

Media Release
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NICTA and University of Sydney creates world first digital map of seafloor geology

New digital seafloor geology map uses artificial intelligence and big data to boost understanding of the ocean floor

A collaboration between National ICT Australia (NICTA) and the University of Sydney School of Geosciences has created the first digital map of seafloor sediments.

In collaboration with the University of Sydney, NICTA has developed a computer algorithm to turn 15,000 seafloor sediment observations into a continuous digital map. The first “census of seafloor sediments” reported in the journal *Geology* is rendered as a spectacular, interactive spinning virtual globe that allows anyone to fly through the colourful patchwork of seafloor geology draped over a terrain map.

Ocean sediments cover 70 per cent of our planet’s surface, forming the substrate for the largest ecosystem on Earth and its largest carbon reservoir – but the most recent map of seafloor geology was drawn by hand over 40 years ago, at the dawn of modern ocean exploration.

Dr. O’Callaghan, lead researcher at NICTA says, “We created the new digital seafloor geology map using an artificial intelligence method called “support vector machine” designed to learn how different types of deep marine sediments are juxtaposed. The new map completely changes our understanding of the geology of the ocean floor”.

Dr. Dutkiewicz, lead researcher at the University of Sydney explains, “The difference between the new and old map is a little like comparing a barren tundra landscape with an exotic tropical paradise full of diversity. The ocean floor used to be portrayed as a monotonous seascape whereas the new map echoes the colourful patchworks of dreamtime art.

“The deep ocean floor is a graveyard with much of it made up of microscopic sea creatures called phytoplankton, whose dead remains rain down through the water column like ‘marine snow’. The composition of their shells is used to decipher how our oceans have responded to past climate change.”

Microscopic marine organisms play a critical role in the global carbon cycle, but many of the mechanisms that are thought to control the geologic accumulation of the phytoplankton carbonate and silica shells as are very difficult to quantify. The new digital map of seafloor sediments provides a missing link for constraining global relationships between the seafloor and the sea-surface.

Dr. O’Callaghan adds, “Big data technologies, paired with old and new data, now allow us to better predict the impact changing climate and ecosystems may have on the life cycle of phytoplankton, by jointly analysing a multitude of sea surface and seafloor observations.

“Now that Australia has a brand-new marine research vessel, the *Investigator*, the new seafloor data set opens the door to future voyages aimed at better understanding the workings and history of the marine carbon cycle.”

The interactive seafloor globe can be viewed on any browser on smartphones, tablets or computers here: <http://portal.gplates.org/#SEAFLOOR>

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

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Note to editors:

The old map from the 70s (Fig. 1) shows large swathes of the ocean floor to be covered by continuous belts of sediments whereas the new map (Fig. 2) shows a complex patchwork.

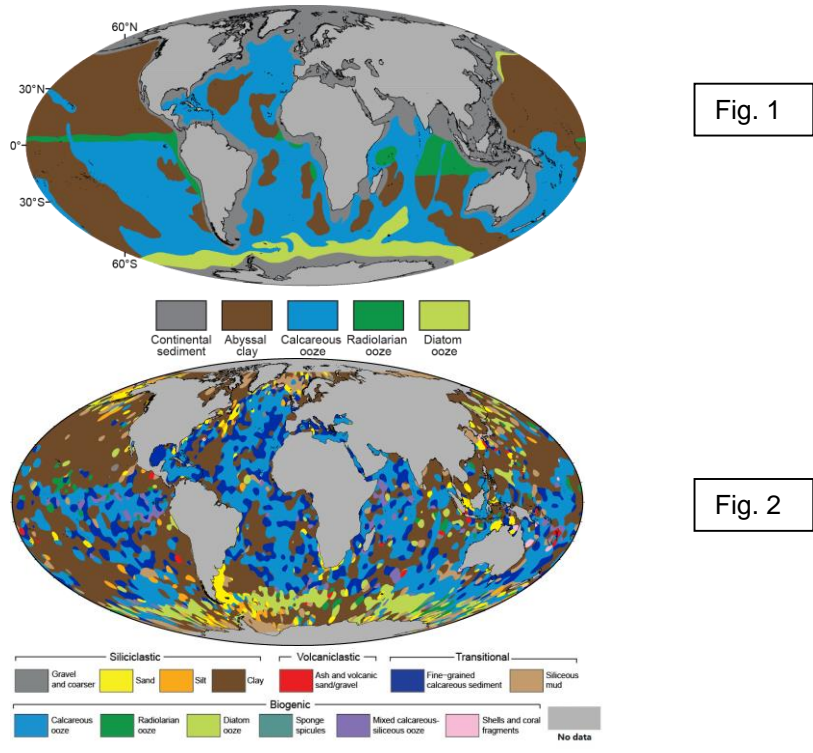


Fig 1 – image provided courtesy of the University of Sydney.

About NICTA

NICTA (National ICT Australia Ltd) is Australia's Information and Communications Technology Research Centre of Excellence. NICTA develops technologies that generate economic, social and environmental benefits for Australia. NICTA collaborates with industry on joint projects, creates new companies, and provides new talent to the ICT sector through a NICTA-enhanced PhD program. With five laboratories around Australia and over 700 people, NICTA is the largest organisation in Australia dedicated to ICT research.

NICTA is funded by the Australian Government through the Department of Communications and the Australian Research Council through the ICT Centre of Excellence Program. NICTA is also funded and supported by the Australian Capital Territory, the New South Wales, Queensland and Victorian Governments, the Australian National University, the University of New South Wales, the University of Melbourne, the University of Queensland, the University of Sydney, Griffith University, Queensland University of Technology, Monash University and other university partners.

About SIEF

Spanning a history of over 90 years, the Science and Industry Endowment Fund (SIEF) provides grants to science and scientists for the purposes of assisting Australian industry, furthering the interests of the Australian community and contributing to the achievement of Australian national objectives. This unique and esteemed funding arrangement received a substantial gift from CSIRO made possible from proceeds of its fast wireless local area network (WLAN) technology, facilitating the rejuvenated Fund to be a mechanism for significant support of science in Australia.

Providing substantial grants available across the National Innovation System, the Fund supports a portfolio of activities including: 17 Research Projects to the value of over AU\$75 million; Research

Infrastructure worth AU\$30 million; Special Research Projects in excess of AU\$13m; as well as a commitment of over AU\$19 million until 2020 for Promotion of Science in the form of Postdoctoral Fellowships, Postgraduate and Undergraduate Scholarships, a Chair in Wireless communication at Macquarie University, Lindau Fellowships and the STEM+ Business Fellowships.

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