The Gruf Complex is a ~12 x 10 km migmatitic body located in the Central Alps (see Fig. 1), in which residual granulites are observed. These granulites recorded ultra-high temperature (UHT) conditions, i.e. $T > 900 \, ^\circ\text{C}$ at $P \approx 8-10 \, \text{kbar}$ and are the result of crustal anatexis.

**GOAL: determine the age of anatexis.**

We combine Lu-Hf garnet dating with petrological and geochemical analyses to infer the age of the anatectic event that produced the residual UHT granulites.
Two types of granulites have garnet cores that contain primary clusters of melt inclusions (MI).

MI are glassy or polycrystalline (nanogranitoids).

Glassy MI and experimentally re-melted nanogranitoids display peraluminous rhyolitic compositions typical of anatectic melts.

incongruent melting of crustal protolith

© Gianola, Cesare, Bartoli, Ferri, Anczkiewicz. All right reserved.
GARNET CHEMISTRY & AGE

Fig.5: Garnet zoning in Type A and Type C granulites.

Fig.6: Lu-Hf dating of the UHT granulites.

- Garnets are almost pure almandine-pyrope solid solutions.
- Garnet cores are enriched in Lu and Hf compared to rims.
- Lu-Hf isochrons for both types of granulites suggest that garnets formed at ca. 41 ± 4 Ma.
CONCLUSIONS

- MI indicate that garnets grew in the presence of melt and are therefore peritectic.
- The partial melting event that formed the residual granulites occurred ca. 41 ± 4 Ma.
- Lu-Hf ages for the UHT granulites are similar to those found in the eclogites of the adjacent Adula Nappe (see Fig. 7).
- Consequently, crustal anatexis in the Gruf Complex is related to the Alpine collision.

Fig. 7: Garnet Lu-Hf ages in the Central Alps.