Geophysical Research Abstracts,
Vol. 10, EGU2008-A-03890, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-03890
EGU General Assembly 2008

Interplay between thick- and thin-skinned tectonics along fold and thrust belts. Example of the Andean foothill (Neuquén basin, Argentina)

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The Chihuido anticline (37˚30'S-38˚40'S and 69˚ W-70˚ W) in western Argentina underlines the eastern orogenic front of Andes. North-south-oriented, it is a crustal-scale anticline, 120 km long and 80 km wide. It culminates at 1500 m in elevation. It is limited to the west by the Agua Amarga syncline and by the deep-rooted Salado fault system late Cretaceous in age.
The main river of the area, the Neuquén River, runs north-south behind the Chihuidos to the west in the Agua Amarga syncline. To the south, it bends to the east across the southern terminaison of the anticline. To the north, the northern end of the Chihuido had been cross cut by the Colorado River that currently flows 60 km farther to the north. Folding of terrace remnants of these rivers attests of a Pleistocene tectonic activity of the anticline. They appear clearly bended over a length of ca 30 km with an amplitude of 350 m at the apex. Behind the anticline above the Agua Amarga syncline, the Neuquén River is depositing a strong thickness of alluvial deposits.
Uplift of the anticline resulted in an increase of dip, to the west and to the east, of a decollement level made of the Huitrin evaporites Aptian in age. This tilt allowed decollement of pelicular shales and sandstones of the Rayoso formation and of the Cenamanian continental redbed clastics of the Neuquén group above it. This slide lead to the opening of valleys at the apex of the anticline, interprated as extrado tension gashes, and to the growth of superficial folds at the eastern toe of the Chihuido. These folds root in the Huitrin evaporites and achieve extension of the apex of the anticline.

Farther to the west along the Salado fault system, vertical offset of Pleistocene alluvial fans with surface faulting attest of an on-going reactivation of the former mountain front. This reactivation is interprated as the consequence of the uplift of the Chihuido fold. The increase of dip of the decollement level beneath the former tectonic wedge allowed its reactivation because the wedge became again undercritics. Thus, the eastward migration of the mountain front (the Chihuidos) leads to a reactivation of the former inner front resulting in an out-of-sequence activity of thrusts.
At the regional point of view, these deformations attest of a present-day compressive setting. Extension is only located at the apex of the crustal anticline and is pellicular.
Project funded by TOTAL.