32 mL min<sup>-1</sup> He + 3 mL min<sup>-1</sup> O<sub>3</sub> programmable T oven  $[\beta, T(t)]$ traditional vacuum line quartz and CO, isotope analysis reactor with sample fraction mass (m)  $(G_0 \mu g C)$ fraction isotopes time  $(\delta^{13}C_a, Fm_a)$ Cu. Pt. Ni switchable catalyst constant T cryogenic traps oven (800 °C) in-line infrared CO2 analyser water trap (µg C s-1)

time