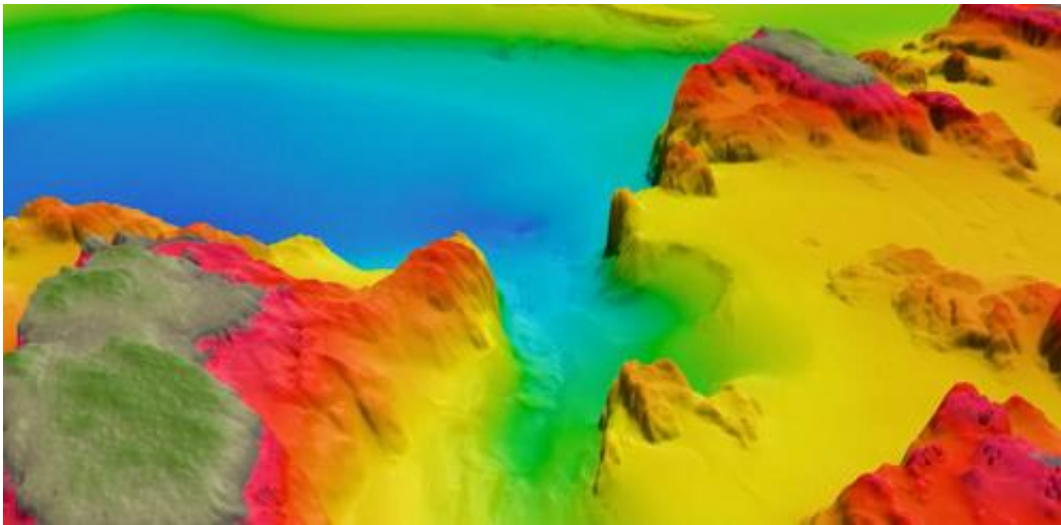


# Software models ocean currents for oil and gas search

October 23 2014, by Aaron Bryans

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Streamline visualisation provides a 2D generalised representation of recorded electromagnetic fields within deep oceans. Credit: IBM Research

A study involving the use of streamline visualisation has found the technology can help guide electromagnetic transmitter and receiver placements, thereby aiding the search for oil and gas on the seafloor.

Curtin University geophysics experts and co-authors Dr Andrew Pethick and Associate Professor Brett Harris used Dr Pethick's visualisation software to determine its impact on the design stages of marine controlled source electromagnetic methods (MCSEM).

The resulting designs may ultimately improve the representation of subsurface geology including oil and gas deposits.

"To understand what's going on very quickly for survey planning, it's really handy because it enables you to see what is physically happening with the direction of currents," Dr Pethick says.

"For a person that knows very little about EM, it's very important.

"It actually bridges an enormous conceptual gap that people have in understanding how the technology works.

"Until they see the streamlines they really don't have a clue about what's happening under the ground."

Dr Harris says his colleague's software is used by people all over the world.

"You can go to his website and people have been able to download it and be able to visualise and understand streamlines in a way that there is no ready possibility without it."

## **Software improves receiver targets**

Electromagnetic fields generated during a marine EM survey engulf thousands of cubic kilometres of ocean and sub-ocean geology.

Streamline visualisation provides a 2D generalised representation of recorded electromagnetic fields within deep oceans.

This representation aids the placement of receivers that are dropped into the ocean and sink to the bottom during surveying and are subsequently recovered for data harvesting.

"[Streamline visualisation] was part of my PhD," Dr Pethick says.

"I had written a pretty comprehensive EM modelling and computation visualisation framework from scratch and it was just a matter of coding it up.

"The greater size and density the receiver network is, the better we can resolve the underlying geology.

"All of the technology does exist already but no one had really tried to apply streamlines in this case.

"The next step is perhaps moving towards a towing system.

"Right now they're actually towing near the air but just beneath the water. Our research may indicate alternative locations."

A towed system consists of a transmitter and EM receivers, which are dragged behind a vessel within the ocean.

**More information:** "Bathymetry, electromagnetic streamlines and the marine controlled source electromagnetic method." *Exploration Geophysics* 45(3) 208-215 [dx.doi.org/10.1071/EG13050](https://doi.org/10.1071/EG13050)

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