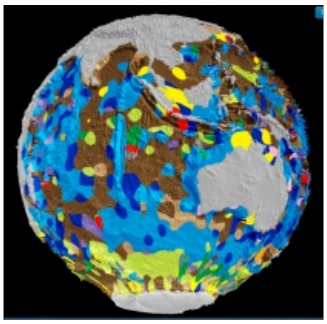
Ocean Floor Geology Revealed



Scientists from the University of Sydneyâ€™s School of Geosciences, Australia, have led the creation of the worldâ€™s first digital map of seafloor geology. Before then, the most recent map of the composition of the seafloor, covering 70 percent of the Earthâ€™s surface, had been hand drawn in the 1970s. Published in Geology magazine, the new map will help scientists better understand how our oceans have responded, and will respond, to environmental change. It also reveals the deep ocean basins to be much more complex than previously thought.

The deep ocean floor is a graveyard with much of it made up of the remains of microscopic sea creatures called phytoplankton which thrive in sunlit surface waters. The composition of these remains can help decipher how oceans have responded in the past to climate change. A special group of phytoplankton called diatoms produce about a quarter of the oxygen we breathe and make a bigger contribution to fighting global warming than most plants on land. Their dead remains sink to the bottom of the ocean, locking away their carbon.

Independent of Blooms

The new seafloor geology map demonstrates that diatom accumulations on the seafloor are nearly entirely independent of diatom blooms in surface waters in the Southern Ocean. This disconnect demonstrates that the researchers, amongst them co-author Professor Dietmar Muller from the University of Sydney, understand the carbon source, but not the sink. More research is needed to better understand this relationship.

Digital Map of the Seafloor's Geology

This research opens the door to future marine research voyages aimed at better understanding the workings and history of the marine carbon cycle. Australia's new research vessel *Investigator* is ideally placed to further investigate the impact of environmental change on diatom productivity. Some of the most significant changes to the seafloor map are in the oceans surrounding Australia.

Dr Dutkiewicz and colleagues analysed and categorised around 15,000 seafloor samples – taken over half a century on research cruise ships to generate the data for the map. She teamed with the National ICT Australia (NICTA) big data experts to find the best way to use algorithms to turn this multitude of point observations into a continuous digital map. The digital data and interactive map are freely available as open access resources.

This research is supported by the Science and Industry Endowment Fund.

Image: A still shot of the seafloor's geology. Image courtesy: University of Sydney.