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The Central Andes of Peru: Structure and Evolution

L. Gonzalez and O.A. Pfiffner
Universität Bern, Institute of Geological Sciences, Bern, Switzerland (adrian.pfiffner@geo.unibe.ch, +41 31 631 48 43)

We present the structural style and its extrapolation to depth in a transect through the Central Andes of Peru from the Pacific Ocean to the Amazon foreland. Three major units make up the Andes in Peru: the Western Cordillera, the Central Highland and the Eastern Cordillera. The Western Cordillera is made up of a folded volcanic arc sequence of Jurassic to Cretaceous age. They were intruded by several plutons in Late Cretaceous times. These plutons form the Coastal Batholith, which outcrops along the entire coast of Peru. The Central Highland consists of a folded sequence of Paleozoic-Mesozoic sediments. The Eastern Cordillera has a core made up of a Late Paleozoic orogen locally intruded by Permian and Triassic grantoids. To the east, a thrust belt involving Paleozoic to Cenozoic sediments forms the transition of the Eastern Cordillera to the Amazon Foreland.
The structural analysis across the entire orogen varies considerably between these major units. Within the Western Cordillera the Jurassic and Cretaceous strata form tight upright folds which must be underlain by a detachment horizon. Thrust faults emerging form this detachment are verging to the east. Eocene volcanics of the Calipuy Group overly these folds unconformably. One major fault zone extends along most of the chain and puts Cretaceous strata onto the Eocene Calipuy Group. This late thrust fault raised the Western Cordillera above the elevation of the Central Highland.
A major fault zone that puts Neoproterozoic crystalline basement rocks of the Eastern Cordillera next to Paleozoic sediments of the Central High Zone forms the western border of this cordillera. The steep fault zone has a thrust and a sinistral strike slip component. To the east of the Eastern Cordillera, an E-verging imbricate stack of thrust sheets affects Paleozoic, Mesozoic and Cenozoic strata. Within the Subandean Zone, Neogene thrusting migrated towards the Amazon Foreland and affected sediments as young as Pliocene. The imbricate thrust faults of the Subandean Zone are likely to level off into a detachment horizon located most probably in Silurian shales. The displacements associated with these thrust faults suggest that the crystalline basement beneath the Eastern Cordillera must also be affected by this thrusting. We suspect that the high elevation of the Eastern Cordillera and the adjacent Central Highland, which connects to the Altiplano, are the result of this Neogene thrusting.
Deformed Pleistocene gravels in the Central Highland and faulted Holocene gravels in the Cordillera Blanca witness to the ongoing deformation within the Andean mountain chain.