Variations of Regional Erosion Rates Since LGM Mapped Through Time and Space

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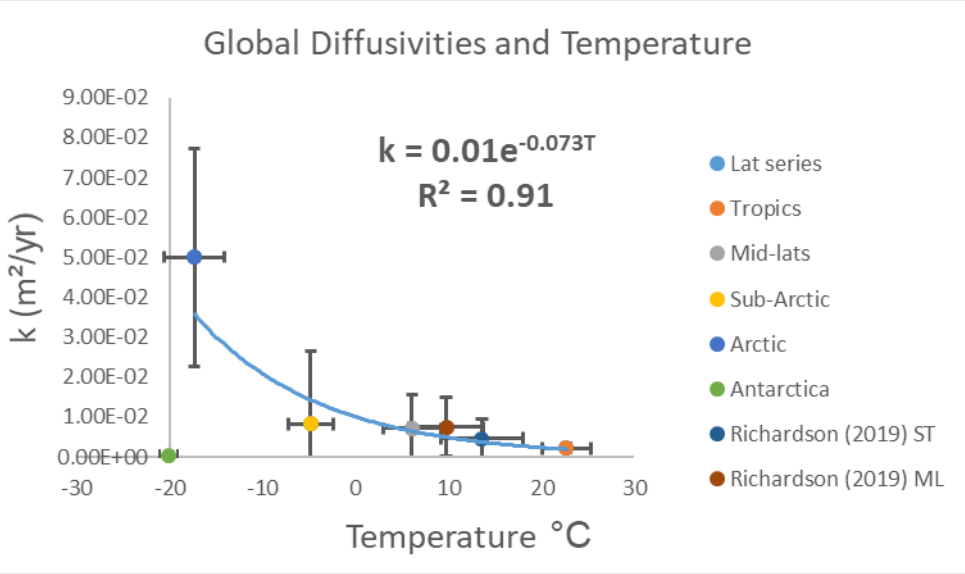
Fig. 1 Air Temperature and Diffusivity Transfer Function: based on observed measures from Tropic to Arctic latitudes



Preview: Spatial relationships of erosion with climate are of global and scientific importance. Currently, study is limited spatially, study is focused on million-year time scales, or erosion rates are considered constant through time. We aim to fill this gap by mapping erosion rates for all land areas for the past 21 ka while varying erosion with varying climate to make comparisons of regional changes since the LGM.

Methods Overview: generate transfer function and apply space-for-time substitution to time-slices; derive past regional erosion; validate results with sediment core accumulation rates.

Objective of Study: to map the erosion rates through time for all land areas for the past 21 ka and assess regional and temporal comparisons.

Highlights

- Time-varying erosion for 21 ka
- All land areas compared through time
- 500-year temporal resolution
- Arctic, sub-Arctic regions exhibit higher variability through time than Tropics and mid-latitude regions.

Fig. 2 Long-term Average Erosion with Time-varying Diffusivity

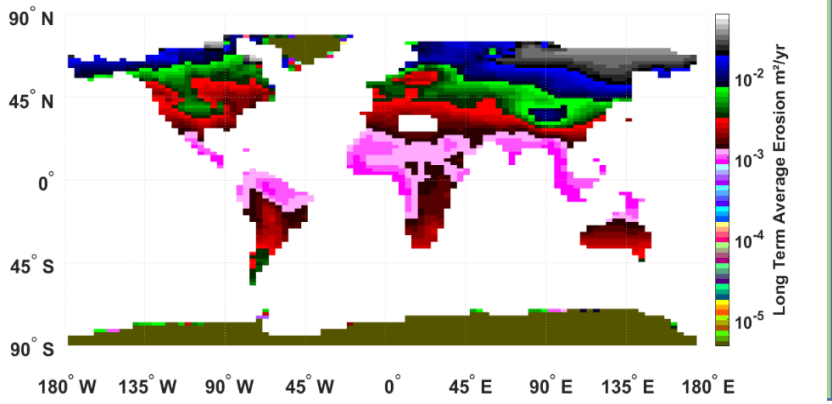


Fig. 3. Selected examples from offshore sediment core records show modeled source rates supported by accumulation rates in neighboring sink areas.

Tropics: - Amazon and Ganges drainages (model) and offshore sediment cores

Model Core

Eastern Arctic: NE, NW Siberia – Lena and Yenisei drainages (model) and offshore Laptev, Kara Seas (cores)