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Uplift and topography formation in of the Cordillera Blanca, central Peruvian Andes

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The Cordillera Blanca detachment fault of the central Peruvian Andes is a singular example of extension in young thick crust above an active subduction zone. The CBDF is a low-angle normal fault marked by a major, west-facing scarp (35˚W dip) and by a thick belt of exhumed mylonitic to cataclastic fault rocks. Furthermore, this active fault is the only known example of neotectonic detachmen t faulting within an oceanic/continental convergence zone. The range also supports some of the most extensive tropical alpine glaciers on the planet. However, the fact that the modern glaciers are confined to the footwall block of the Cordillera Blanca fault together with a strong along strike variation in the morphology of the range ($\sim$200 km), suggests to us that the Cordillera Blanca provides a unique setting in which to study the interplay between glacial erosion, relief generation and detachment faulting. We have investigated the Quaternary slip rates along the Cordillera Blanca detachment fault in order to quantify uplift and extension rates in this portion of the Peruvian Andes and have surveyed offset moraines as well as tectonically generated fluvial terraces on the footwall of the fault at several locations along strike. These measurements together with dating of offset moraine crests using *in situ* produced cosmogenic radionuclides suggest a south to north variation in the time integrated rate of vertical uplift from $\sim$1-2 mm/year in the south to 4 – 6 mm/yr in the north. Interestingly, Both the maximum range crest elevation as well as the relief display this same along strike trend increasing from south to north. Furthermore, geomorphic evidence suggests that in an absolute reference frame it is the footwall, which is being displaced. While it is possible that the tectonic forcing varies along strike, is seems to us more plausible, that the along strike variation in both the slip rate and the relief is either predominately controlled by, or strongly coupled to glacial down cutting. Thus, it appears that uplift

of the high peaks of the Cordillera Blanca is to a great degree driven by the positive feedbacks between climatic and tectonic forcings.