Geophysical Research Abstracts,
Vol. 11, EGU2009-7272, 2009
EGU General Assembly 2009

Hydrothermal Fluxes at the Turtle Pits Vent Site, southern MAR

J. Köhler, M. Walter, C. Mertens, J. Sültenfuß, and M. Rhein
IUP, Universität Bremen, Bremen, Germany (jannak@uni-bremen.de)

The Turtle Pits vent fields are located in a north-south orientated rift valley at the Mid-Atlantic Ridge (MAR) near 5^{o}S. The site consists of three known hydrothermal fields: Turtle Pits, Comfortless Cove, and Red Lion. Data collected during a Meteor cruise in May 2006 and a L' Atalante cruise in January 2008 are used to calculate the total emission of volume, heat, and helium of the site. The data sets consist of vertical profiles and towed transsects of temperature, salinity, and turbidity, as well as direct velocity measurements with a lowered acoustic Doppler current profiler (LADCP) and water samples for Helium isotope analysis. Vent fluid samples for noble gas analysis where taken with an ROV.

The particle plume is confined to the rift valley since the depth of the valley exceeds the rise height of the plume. Therefore the fluxes of heat and volume can be estimated from the helium fluxes at the vent sites in comparison with the horizontal helium transport in the valley. The comparison of the ^{3}He concentration measured south of the hydrothermal vents with the ^{3}He signal north of the hydrothermal vents suggests a rather strong northward flow. This is confirmed by the tide corrected velocities observed with the LADCP during the Meteor cruise. The northward volume transport has been calculated using the local bathymetry and tide corrected velocities from the Meteor cruise. In combination with the ^{3}He concentrations and an average ^{3}He end member concentration a flux of 900 l/s is estimated, which corresponds to a heat flux of 450 MW.

The rise height of the particle plume estimated from the turbidity data combined with the known background stratification yields an estimate of the total flux of the hydrothermal vents which is one order of magnitude lower.