashes over coastal defences, says Pullen. In the early 2000s, he helped put large tanks behind the sea wall at a coastal park in Kent, next to the tunnel under the English Channel. The tanks captured water slopping

NOC

**CORRECTION**

The News story 'Data on mining the deep sea' (*Nature* **567**, 294; 2019) erroneously affiliated Matthias Haeckel with Germany's University of Kiel. He is, in fact, at the GEOMAR Helmholtz Centre for Ocean Research Kiel.