$1 million grant will help UC Santa Cruz researcher explore beneath the sea floor

By JANE PALMER

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SANTA CRUZ -- A boost in funding will help a UC Santa Cruz scientist's mission to understand the vast plumbing system deep beneath the ocean floor.

The National Science Foundation awarded a $25 million grant to a group of scientists from five institutions to form a new science and technology center and explore the hidden world underneath the seafloor. Andrew Fisher, a hydrogeologist at UCSC who leads the university's participation in the center, will receive about $1 million .

"We are thrilled," Fisher said. "There were 240 initial proposals to this program, and they funded five."

Fisher aims to use most of the money for a grant program that will encourage collaboration with other researchers.

"In essence what we are creating is a structure which will hopefully work to promote research on the deep biosphere," Fisher said.

Fisher's research explores how water moves in and out of the earth's oceanic crust. This summer, he will venture on an expedition to the Juan de Fuca Ridge off British Columbia, where he has conducted his fieldwork since the early 1990s.

On previous expeditions, Fisher and his collaborators drilled three holes hundreds of meters deep through the seafloor sediments into the rocks of the upper oceanic crust. The researchers then capped these holes with towering structures called "CORKs," which stand about two stories high on the ocean floor.

This summer, Fisher aims to install three more of these CORKs and conduct a long-term pumping experiment where scientists will pump into one borehole and monitor the other boreholes around it. It is an experiment that will give insight into the complicated hydrologic network that exists below the ocean floor, he said.

"It is like what they do in oilfields or in groundwater aquifers, but it has never been done on the seafloor before," Fisher said.

Fisher also plans to pump tracers into the water and monitor where the water turns up and how long it takes to reach its destination.

"That is going to tell us how fast the water is moving and in what direction." Fisher said.

The research will help determine whether the earth's crust is an appropriate place to try and sequester carbon dioxide, Fisher said.

The research also will give scientists an insight into how aquifers are connected across long distances above the earth's crust.

"These are questions that we can't test very easily on land but ironically they are easier to test below the seafloor because it is one giant aquifer down there," Fisher said.

The amount of water in the oceanic crust is about the same quantity as all the water in the ice caps and glaciers on earth, Fisher said. Moreover, the amount of water that circulates through the crust is equivalent to the combined flows of all the rivers that flow off the continents, he said.

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Some of the applications of Fisher's research are even more esoteric, Fisher said. For scientists who are interested in life on other planets or who are interested in what life was like four billion years ago, the ocean crust is like a natural laboratory, he said.

"Every time people explore new parts of the earth they make discoveries about new organisms and new processes," Fisher said.

Fisher believes that ultimately his work will contribute to an understanding about new kinds of life and the mechanisms life uses to survive.

"There are a lot of people who are interested in life on Europa or Mars who will be looking at our results," Fisher said. "It is not exactly the same thing but is similar -- it is a model."

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