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SPECTROSCOPIC INVESTIGATIONS AND PARTICLE ANALYSIS ON OCEAN SEDIMENTS METHODICAL DEVELOPMENT AT THIN SECTION OF THE CORE SO147/106KL (PERUVIAN CONTINENTAL SHELF, MIS 5E)

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Digital image processing of thin sections is used to produce high-resolution data. In this study two different image-processing methods are compared with each other and linked together, based on a marine sediment core of the drilling site SO147-106KL at the Peruvian shelf (Rein et al. 2006).

RADIUS is a particle analysis application, developed by Seelos & Sirocko (2005), which classifies particles in digital photographs of thin sections. The particle detection is based on colour detection, therefore the classification of the particles is depending on grain sizes. The second method COMPONENTS (Rein & Jäger, acc.) analyzes the sediment composition by applying band ratios on multi-spectral images of thin sections. For generating multi-spectral pictures for COMPONENTS, a photograph routine was developed during this study.

In order to compare both methods, a MATLAB® module PhaseAnalysis was programmed and incorporated to the RADIUS environment. This module evaluates the results of COMPONENTS and makes them available in RADIUS for a subsequent combined treatment. The linkage of particle analytics with multi-spectral phase analytics offers several advantages: The used band ratios are more accurate in the detection of particles as well as phases than absolute grey values. Thus, improvements of the particle analysis results as well as a mutual validation of the results of both methods are possible. On the basis of quartz and carbonate, a calibration curve was calculated. Through this the relative surface quota of image analysis can be converted into weight percentage, in order to compare the results with conventional analysing methods.

This routine is applied to a laminated sediment core from the Peruvian continental margin, representing the MIS 5e-d transition. Obviously the grain sizes of the clastic sediments change during the $\delta^{18}O$-increase. This documents a moderately increasing fluvial runoff on the continental shelf during times of changing sealevel and continental precipitation accordingly to the global signal. The amount of lithic supply is controlled by the discharge of river floods in northern and northern central Peru and the current inter-annual SST variability is linked to ENSO variability.

Rein, B., F. Sirocko, A. Lückge, L. Reinhardt, A. Wolf & C-W. Dullo (2006): Abrupt change of El Niño activity off Peru during stage MIS 5e-d. – In Frank Sirocko, Thomas Litt, Martin Claussen, F. Sanchez-Goni (eds.): The climate of the past interglacials, Elsevier, 305–322.

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