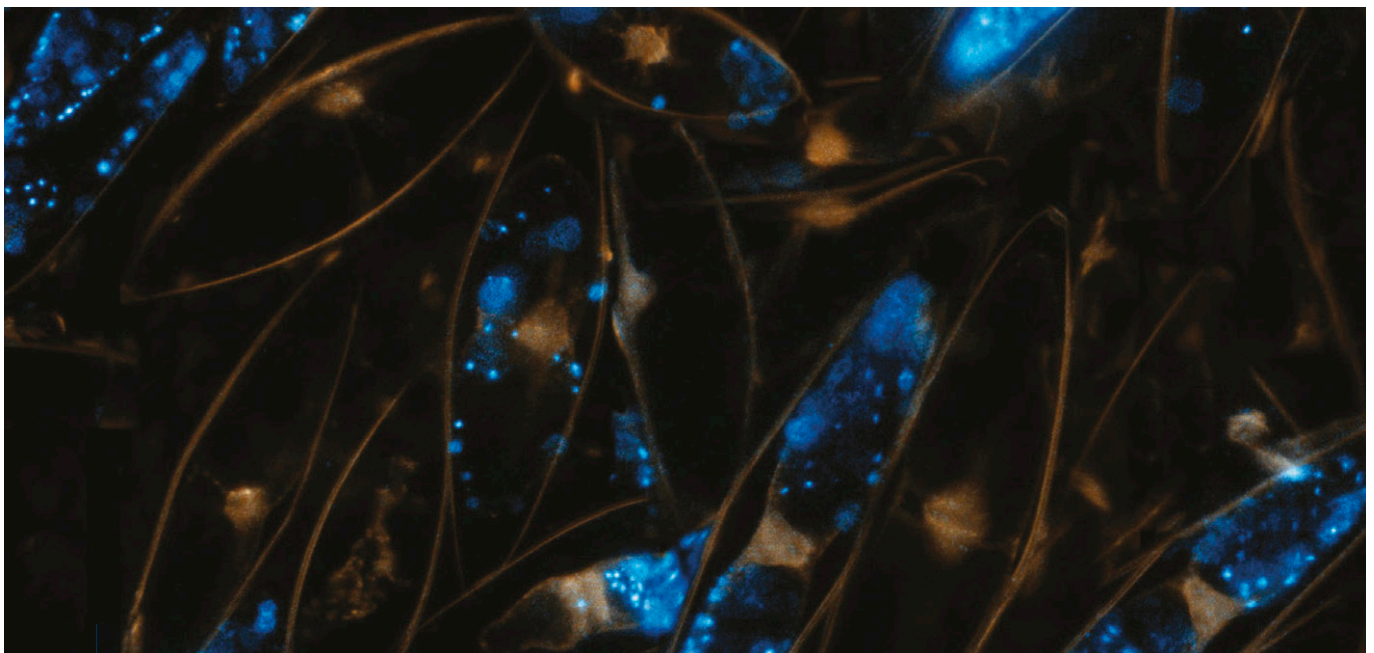


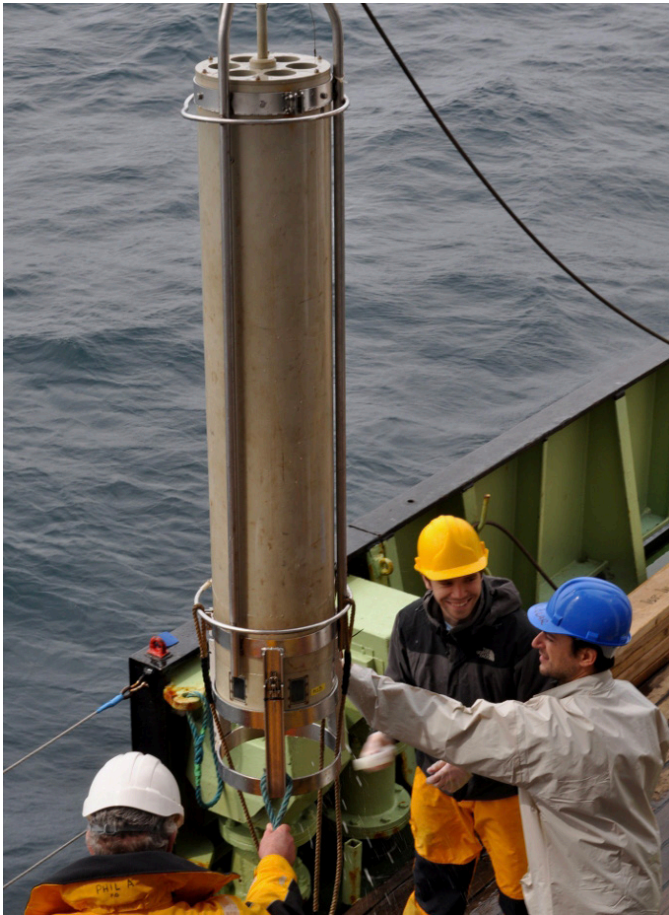
The Twilight Zone

Just under the sunlit waters of the sea surface is the twilight zone of the Mesopelagic layer. Situated between 100 and 1,000 metres deep, this layer receives only faint sunlight during the daytime but not enough for photosynthesis to take place. Most life needs sunlight to survive so the twilight zone is of great ecological interest to scientists as the creatures living in this zone, and the processes that allow them to live, are still not fully understood. A great diversity of strange and bizarre fish can be found here, many of them bioluminescent, feeding on the detritus that drifts down from the sea surface.

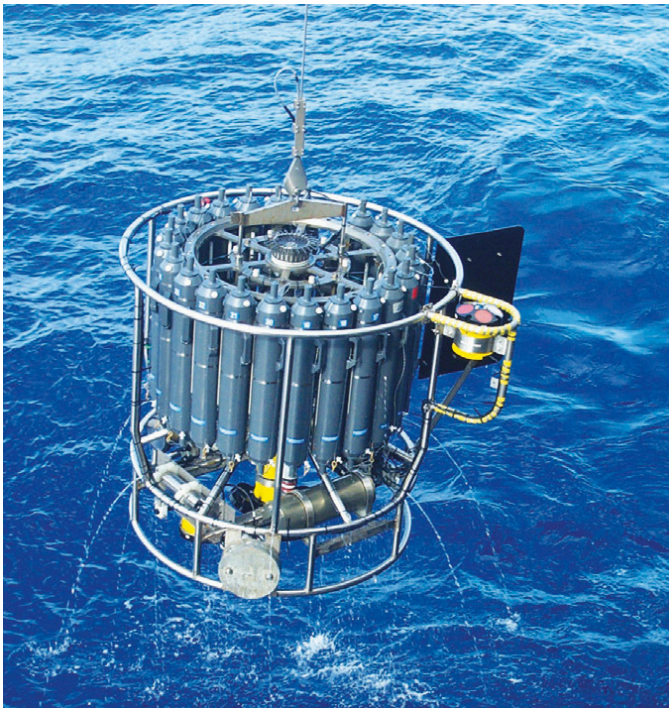
The detritus is made up of particles of living and dead material that is constantly raining downwards towards the ocean depths. This is known as 'marine snow', which becomes less dense as it sinks downwards as much of it either becomes dissolved or converted into minerals. Scientists use sediment traps to look at the rate at which this marine snow drifts down from the sea surface.



Bioluminescent dinoflagellates



Marine snowcatcher



Using a CTD to recover water samples from the twilight zone

The National Oceanography Centre has sampled and measured the water column from the surface to the ocean floor at the Porcupine Abyssal Plain observatory in the North Atlantic for 20 years. The Porcupine Abyssal Plain sustained observatory is a heavily instrumented area of the open ocean 563 kilometres south west of Ireland and in a water depth of 4,800 metres. Its instruments measure a wide variety of properties of the environment above and within the water and on the seabed. Much of the data is transmitted to scientists in real time to land via satellite.

Taking samples from the surface to the ocean floor – nearly five kilometres down – scientists are trying to understand what controls the downward transport of carbon, locked in dead plant and zooplankton bodies and excrement, from the surface and the atmosphere into the deep ocean. Most of this carbon-rich material is broken down in the twilight zone and then mixes back up to the surface in winter. Any sediment that drifts further down finds its way to the seafloor. This carbon can be lost for centuries. This is of direct relevance to current concerns about climate change. in a wide variety of colours.