

# Logatchev - A Potential MPA

## Location

The Logatchev vent area consists of two distinct hydrothermal vent fields. Logatchev-1 is located at 14°45'N 44°58'W and Logatchev-2 at 14°43.22'N, 44°56.27'W. It is the southernmost hydrothermal vent field on the Mid-Atlantic Ridge (MAR) known today.

## Potential Reasons for Selection

Logatchev is the largest vent area on the MAR encompassing about 200 000 m<sup>2</sup> as observed so far. It hosts the highest diversity of species and biotopes known from the MAR. The high diversity of biotopes presents a unique opportunity to understand how the structure and composition of hydrothermal hot vent communities is controlled by their geological settings. Located approximately 1000 km from the next vent field (Snake Pit), Logatchev is the most isolated vent field on the ridge. As the faunal exchange between the vents decreases with distance, the fauna found at Logatchev might differ considerably from the others and have a high degree of endemism.

## Site Description

The Logatchev vent area is located on an uplifted rock at the eastern slope of the rift valley, an unusually shallow location. In contrast to other vent fields, it is not based on basalt but ultramafic rocks with a high methane content in the fluids. The Logatchev-1

field consists of three distinct sites, a large sulphide mound with smoking craters, an active chimney complex known as Irina-2 and a diffuse flow through soft sediment called Anya's garden. Within these areas, highly variable biotopes are found, including black smokers, smoking craters, diffuse flow areas, bacterial mats, mussel beds and sedimented areas. Two different types of smokers occur, the more common vertically flowing ones, and the so-called creeping smokers that spread horizontally.

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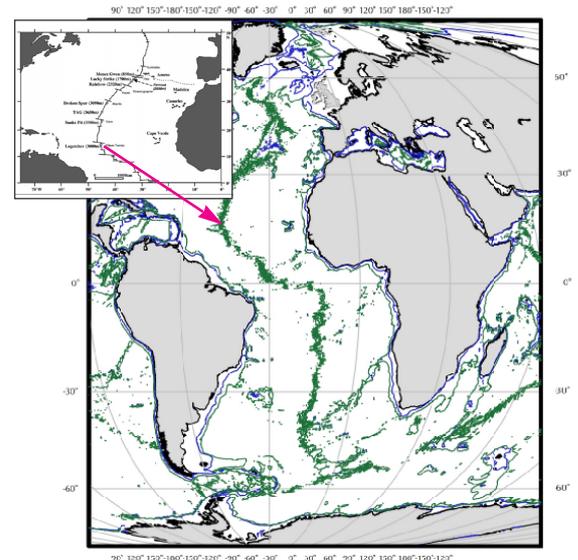


Fig. 1: Location of the Logatchev hydrothermal vent field on the Mid-Atlantic Ridge (MAR). The inserted map depicts the eight active hydrothermal vent fields known to date on the MAR between the equator and the Azores Archipelago. The major transform faults are also drawn on the map (from Desbruyères et al. 2000).

Logatchev-2 consists of six sulphide mounds within a field of about 550 times 200 m. There are extensive massive sulphide deposits in the area containing an unprecedented high concentration of copper, zinc, gold and with an anomalously high uranium level. The cobalt concentration is also higher than in other hydrothermal vent fields. Further hydrothermal activities have been recorded north-east and south of the Logatchev-1 field but nothing is known yet about them except that they are showing a high concentration of commercially valuable minerals as well.

## Biological Features

With an estimated number of 50 species from several different taxa including sea anemones, crabs, mussels and starfish, Logatchev hosts the highest species diversity known in the region at present. It is likely that it also has the highest biomass, as estimates for mussels alone are significantly higher than in other vent fields. As in other vent fields, mussels from the genus *Bathymodiolus* are quite abundant, yet the represented species differs significantly from other sites. Several taxa have been found which are new to the region, including vesicomid and thyasirid bivalves and cerithiacean gastropods. The vesicomid clam population is the first living clam population that has been recorded from the MAR and is of special scientific interest. At the Logatchev-2 field, no modern hydrothermal activity has been observed so far and thus no living associated fauna. However, the subfossil

**The Logatchev  
 vent field -  
 a Showcase Example  
 for a High Seas  
 Network of Marine  
 Protected Areas**

valves of two bivalve species of the family *Vesicomidae* found are new records for hydrothermal vents and give further insight into the biogeography and composition of the Atlantic hot vent fauna.



Fig. 2: Population of vesicomid clams at Anya's Garden. Also seen on the photograph are the mussels *Bathymodiolus* sp. aff. *puteoserpentis*, ophiuroids *Ophioctenella acies*, galatheid crab *Munidopsis* sp. and unidentified fish (in: Gebruk et al. 2000)

### Threats

The Logatchev hydrothermal vent area has been visited by several expeditions since its discovery in 1994 and a further one is planned for 2003. Research activities can adversely affect vent systems e.g. by sampling when not managed and monitored adequately. The area's extensive massive sulphide deposits with their high copper and uranium concentration and its high species and biotope diversity makes the Logatchev area especially susceptible to harm from prospective mining activities and bioprospecting. In case of mining, radioactivity might be released and enter the environment due to the high uranium content in the massive sulphides. The effect of radioactivity to deep-sea ecosystems is totally unknown. Screening for massive sulphides has already taken place in the area and sites close to the vent field have been declared as being promising for massive sulphides. Bioprospecting, while not necessarily harmful, needs to be managed carefully to ensure that sampling techniques are not damaging.

### Legal aspects

The Logatchev vent field is located on the High Seas, in the "Area", and therefore falls within the jurisdiction of the International Seabed Authority (ISBA), a body established under the UN Convention on the Law of the Sea (UNCLOS, 1982). The "Area" and its resources have been designated as the "common heritage of mankind" [sic]. Pursuant to UNCLOS, all rights to the resources are vested in mankind [sic] as a whole, on whose behalf the ISBA shall act. In accordance with the terms of UNCLOS and other provisions of international law, States are under an obligation to „*protect and preserve rare or fragile ecosystems as well as the habitat of depleted, threatened or*

*endangered species and other forms of marine life*". To give effect to this binding commitment to protect and preserve the marine environment, the ISBA is required to adopt and implement measures for the protection and preservation of the marine environment in the Area. The ISBA is currently developing regulations for future mining of massive sulphides and cobalt crusts in the Area, including provisions to control and reduce the environmental impact of these activities. These regulations could include provisions to designate particular areas as sensitive no-mining areas, as well as establishing procedures for designation of further sites as they are identified in the future.

Moreover, the World Summit on Sustainable Development (WSSD, 2002) called for action to maintain the productivity and biodiversity of important and vulnerable marine areas both within and beyond national jurisdiction. It urged nations to make significant progress within a concrete time frame, calling for adoption of the ecosystem approach by 2010 and the establishment of representative networks of MPAs by 2012. The resolution of the UN General Assembly A/57/L.48 (2002) endorses the Plan of Implementation adopted at WSSD and further calls for urgent and coordinated action to protect vulnerable benthic habitats.

### Action required

In order to facilitate a spatial and temporal separation of incompatible activities, and to minimise potentially unsustainable human disturbance in these rare and sensitive ecosystems, it is proposed to designate the Logatchev vent field as no-mining site. As a first step, the need for effective implementation of conservation measures in certain areas of the High Seas and the Area should be acknowledged. 2 - Pilot case studies, for example on the case of Logatchev, should be instrumental to developing management schemes, identifying stakeholders, responsibilities, cooperation and coordination and enforcement. 3 - A framework agreement, e.g. on a regional basis, will secure the international commitment and buy-in prior to developing 4 - the hard law.

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### References/Further Reading

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