

### ***Carbonate U-Pb dating by LA-ICPMS***

Ten thin sections were analysed in one U-Pb LA-ICPMS analytical session at the Goethe University of Frankfurt (Germany) following the methods described by Gerdes and Zeh (2006, 2009). A Thermo Scientific Element XR sector field ICP-MS was coupled to a RESOLUTION 193 nm ArF Excimer laser (Compex Pro 102, Coherent) equipped with an S-155 two-volume ablation cell (Laurin Technic, Australia). Thin sections were ablated in a helium atmosphere (300 ml/min) and mixed in the ablation funnel with argon (1 L/min) and nitrogen (6-8 ml/min). Analyses were performed with squared ablation spots with side of 213  $\mu\text{m}$ , 8 Hz frequency and fluence of about 2  $\text{J}/\text{cm}^2$ .

Fractionation of  $^{206}\text{Pb}/^{238}\text{U}$ ,  $^{207}\text{Pb}/^{206}\text{Pb}$  ratios and their drift were corrected based on repeated analyses of soda-lime glass NIST-SRM 614. WC-1 calcite RM (Roberts et al., 2017) was used to correct for matrix offset (5 %) between NIST glass and carbonate.

The carbonate phases analyzed were Cal1, Cal2 and Dol1. Dating was unsuccessful due to the high common lead and low uranium contents of these phases.

### ***References***

Gerdes, A. and Zeh, A. (2006). Combined U-Pb and Hf isotope LA-(MC-) ICP-MS analyses of detrital zircons: comparison with SHRIMP and new constraints for the provenance and age of an Armorican metasediment in Central Germany. *Earth Planet. Sci. Lett.*, 249, 47–61.

Gerdes, A. and Zeh, A. (2009) Zircon formation versus zircon alteration-new insights from combined U-Pb and Lu-Hf in situ LA-ICP-MS analyses, and consequences for the interpretation of Archean zircon from the Central Zone of the Limpopo Belt. *Chem. Geol.*, 261(3–4), 230–243.

Roberts, N. M., Rasbury, E. T., Parrish, R. R., Smith, C. J., Horstwood, M. S., & Condon, D. J. (2017). A calcite reference material for LA- ICP- MS U- Pb geochronology. *Geochemistry, Geophysics, Geosystems*, *18*(7), 2807-2814.