Luminescence characteristics of quartz from Hsuehshan Range (Central Taiwan) and implications for thermochronometry

The mountain building processes in Taiwan are currently among the most rapid in the world. However, the spatial and temporal dynamics of this orogen are still poorly resolved within the <0.5 Ma timescale, reflecting methodological gaps in addressing young and rapid bedrock cooling by erosion. Optically Stimulated Luminescence (OSL) from quartz is an emerging thermochronometer that could potentially provide valuable low-temperature markers on a ~0.1 Ma timescale. Here we study four meta-sandstone samples from the Hsuehshan Range in central Taiwan. We characterize the OSL from these samples in terms of feldspar contamination, saturation dose, signal components, and thermal stability. We conclude that the OSL is dominated by the fast component, and is therefore amenable to dose measurement using the SAR protocol. Based on the luminescence characteristics and ambient dose rate, we suggest that these samples may be valuable for evaluating recent cooling rates exceeding 360 ± 100 C/Ma, in places where the alternative thermal scenarios (instantaneous cooling or prolonged isothermal storage) may be ruled out by external geological constraints.

General information
Publication status: Published
Organisations: Center for Nuclear Technologies, Radiation Physics, National Taiwan University, Swiss Federal Institute of Technology Zurich, Aarhus University
Contributors: Wu, T., Jain, M., Guralnik, B., Murray, A. S., Chen, Y.
Pages: 104–109
Publication date: 2015
Peer-reviewed: Yes

Publication information
Journal: Radiation Measurements
Volume: 81
ISSN (Print): 1350-4487
Ratings:
BFI (2015): BFI-level 1
Scopus rating (2015): CiteScore 1.26 SJR 0.639 SNIP 1.145
Web of Science (2015): Impact factor 1.071
Web of Science (2015): Indexed yes
Original language: English
Keywords: Fast component, Kinetic parameters, Luminescence, OSL-Thermochronemetry, Quartz, Taiwan, Cooling, Temperature, Isothermal storage, Luminescence characteristics, Mountain building, Optically stimulated luminescence, Signal components
DOIs:
10.1016/j.radmeas.2015.03.002
Source: FindIt
Source ID: 274438712
Research output: Contribution to journal › Conference article – Annual report year: 2015 › Research › peer-review