

## UNDERWATER CLUES

# Where there's black smoke — there's ore

By Sheryl Ubelacker  
The Canadian Press

**F**or Steven Scott, excitement is seeing a big, billowing plume of black smoke.

No, Scott isn't an arsonist, and the "smoke" he looks for isn't on land — it's under water.

Scott, director of the marine geology research lab at the University of Toronto, spends about four months a year at sea, mapping the ocean floor and looking for his specialty, underwater ore deposits.

These deposits form around a "black smoker," a column of what looks to the untrained eye like thick smoke rising from a fissure in the ocean floor. This smoke is actually boiling hot water laden with particles of minerals such as copper, zinc, lead, iron and even traces of silver and gold.

When the hot spring hits the surrounding cold water, the minerals solidify and form a chimney around the geyser. Eventually they grow so big, they topple over, creating mounds of mineral deposits.

While it's unlikely underwater deposits will be mined commercially in the near future, they may help geologists pinpoint with more accuracy and less expense where ore deposits are located under the ground.

"The work we're doing on the sea floor has direct relevance to mineral exploration for these kinds of deposits on land, which is why the mining industry is interested in what we do," Scott explained.

"We're quite sure they formed if not directly the same as black smoker activity, then some process similar to it on ancient ocean floors. And some small parts of these ancient ocean floors became what is now continental crust (land) through some slow, long drawn-out geologic process.

"By looking at the forming environment (in the ocean), we can see exactly what the geological relationships were."

Scott's next voyage — to the Woodlark Basin, on the floor of the Pacific off Papua, New Guinea — will begin in early April on board the Soviet scientific vessel *Keldysh*.

"The Soviet Union is now getting in on this," said Scott, pointing at a wall-size map of the world's oceans in his recently opened lab.

"Scientific glasnost is happening. The Russians are trying to

TORONTO



— Steven Scott  
Ocean researcher

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come in out of the scientific cold.

"They are opening up their laboratories and their facilities, and in my case, their ship."

Scott and two Australian ocean researchers will join their Russian counterparts for the month-long expedition, spending 20 days diving to the ocean bottom in mini submarines.

"What we're doing is mapping or exploring the ocean floor — the deep ocean floor, not this beach sand stuff — from in excess of several hundred metres and down to depths of 3,000 or 4,000 metres.

"Seventy per cent of Earth is covered by water," he said. "And if we're going to understand our planet, we have to look at that 70 per cent."

Scott's interest in the sea began only eight years ago. Prior to that, he was strictly a landlubber geologist, studying sulphide ore deposits on five continents.

He learned about black smokers reading an article in *National Geographic*.

"I got excited about this because there was the answer. So I made it my business to get involved in this research, and I ended up being the first ore deposit geologist of any nationality and the first Canadian to see these black smokers."

Since then, Scott has been on a number of expeditions to map the locations of black smokers and their encircling ore chimneys, including the first ones discovered off the coast of Vancouver Island.

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