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Long term ocean bottom pressure monitoring in the Logatchev Hydrothermal Field at the Mid-Atlantic-Ridge

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A suite of monitoring instruments was deployed to survey the temporal variation of mid-ocean ridge hydrothermal activity. The Logatchev Hydrothermal Vent Field (LHF) was one target in the multidisciplinary approach of Priority Program SPP1144 funded by the German Research Foundation (DFG). Besides temperature, acceleration and tilt sensors an ocean bottom pressure station (OBP) was installed to control the absolute hydrostatic pressure.

From bottom pressure measurements carried out in the framework of long term monitoring of hydrothermal activity in the Logatchev Hydrothermal Field a data set of the time span from 2005 to 2009 was recovered and analysed. A newly designed OBP allowed faster sampling without the consequence of reduced pressure resolution (0.5 mm water column), thus expanding the frequency range of recording. Pressure signals with frequencies of up to 250 mHz could be restored. Thus pressure finger prints from sea floor uplift/subsidence at the low frequency end to earthquakes at the high frequency end are contained in the data. On the other hand tides, instrumental drift and oceanographic variations superposition these pressure signals of tectonic origin and complicate their interpretation. An approach to separate different components and assign them to tectonic, instrumental and oceanographic sources is made by comparison with satellite altimeter data, ocean modelling, pressure data from another location, weather information and global earthquake catalogue data of teleseismic events.

The comparison shows limits and capabilities of ocean bottom pressure measurements supporting strategies for planning future OBP deployments.