As environmental concerns heat up amid growing interest in minerals exploration and mining of the Pacific ocean’s seabed, one scientist is advocating the search for more inactive hydrothermal vents as a way of safely mining the sea.

Dr Sven Peterson, a minerologist at the Leibniz Institute of Marine Sciences (IFM-GEOMAR) in Germany, said inactive vents were less likely to host marine life, so mining them would pose lesser danger to the ocean’s ecosystems.

“At water depths of 500 to 5000 metres which the mining industry will be interested in, there is no light but we still see oases of life there. This, of course, is of concern among biologists who do not want mining to happen at these oases in the deep.

“So, mining companies might want to go for inactive deposits where there is no vent fauna like mussels, shrimps and tubeworms that biologists want to protect,” said Peterson, who specialises in the formation and evolution of seafloor hydrothermal systems and their associated mineral deposits.

He was a speaker at the European Union-funded Deepsea Minerals regional workshop organised by the Pacific Community’s Applied Geoscience and Technology Division (SOPAC), held in Fiji in June.

Environmental issues surrounding seabed mining, specifically mineral extractions from Seafloor Massive Sulphides (SMS), which occur in hydrothermal vents, are surfacing because these vents are also home to unique marine life, some of them not found anywhere else in the ocean.

There are worries that this, being a new area even for science, leaves industries and governments with little to go on with when gauging or assessing the extent of the impact and ramifications of seabed mining upon ocean life.

So far, there have been indications that mining the seabed, when it does take place, would most likely begin around active hydrothermal vents, such as the case for Nautilus Minerals, the world’s first seabed minerals miner whose Solwara 1 project is located at 1600 metres water depth in the Bismarck Sea, Papua New Guinea, is scheduled to begin production in late 2013.

However, inactive vents hold as much promise as active vents and their discovery ought to be pursued as vigorously as the search for active hydrothermal systems for the comparative advantages in mining them, Peterson told Islands Business.

“In the active vents, you have heat sources with temperatures above 350 to 500 degrees Celsius and this water carries all the metals and when it reacts with cold water, it precipitates them as smoke; this is why they are called ‘black smoke’, because they look like industry chimneys.

“But in the inactive vents, this heat source has died away and there is no replenishment of hot fluid coming from below. The metals have been precipitated on the seafloor but there’s no new warm water flowing through.

“The animals in the ecosystems, they live on the warm fluids and the chemicals contained in the fluids so if there’s no warm fluid, then the animals are no longer there, only the metals are left and they could be more easily mined than active deposits.

“If you could also imagine that at 350 degrees C, hot fluid is not very nice to the mining equipment that you take down to the seafloor.
“It’s very aggressive fluid so any mining equipment in active vents are likely to face corrosion, so that’s another reason not to go to active sites,” said Peterson.

He said finding inactive hydrothermal vents tended to be more difficult as they lie dormant on the ocean floor with little indication of their presence, unlike the active vents, which can be detected via the hot fluids coming out of them.

But inactive vents are suspected to have much larger minerals deposits, accumulated over millions of years and if one is found with significant mineralisation, mining it could save the ocean of a number of active hydrothermal vents and their ecosystems.

This, Peterson added, may be the critical link in the conservation of ocean life in relation to seabed mining.
“We know a huge number of active deposits but we lack the techniques to actually find inactive deposits, which would be the major target for industry or government authority to mine the seafloor.

“We can easily find active ones but it’s very hard to find inactive sites. Nautilus is doing a good job in exploring for deposits, but again they use similar techniques as the scientists do in looking for active deposits.

“So they have in the past found a huge number of so called ‘plumes’, incidence of warm water and chemicals in the water column that indicate that an active mineral site is somewhere at the seafloor.

“Then they try to find those active deposits on the seafloor, and then they hope to find in the area surrounding the active sites, inactive sites that are large enough to become mining sites. However, Nautilus has so far not been very good in acquiring large inactive deposits despite all the efforts they’ve put into it,” said Peterson.

While calls have been made, especially by Greenpeace for the setting up of more Marine Protected Areas where all extractive uses of the sea are banned, Peterson believes the ecosystems in the seafloor are self-preserving, and if mining the seabed is done smartly, the destruction can be managed.

“The discovery of hydrothermal systems is fairly recent. They were discovered in 1979, and

maybe 10 years later we knew about 20 deposits. And so everything we found was a unique ecosystem on the seafloor. Let's say there was only one known in all —Papua New Guinea.

"But when you go down there now with the new exploration and the continuing exploration in the area around the PNG waters, there are 20 to 25 known in very close proximity.

"So if you have one of those big and rich enough in metals to be mined, there would still be 20 to 24 others that will not be touched because they are simply too small to be mined.

"I think it's valid to take one system out, especially if people try to work on inactive deposits, and not touch the active sites. But I don't think you will terminate the entire ecosystems because we know now that there are many systems nearby that can be resettled," said Peterson.

Active hydrothermal vents form the Seafloor Massive Sulphides (SMS) deposits which typically contain copper, gold, silver, zinc and lead.

According to SOPAC data, SMS deposits in the Pacific have been located in the Exclusive Economic Zones of PNG, Niue, Vanuatu, Solomon Islands, Fiji, Tonga and Palau. Other types of mineral deposits are Manganese Nodules (MNs) and Cobalt Rich Crusts (CRCs).

MNs typically contain nickel, copper and cobalt and they have been located in EEZs of Cook Islands, Tuvalu, Kiribati and Niue.
CRCs, found in EEZs of Kiribati, Tuvalu, Samoa, Marshall Islands and Federated States of Micronesia, are said to contain cobalt, nickel and platinum.

Source: **Dionisia Tabureguci** - Island Business August 2011 .