Geochronology of synkinematic white micas in alpine shear zones of Mont-Blanc and Belledonne.

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Résumé

New in situ 40Ar/39Ar and Rb-Sr ages of synkinematic white micas provide insights in the thrust propagation in the Western Alps. We analyzed six mylonitic rocks from the Alpine External Crystalline ranges Massifs (ECM), specifically three from the Mont-Blanc shear zone, two from the base of the Helvetic nappes, two from the Synclinal Median in Belledonne, and one from the Grand Chatelard thrust east of Belledonne. 40Ar/39Ar dating in the three samples from the Mont-Blanc shear zone range from 14.9±1.0 to 17.0±1.1 Ma. The sample from the Helvetic nappes above the Mont-Blanc yields an age of 13.0±0.7 Ma, while the sample from the Roselette klippe, west of the Mont-Blanc shear zone and also attributed to the Helvetic nappes yields an age of 16.3±3.1 Ma. The two samples from the Synclinal median provide 40Ar/39Ar ages of 14.8 ± 0.1 Ma and 17.7 ± 0.1 Ma. At the Grand Châtelard Thrust, 40Ar/39Ar ages show a peak at 36.2 ± 0.5 Ma, interpreted as the main deformation age, while the younger Rb–Sr age of 12.1 ± 2.6 Ma on the same sample is interpreted as recording fluid/ rock interactions. We discuss these ages with respect to the mylonites petro-structural analysis: the ages from synclinal median show that thrusting atop that structure was coeval with thrusting along the Mont-Blanc shear zone, suggesting they could be a continuous structure. That thrust system offset the base of the Helvetic nappes, but the nappes yield similar ages. These data are compatible with a model of duplex for the Mont-Blanc and possibly for Belledonne. Age on the Grand-Chatelard confirms that internal thrusts are older, whilst they may have been re-activated later.

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