Mineral sorting within depositional environments: a detrital petrographic study of alluvial to marine systems in the Kennebec and Penobscot drainages, Maine USA

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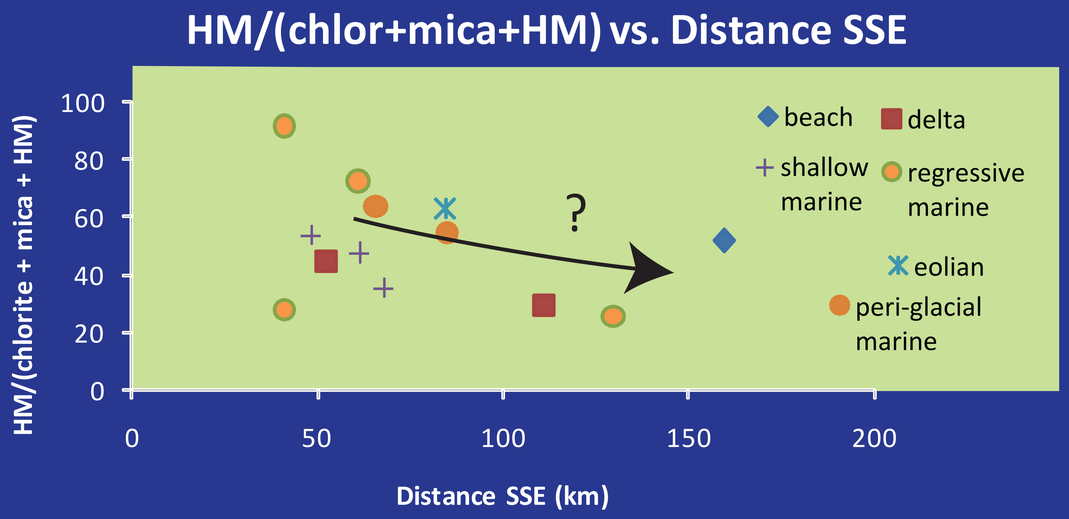
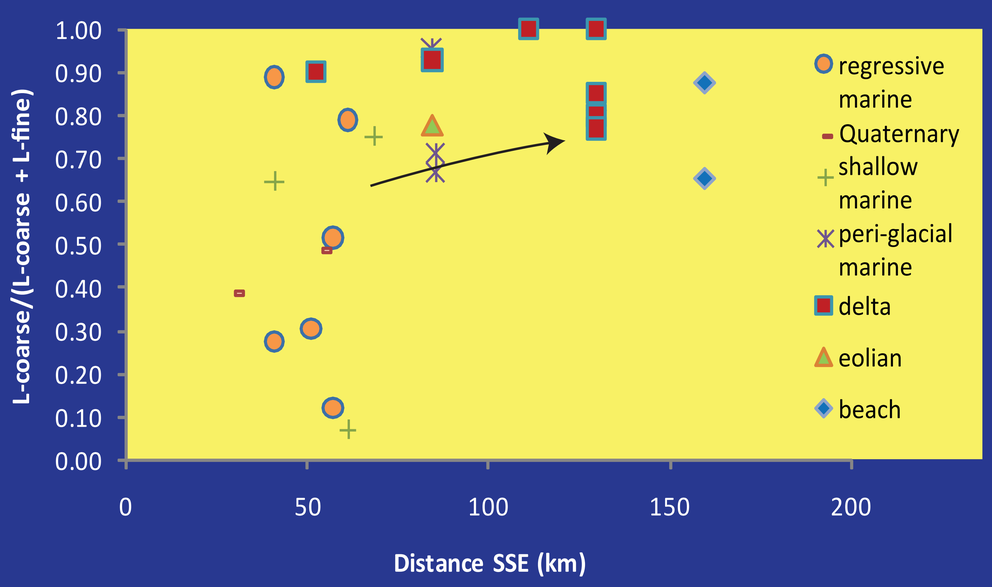
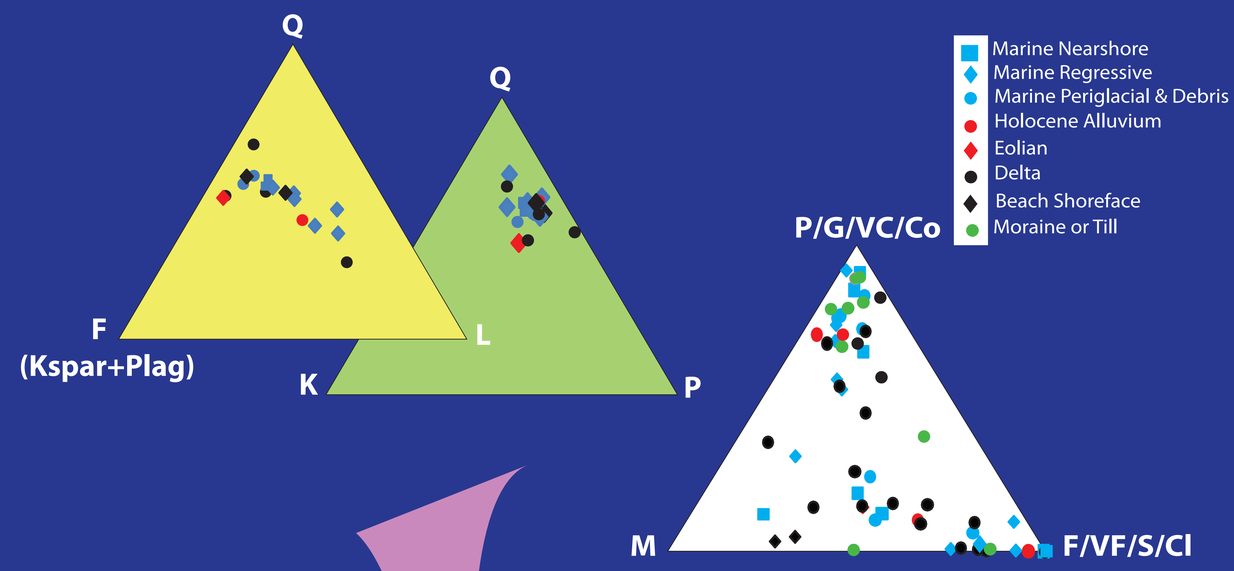
Numerous workers have considered the mechanics of grain transport, sorting, and grain-shape modification: smaller and/or less dense grains are likely to concentrate in lower energy environments than larger and/or more dense grains. While the mechanics of transport and sorting are increasingly understood, few actualistic studies have been carried out that isolate the effect of sorting within depositional environments on mineral assemblages.

RESEARCH QUESTION

How will mechanical sorting of minerals during transport be reflected in sandstone mineral composition in the absence of significant chemical alteration prior to and after transport?







- (Our current, working hypothesis):
Ratio of high-density minerals (HM) to (mica + chlorite + HM) appears to decrease with increasing transport distance within the same depositional environment.

- Very fine-grained lithic fragments (volcanic and fine-grained metamorphic) significantly diminish in abundance downstream, despite that downstream areas are rich in fine-grained bedrock.
⇒ Fine-grained rock fragments derived from upland areas are depleted during transport.

- Quartz/Kspar/Plag and Quartz/Feldspar/Rock fragment ratios show little appreciable variation over a range of transport distances (<150 km) and depositional environments.