Geophysical Research Abstracts
Vol. 17, EGU2015-14367, 2015
EGU General Assembly 2015
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Observations of historical sea cliff retreat rates exceed long-term estimates derived from cosmogenic ^{10}Be

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Historical observation of coastal retreat are limited to relatively short timescales (< 150 years), during which time humans may have modified the coastal environment. There is growing concern that rates of coastal change may be accelerated in the face of anticipated stormier climates and rising sea level, yet there is little knowledge of rates of coastal change prior to the relatively brief historical records. In order to make predictions about potential future coastal change it is important to establish baseline conditions averaged over longer time periods. Here we present analysis of sea cliff retreat throughout the Holocene averaged for chalk cliffs in south-east England using cosmogenic isotopes. We determine long-term rates of sea cliff erosion from ^{10}Be measured from *in-situ* flint samples collected from three transects across coastal platforms in East Sussex. A numerical model of ^{10}Be accumulation on an evolving coastal profile allows estimation of cliff retreat rate during the Holocene. The model accounts for variation in ^{10}Be accumulation with tides and sea-level rise, and takes into account platform downwear and topographic shielding by adjacent cliffs. We find that cliff retreat rates during the Holocene were significantly slower (2-6 cm yr^{-1}) than those derived from recent historical observations (15-25 cm yr^{-1}). Modelled accumulation of ^{10}Be requires retreat rates that increase rapidly in recent times, potentially reflecting human modification of the coastal sediment budget through construction of sea defences, flood defenses and aggregate extraction. Therefore knowledge of past human activity at the coastline may be important in anticipating future rates of coastal retreat.