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Exhumation of the Cordillera Blanca batholith (Peruvian Andes) constrained by amphibole barometry and low-temperature thermochronology modelling

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The Cordillera Blanca batholith forms the highest Peruvian summits and builds the footwall of the Cordillera Blanca normal fault (CBNF). Even if several models have been proposed, the processes driving both the exhumation of the Cordillera Blanca and extensional deformation along the CBNF are still debated. We coupled barometric and thermochronologic data to quantify the emplacement and exhumation history of the Cordillera Blanca batholith from the late Miocene to present. Based on new thermobarometry data and a compilation of crystallization ages in the Cordillera Blanca batholith, we propose that the batholith was emplaced at a depth of $\sim$3 km in successive sills from 12 to 5 Ma. Close to the CBNF, the younger rocks that are emplaced the deepest (i.e. $\sim$6 km) are exposed at the surface, suggesting post 5 Ma tilting. In addition, a formal inversion of the barometric and thermochronologic data (apatite fission-track and apatite (U-Th)/He) indicates an increase of the exhumation rates in the Cordillera Blanca during the Quaternary. The higher predicted exhumation rates correlate with areas of high relief suggesting that Quaternary valley carving by glaciations have a significant impact on the latest stage of the Cordillera Blanca exhumation (2-0 Ma).