

Quartz OSL dating of late Holocene beach ridges from the Magdalen Islands (Quebec, Canada) - DTU Orbit (08/11/2017)

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Quartz optically stimulated luminescence (OSL) dating has been applied to sandy beach ridge systems from the Magdalen Islands in the center of the Gulf of St. Lawrence (Quebec, Canada) to provide the first chronological framework for these features. Nineteen beach ridges (22 samples) from four different sites throughout the archipelago were investigated. At one of the sites, samples were taken at 9 m and 7.5 m depth using a vibracore. The quartz is dominated by the fast OSL component and a single-aliquot regenerative-dose (SAR) protocol was used to measure the equivalent doses; a low preheat (180°C/ 10 s) was chosen to avoid the influence of thermal transfer. The average dose recovery ratio of all samples is 1.02 ± 0.02 ($n = 130$) suggesting that the SAR protocol works satisfactorily on this material. The OSL ages are internally consistent and supported by independent age control (radiocarbon). The OSL ages indicate that the ridges were built between 2.6 ± 0.2 ka and 0.40 ± 0.10 ka, i.e. during a period of sea level rise. This rise eroded adjacent sandstone cliffs, which contributed a significant sediment supply to the littoral drift and beaches. Some low-lying coasts in the archipelago are still prograding, despite a relative sea level increase of ~ 1.6 mm/a over the last 600 years. The late Holocene ages obtained in this study indicate that these processes have been active for at least the past two thousand years. This study demonstrates for the first time that OSL dating using quartz has great potential in this area, and is an appropriate method for establishing precise chronologies for coastal sediments in this region of the Gulf of St. Lawrence. © 2015 Elsevier B.V. All rights reserved.

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