



New techniques for hydrothermal plume investigation by AUV

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With no more than 10% of the global ridge-crest investigated systematically for submarine hydrothermal activity in the first 25 years of its study, new technologies are always being sought to help improve the efficiency with which such research can be carried out. Here we will discuss the specific case of coupling in situ biogeochemical sensors with an autonomous underwater vehicle and present preliminary results from two recent cruises, RV Kilo Moana cruise KM0417 to the Lau Basin (part of the US Ridge 2000 programme) in late 2004 and RRS Charles Darwin cruise CD169 to the southern Mid-Atlantic Ridge, 0-10S (part of a broader German-UK-US collaboration) in Spring 2005. The aims of these cruises is to demonstrate the capacity, in future, to use such technology to not only locate new sites of venting on previously unstudied areas of seabed but also to use various combinations of in situ biogeochemical sensors to investigate the fate of materials dispersed away from the vent-field to allow us to assess their impact upon the surrounding oceans as well as characterising the underlying seabed. In the Lau Basin, the technique has already been proven using the ABE autonomous underwater vehicle coupled with in situ optical backscatter, Eh, and Fe sensors. The Lau Basin is a rather restricted basin where newly-discovered ecosystems appear similar to those reported previously, elsewhere along this fast-spreading and hydrothermally abundant section of ridge-crest. On the southern MAR, by contrast, venting may be sparser along the slow-spreading ridge but if our approach is equally successful, entirely new biogeographic provinces may be found, just weeks

before this paper is delivered!