Paleoenvironmental change in the middle Okinawa Trough over the last 30 ka: Evidences from clay minerals and geochemistry

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Clay minerals and geochemical analyses of the fine-grained sediments in Core DGKS9604 from the middle Okinawa Trough were used to investigate sediment sources and transport processes. The transport and depositional processes of terrigenous sediments in the middle trough are closely related to sea-level changes, Kuroshio Current variability, and the changes of monsoon-driving fluvial run-off.

Direct supply of terrigenous sediments from the Changjiang (Yangtze River) to the middle trough occurred between 28 and 15 ka BP, with higher amounts of kaolinite and smectite. From 15 to 7.6 ka BP the terrigenous sediments are predominantly transported from the continental shelf of the East China Sea with rapidly increasing sea level. The change in sedimentation rates clearly reflects the variation of fluvial run-off which was basically controlled by monsoon variablity in the large drainage basins. The deglacial increase and decrease sooner in smectite and the fluctuation of other minerals reflects the mixing processes between fine-grained fluvial material and reworked continental shelf material because of sea level change. The high proportions of chlorite, as well as other geochemical proxies, imply that the fine-grained terrigenous sediments that accumulated since 7 ka BP were mainly sourced from Taiwan, probably transported by the mainstream of Kuroshio Current which strengthened in the Okinawa Trough at that time. A sharp increase in sediment input from Taiwan at ~1.8 ka BP with high chlorite/kaolinite ratio might be caused by heavy precipitation and/or more frequent earthquake activity in and around Taiwan. The overriding control of sea level changes on the clay mineral distribution pattern precludes a definite climatic interpretation of clay mineral data in terms of climatic/monsoonal changes in such highly dynamic sedimentary environment.

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New petrographic, major and trace element data on lithospheric mantle beneath central Siberian craton

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Mantle xenoliths entrained in the Udachnaya kimberlite in central Siberian craton have been extensively studied since several decades. A usual problem with most of the available data, however, is that the Udachnaya xenoliths, like many other kimberlite-hosted peridotite suites worldwide, are extensively altered due to interaction with host magma and post-eruption alteration. This alteration causes particular problems for whole-rock studies including microstructures, modal estimates, major and trace element compositions.

We report petrographic data and major and trace element compositions for whole-rocks and minerals of some 30 unusually fresh peridotite xenoliths from Udachnaya. Microstructures, mineral orientation data and seismic properties for some of the same samples are given in [1]. The rocks represent spinel, garnet-spinel and garnet facies peridotites including garnet- and cpx-rich lherzolites, garnet and spinel harzburgites and dunites. Thermobarometric estimates for garnet-bearing rocks from mineral compositions yield T = 840-1270°C and P = 25-57 kbar; low-T spinel facies rocks may originate from shallower levels. Thus, the suite represents a lithospheric profile from the sub-Moho mantle down to ~180 km. The deeper peridotites commonly have porphyroclastic microstructures with mainly neoblast olivine, opx porphyroclasts and more or less coarse cpx and garnet. More shallow rocks are commonly protogranular.

Trace element compositions show variable HREE levels in garnet and cpx, a broad range of primitive mantle-normalised patterns including common sinusoidal shapes for garnet, and variable enrichments in highly incompatible elements. The major and trace element data are used to re-assess the origin of the cratonic mantle in central Siberia, in particular regarding the role of subduction-related processes in melt extraction and post-melting enrichments [2].

[1] Saumet *et al.* (2009) *GCA*, this volume. [2] Wittig *et al.* (2008) *Lithos* **71**, 289-322.