Geophysical Research Abstracts
Vol. 14, EGU2012-5217, 2012
EGU General Assembly 2012

Hydroacoustic investigation of the emissions of gas from the seabed in fieldwork and experimental studies

M. Tomczyk (1), G. Bohrmann (1), I. C. Wright (2), H. Sahling (1), and C. Waldmann (1)

(1) University of Bremen, Marum, Bremen, Germany (mtomczyk@marum.de), (2) National Oceanography Center, Southampton, United Kingdom (ian.wright@noc.ac.uk)

The investigation of the fate of rising bubbles from the seabed is of increasing importance, to be able to quantify the potential input to atmospheric methane (CH4). Hydroacoustic methods seem to be the most sensitive and reliable way to remotely determine bubble fluxes over a large area. The advantage of noninvasive remote sensing methods can be used to better understand the role of cold seep sites in global climate changes. During two cruises in 2011 (R/V Meteor cruise M84/2 in the Black Sea in February and RSS James Ross Clark JCR253 arctic cruise in August) a combination of several techniques was evaluated for detection, localization and classification of gas emissions from natural cold seeps, including a detailed hydroacoustic survey of investigated areas and data analysis with the use of specialized software. Acoustic data were collected using different echosounders and platforms: two multibeam systems EM122 and EM710, multifrequency echosounder EK60, and parametric narrow-beam Parasound echosunder. Detailed location maps of gas seeps, and 3D visualization models showing the registered flares were obtained. All hydroacoustic intruments provided evidence of acoustic anomalies in the water column, related to the strong impedance step between the free gas (bubbles) and the surrounding water. On echograms, rising bubbles often appear as flare-shaped reflections, simply called “flares”. Most of these flares do not reach the sea-surface, nevertheless, some of gas bubble plumes rising up to several hundred meters above the seabed. Flares do not rise straight upwards but are deflected in a direction of current, which can be seen after processing multibeam echosounder data. Matlab codes were used in order to process data coming from EK60 fish-finder echosunder. These data can be used for quantification of gas bubble emissions. Bathymetry data sets exported from MB-System with 2 m horizontal resolution were examined in Fledermaus software for further cleaning, geomorphic analysis, and for exporting grids to ArcMap GIS software for analysis of georeferenced images. In order to be able to quantify the gas bubble emission using imagining active sonar (Imaginex 881A) a calibration was carried out employing a self-constructed bubble-making system. First results of the observations will be presented.