Geophysical Research Abstracts,
Vol. 11, EGU2009-9227, 2009
EGU General Assembly 2009

Geochemical and thermochronological signals in Tertiary to Recent sediments from the Western Andes (15-19°S): proxies for sediment provenance and Andean uplift.

A. Decou (1), M. Mamani (2), H. von Eynatten (1), and G. Wörner (2)

(1) Göttingen Universität, Sedimentologie, Göttingen, Germany (adecou@gwdg.de), (2) Göttingen Universität, Geochimie, Göttingen, Germany

During the Cenozoic the landscape at the western margin of South America changed dramatically due to the tectonic evolution of the Andes (Isacks 1988, J Geophysical Res 93) and significant variations in climate (Gregory-Wodzicki 2000, GSA Bulletin 112). At present day the climate in the western Central Andes (N-Chile, S-Peru) is arid (rainfall average is less than 100-200 mm/y) Climate has changed significantly through time, for example, sediments on the Altiplano and the eastern Central Andes indicate a period of increased precipitation at around 7-8 Ma (Gaupp et al. 1999, PPP 151; Uba et al. 2007, Geology 35). The uplift of the Andes started some 30-25 My ago (Isacks, 1988,). Siliciclastic sedimentation along the western flank of the Central Andes started at 55 Ma and lasted until recent time (Moquegua Group, Roperch et al. 2006, Tectonics 25). This implies that a river system with sediment deposition was already developed before the Andean uplift which occurred during deposition of the Moquegua Group.

The Moquegua group is composed of four units: Moquegua A (55-45Ma), Moquegua B (45-30Ma), Moquegua C (30-15?Ma) and Moquegua D (15?-0Ma) (Roperch et al. 2006). The sedimentary basin of Moquegua has a complex internal structure and is composed of different subbasins. We focus in this study respectively, from north to south, on the Cuno Cuno section (cut by the Rio Ocoña), the Majes section (cut by the Rio Majes) and the Moquegua section (cut by the Rio Moquegua). Several facies and compositional changes of Moquegua Group sediments, both along orogenic strike and through time, are already described; however, it lacks a detailed provenance study to constrain the tectonic and climatic controls on sediment generation, dispersal, and accumulation.

To do so sandstones from all Moquegua units from the three different sections have been sampled. Because it is crucial to know all the potential source rocks in some detail, the Proterozoic-Paleozoic basement, the Jurassic-Cretaceous sediments and the six different volcanic arcs (Chocolate, Toquepala, Tacaza, Huaylillas, Barroso and the frontal arc respectively from the oldest to the youngest) were sampled as well. The heavy mineral fraction has been separated for each potential source rock and the sediment samples. Single grain amphiboles and oxides have been used for geochemical analysis. Major elements from single grain amphiboles and oxides have been measured using the electron microprobe. The amount of trace elements from single grain amphiboles has been obtained using LA-ICPMS. Those two methods allow us to distinguish the different potential source rocks from each other and to define the sediment provenance for each member of the Moquegua Group, in each of the sections from N to S. Further thermochronological investigations, such as zircon fission track dating, will allow us to better constrain the uplift of the Central Andes.