Geophysical Research Abstracts, Vol. 9, 05357, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-05357


# Sedimentology, petrography and provenance of modern Southern Chile Trench sediments (36S̊-47˚S)

G. Roeser (1), B. Heberer (1,2), J. H. Behrmann (3), M. Rahn (4), **A. Kopf (5)**

(1) University of Freiburg, Germany, (2) University of Salzburg, Austria, (3) IFM-GEOMAR Kiel, Germany, (4) HSK, Villigen-HSK, Switzerland, (5) RCOM, University of Bremen, Germany (georg.roeser@geologie.uni-freiburg.de / Phone: +49-761-2036503)

Sedimentology, petrography and the provenance of sediments from the Southern Chile Trench (36˚S to 47˚S) that are about to be subducted into the seismogenic zone beneath the South American Plate, were investigated in an integrated approach combining description of a large collection of gravity cores, quantitative X-ray petrography, modal analysis and fission track age analysis on detrital apatite. The sedimentary environments studied were trench hemipelagics, trench fan deposits, and more distal hemipelagics sedimented on the Nazca Plate north of the Chile Triple Junction (CTJ). The trench is fed by terrigenous turbidity currents from multiple point sources via submarine canyons, extending from the shelf break across the slope, and building submarine fans at the bottom. The turbidites are interlayered with clay- and silt-sized hemipelagics. Within the trench, sediment is transported northwards along a slightly inclined axial channel. The regional depth gradient in the trench floor is caused by the northward age increase of the Nazca Plate.

Both, grain-size and core physical properties reveal distinct latitude-dependent trends. In the trench and the trench fans, contents of clay-sized particles increase towards N with a coeval decrease of the medium and coarse silt fraction due to a combination of several factors, such as the northward directed sediment transport, changes in hinterland lithologies, and different erosion patterns as well as greater water depths in the N. Bulk density of the hemipelagic section reveals a slight but consistent increase towards the S. This relates to higher sediment input, morphologically expressed by a completely buried trench, and goes along with an increase in average turbidite thickness.

Modal analyses of turbidites show a southward increase in sediment maturity. While volcanic lithics represent the most dominant fraction within samples from 36˚ to 43˚S, quartz, and metamorphic and magmatic lithics prevail near the CTJ (at 46.5˚S). This reflects the source lithologies, especially the absence of present-day volcanic activity in the hinterland between 47˚ and 49˚S, and is also mirrored in the southward decreasing magnetic susceptibility found in the gravity core material. Further north, active volcanoes in the Main Cordillera partly cause singularities in the provenance signal due to an overwhelming contribution of highly erodible volcanics. Neither were major intrasite variations of detrital modes detected nor variations between trench and trench fans, the latter being ascribed to intense source mixing within the trench.