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Use of the sonar systems for analyzing the spatial and temporal variations of gas seepage in deep water

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The work presented herein describes the application of the Parasound (Atlas Electronics) sediment echosounder used as a conventional single beam 18 kHz echosounder in mapping gas seepage in deep waters. It reviews the advantages and limitations that this existing sonar has in studying these systems. New techniques for data analysis for adapting single beam sonars to deep waters are proposed and applied to a data set acquired during two Meteor cruises: M72/3a and M72/3b (in the Batumi Seep Area, offshore Georgia, south-eastern Black Sea). The results show that backscatter from gas that rises from the seafloor through the water column can be observed during the surveys. Moreover, average gas flux can be calculated on the basis of the quantitative analysis of the backscatter intensity. The single beam sonar data can be used for several purposes in deep waters, in particular to estimate the spatial distribution of gas outlets (at the sea floor), and their temporal variations in the quantity of the produced gas during a period of one month (in which the surveys took place).

Keywords: flare imaging, underwater acoustic, data processing, methane seeps, Black Sea