Two-dimensional chronostatigraphic modelling of OSL ages from recent beach-ridge deposits, SE Australia

Optically-stimulated luminescence (OSL) dating, in concert with two-dimensional ground-penetrating radar (GPR) profiling, has contributed to significant advances in our understanding of beach-ridge systems and other sedimentary landforms in various settings. For recent beach-ridges, the good OSL properties of coastal quartz permit a high sample throughput thanks to shorter measurement times and simpler sample preparation prompting the collection of more samples at higher sampling resolution. However, sampling at high resolution increases the chance of age inversions because random errors between samples may be larger than the difference in sample ages. Age inversions can be avoided, however, if the stratigraphic constraints are included in the age estimation process. Here, we create a custom Bayesian chronological model for a recent (< 500 yr) beach-ridge sequence in Moruya, southeast Australia, for direct comparison with a GPR profile. The model includes a full 'burial-dose model' for each sample and a dose rate term with the modelled ages constrained by the vertical and shore-normal sample order. The modelled ages are visualized by plotting isochrones on the beach-ridge cross section, and validated against a beach monitoring dataset. The modelling approach allows a more detailed interpretation of the Moruya beach-ridge system; when combined with higher-resolution sampling, the approach will increase the precision of beach-ridge chronologies and provide further insights into their formative processes.

General information
State: Published
Organisations: Center for Nuclear Technologies, Radiation Physics, University of Wollongong, University of Tokyo
Contributors: Tamura, T., Cunningham, A. C., Oliver, T. S.
Pages: 39-44
Publication date: 2019
Peer-reviewed: Yes

Publication information
Journal: Quaternary Geochronology
Volume: 49
ISSN (Print): 1871-1014
Ratings:
BFI (2019): BFI-level 1
Web of Science (2019): Indexed yes
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 3.17 SJR 1.972 SNIP 1.287
Web of Science (2017): Impact factor 3.44
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 2.3 SJR 1.738 SNIP 0.984
Web of Science (2016): Impact factor 2.46
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): CiteScore 3.22 SJR 2.158 SNIP 1.367
Web of Science (2015): Impact factor 3.142
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): CiteScore 2.86 SJR 1.953 SNIP 1.218
Web of Science (2014): Impact factor 2.687
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 2.89 SJR 2.512 SNIP 1.344
Web of Science (2013): Impact factor 2.476
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): CiteScore 3.77 SJR 2.783 SNIP 1.856
Web of Science (2012): Impact factor 4.015