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The role of mixing and internal waves in the hydrographic variability at a hydrothermally active segment of the southern MAR

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An evanescing hydrothermal plume was observed in the axial valley of the South Atlantic Mid-Atlantic Ridge at 8°16' S 13°32' W. The temporal variability of the plume signal was associated with large vertical excursions of temperature/density surfaces and the intermittent occurrence of homogeneous layers in the water column. Here, we investigate the hydrographic conditions and the role of diapycnal mixing in creating the environment which determines the export of hydrothermal products into the open ocean.

The data set used for this study comprises measurements of velocity and stratification with a high temporal and horizontal resolution which have been obtained during the *RV* Meteor cruise M62/5. The velocity field has been surveyed with lowered Acoustic Doppler Current Profilers (ADCPs) which provide information about the horizontal flow field and the vertical shear thereof. The stratification and its variability was measured with a CTD system, used for standard hydrographic casts as well as for yo-yo and towed timeseries casts.

The distribution of properties in general and especially the occurrence of thick well mixed layers was found to be well linked to the tidal phase of the flow, showing significant differences between ebb and flood tide. The complex topography of the rift valley gives rise to internal waves with an amplitude of more than 200 m which are observed during a towed time series CTD cast. The role of vertical mixing caused by the internal wave activity in creating the homogeneous layers and erasing the plume anomalies in the investigation area is studied by means of diapycnal diffusivities calculated from the vertical shear of the velocity measurements and by observations of strain and inversions of the density field.