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Long term ocean bottom pressure monitoring in the Logatchev Hydrothermal Field - indications for tremor, earthquakes, uplift and subsidence

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The mid oceanic spreading axes are centers of recent ore generation, accommodate little known chemotropic biological communities, 90 per cent of the global volcanism and contribute 25 per cent of the heat released from the earth. But little is known about these systems because their location in the depth of the oceans and much less about their changes in time. Target of a joint multidisciplinary approach to learn more about the temporal variations of a hydrothermal field has been the Logatchev Hydrothermal Field (LHF) at the Mid Atlantic Ridge in the framework of the SPP1144 of the German Research Foundation. It was chosen because of its high representativity with its moderate spreading rate, the mixture of basaltic and mantle rocks in the subsurface and its pronounced bathymetric relief.
In the Logatchev Hydrothermal Field (LHF) hydrothermal activity is observed at several distinct sites. Focussed high-temperature outlets at black smokers were found as well as diffuse warm water outflow. Four locations in the LHF were equipped with instruments, to monitor physical parameters for about one year. At "OBP-site" an ocean-bottom-pressure-meter (OBP) and an ocean-bottom-tilt-meter (OBT) were installed, monitoring water pressure, temperature as well as the sea floor inclination. At "Mooring-site" a sensor chain scanned the temperatures of the bottom water every 6 minutes in 1 m intervals, from the sea floor to 25 m vertically above. The adjoining mussel fields Quest and Irina2 were instrumented with 12 temperature loggers each, registering the temperatures.

In this poster data of the long term ocean bottom pressure monitoring are presented and discussed in context with temperature data regarding their meaning for tectonic processes. Earthquakes and very low frequency tremor activity are recognized. Temperature monitoring and CTD measurements help to separate sea floor uplift and subsidence from oceanographic signals.