Geophysical Research Abstracts, Vol. 7, 08979, 2005 SRef-ID: 1607-7962/gra/EGU05-A-08979 © European Geosciences Union 2005



## What Drives Orogeny in the Central Andes?

S.V. Sobolev (1) and A.Y. Babeyko (2)

 (1) GeoForschungsZentrum, Potsdam, Germany, (2) Institut f
ür Meteorologie und Geophysik, J.W.Goethe Universit
ät, Frankfurt am Main, Germany (stephan@gfz-potsdam.de / Phone: +49-331-2881248)

The Andes, the world's second high orogenic belt, were generated by the Cenozoic tectonic shortening of the South America (SA) plate margin overriding the subducting Nazca plate. We employ a coupled thermo-mechanical numerical modeling technique to identify factors controlling the intensity of the tectonic shortening. From the modeling we infer that the most important factor was fast and accelerating westward drift of the SA plate, while large changes in the subduction rate were not as important. Another important factors are crustal structure of the overriding plate and shear coupling at the plates interface. The model with thick (40-45 km at 30 Ma) SA crust and relatively high friction coefficient (0.05) at the Nazca-SA interface generates more than 300 km of tectonic shortening during 30-35 Myr and replicates crustal structure and evolution of the high Central Andes. The model with the initially thinner (less than 40 km) continental crust and lower friction coefficient (less than 0.015) results in less than 50 km of the SA shortening, replicating situation in the Southern Andes. Our modeling also demonstrates an important role of the processes leading to mechanical weakening of the overriding plate during tectonic shortening. Main of them are lithospheric delamination, triggered by the gabbro-eclogite transformation in the thickened continental lower crust, and mechanical failure of the sediment cover at the shield margin.