

Analysis of Quartz Grain Deformation Along the Llanganuco Canyon of the Cordillera Blanca Fault, Peru

Tami Banks

with Cameron Hughes and Micah Jessup

University of Tennessee Knoxville, Earth and Planetary Sciences

ABSTRACT

Quartz is the most common mineral in the Earth's crust. Because it experiences predictable and observable changes with increasing temperature, specific quartz grain deformations identify the minimum temperatures that the grain reached and can help to establish the extent of strain that the rock has undergone. The Cordillera Blanca is a formation made by the tectonic processes that create earthquakes and faults in the brittle upper crust. Rocks from deep in the crust are exposed. Rock samples were taken from various points along the Llanganuco Canyon, creating a profile from closest to the fault, where it would have undergone brittle fracture, to furthest from it, where it would have experienced higher temperatures. Thin sections were made of each rock and studied for the quartz deformation traits. Analysis of the thin sections confirmed brittle fracture near the fault and showed the progression of quartz deformation to that caused by temperatures exceeding 500 °C. Determining temperatures that the rocks have reached gives insight to the processes that the crust undergoes with tectonic activity.

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