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Rock cooling history using thermoluminescence of natural radiation dosimeter

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Recently, optical luminescences from quartz and feldspar have been proposed to have great potential in low temperature thermochronology (<100°C). The present study aims to explore thermoluminescence (TL) of feldspar to determine cooling history of rock. The advantage of thermoluminescence over optical luminesce is single TL glow curve has different thermal and athermal stability at different temperature of the glow curve, which can be determined by computerized glow curve deconvolution (CGCD) method and estimation of rate of anomalous fading in the laboratory. The rock samples were collected from Alex Knob of Franz Josef glacier, New Zealand, which is expected to be one of the rapidly exhuming settings in Southern Alps. The natural luminescence levels, which are in the dynamic equilibrium because of competition between growth due to ambient radioactivity and decay due thermal and athermal loss, are determined using multiple aliquot regeneration (MAR) protocol. Multiple thermal signals with wide range of thermal stability, extracted from composite glow curve, particularly low temperature part which is more sensitive to ambient temperature, is promising for better constraint on late stage cooling history.