Erosion on Taiwan: Trace element and (Sr, Pb, Zn) isotopic constraints on marine sediment provenance

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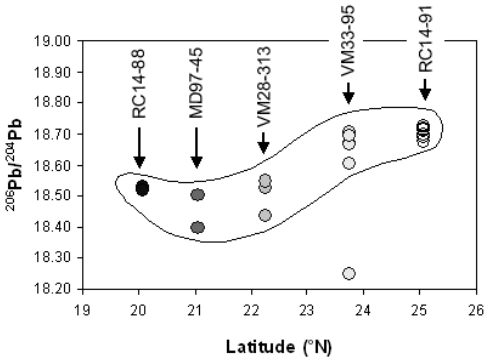
The very high rate of erosion on Taiwan makes this orogen an important source of sediments. A comparison between trace element concentrations and isotopic compositions (Sr, Pb, Zn) of the detritic part of the marine sediments and the results obtained on samples from Taiwan should allow identifying the sedimentary contribution of Taiwan orogen versus the sedimentary contributions by oceanic currents and atmospheric dust.

Five marines cores offshore Taiwan have been analysed. Continental samples (andesites, sedimentary material and Taitung River suspended load) of Taiwan have also been analysed to give best estimate of Taiwan end-member. Sr and Pb isotopic results on the marine cores are very spread out for the silicate fraction:



The core located in the Okinawa basin shows the more radiogenic Sr and Pb compositions, which can be modelled by mixture between Taiwan rock and Yellow Sea sediment contributions. In contrast, core samples close to Luzon arc present typical volcanic isotopic signatures. Zn isotopic compositions of the detritic part of marine sediment present clustered values similar to the litterature data measured on sedimentary material, except for the Manila trench core, which presents the highest values, close to those obtained on Taiwan rocks. These results comfort the Sr and Pb isotopic data.

Mixing lines between the different potential end-members evidence that the marine core samples represent mixture between volcanic arc, Taiwan sedimentary material and Yellow sea Sediment (i.e. Yellow river and China Loess).

Chemical and physical weathering in the Kabini River Basin, South India

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Introduction

The Kabini river basin (7000 km^2, 900 masl, Southern Karnataka, India) lies on the Deccan passive margin plateau. The west-facing scarp of the plateau (Western Ghats) slows down the Southwest monsoon flux, inducing a steep decline on 50 km of mean annual precipitations (P) from west (P = 7 m) to east (P = 0.5 m) in the Kabini basin. Different regoliths (depth, types of soil) developed on the silicate basement of the Dharwar craton are organized along this climosequence (Gunnel and Bourgeon, 1997). The aim of our study is to investigate the relative influence of regolith depth, tectonic, climate and hydrology on both silicate chemical and physical weathering. The human activity impact is also taken into account.

Methodology and results

On a local scale, an integrated ecosystem approach is developed on two small paired watersheds (Moole Hole, forested, 4.3 km^2 ; Maddur, cultivated, 6.3 km^2) both located in the transition climatic zone (P = 1 m). Digital Elevation Model and thematic maps for soil, geology and land use were implemented. Mineralogy and geochemistry of the protolith/regolith have been investigated. The atmospheric deposit, groundwater and stream chemistry has been monitored. On a regional scale, four sub-basins (100-1000 km^2) representative of the humid, semi-arid and transition climatic zones have been monitored in order to assess the spatial variability of the weathering fluxes in the climosequence. Preliminary results will be presented on the weathering fluxes and the hydrogeochemical processes. Comparisons will be carried out with other watersheds from the tropics (Oliva et al., 2003 ; Braun et al., 2005 ; White et al., 1998).

References

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Gunnel Y. and Bourgeon G. (1997) *Catena*, 29, 239-262.
Oliva P. et al. (2004) *Chem. Geol*., 202, 225-236.
White et al. (1998) *GCA*, 62, 209-226.