



Subject offered for a contract starting 2015

SUBJECT TITLE: Seismicity, magmatism and hydrothermalism of Lucky Strike volcano, Mid-Atlantic Ridge

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Second advisor / Supervisor:
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Host lab/team: **IPGP- Equipe de Géosciences Marines – UMR7154**
Financing : **Doctoral contrat with or without assignment**

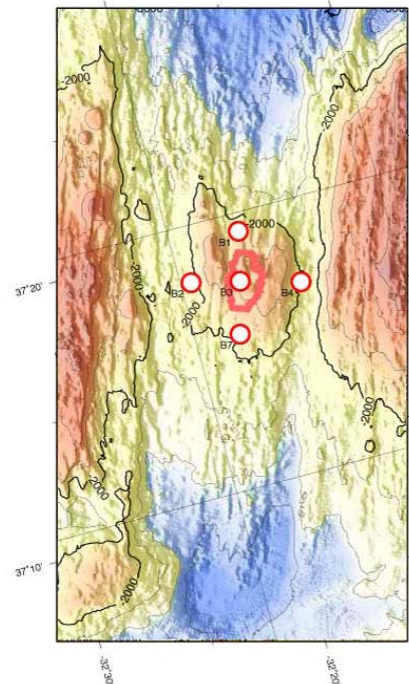
For more information go to <http://ed560.ipgp.fr>, section: Offres de these (PhD offer), You must apply on the Doctoral School website

Presentation of the Subject : (1 or 2 pages)

The submarine « Lucky Strike » volcano hosts one of the most active hydrothermal sites in the world, nourished by a magma chamber 3 km beneath the surface. The volcano sits on the Mid-Atlantic Ridge at 37°N and its summit lies 1600 m beneath sea level. This volcano has been the subject of some of the most important marine geophysical and geological studies in the past 20 years, providing an unequalled image of the structure of a mid-ocean ridge volcano.

Since 2007, as part of the European Multidisciplinary Seafloor Observatory (EMSO) project, Lucky Strike volcano hosts a pioneering seafloor observatory, including seismological, geodetic, chemical biological and oceanographic sensors. The seismological network provides the longest time series ever measured on a seafloor volcano. Thousands of seismic events have been identified and located, and the summit events appear to almost always be connected with the hydrothermal circulation that feeds the surface vents.

We propose a thesis subject whose goal is to determine the state and evolution of tectonic, magmatic and hydrothermal activity within the volcano. Using mostly the seismological data collected on the volcano, the student will determine the seismicity and study the state of stress that it reveals, in order to understand the past, present and future of accretion and hydrothermalism around the volcano. A strong understanding of plate tectonics and of seismic wave propagation (or of physics in general), as well as familiarity with numerical modelling is highly recommended.



Bathymetric image of Lucky Strike volcano. Seafloor seismometers are indicated by circles and the limits of the subsurface magma chamber are traced in red. The hydrothermal site lies beneath the central circle.

Depending on the student's interests, the project may be complemented, in collaboration with the University of West Brittany (Dr. Julie Perrot), by a methodological study of the transformation of seismic waves into far-propagating acoustic waves in the water column. For this study, the student will use a concurrent data set of acoustic signals recorded in the water column around the Lucky Strike site.