Title:

Tomographic and morphometric analysis of shallow sediments: Pamplona Zone, Gulf of Alaska

Abstract:

Convergence and shallow subduction of the Yakutat microplate beneath North America has shaped the Pamplona zone fold and thrust belt in the northeastern Alaska subduction zone. Here, convergent tectonics and glaciomarine sedimentary processes have created patterns of deformation and deposition recorded by a shallow sedimentary sequence with varying fluid pressure, compaction, and fault activity. If the record of ice sheet advance is preserved on the seafloor and in the underlying sediments then bathymetric evidence of glaciomarine processes should overlap with evidence of overpressure, such as low velocity zones in the shallow sediments.

In this study, we present a velocity model through the Bering trough as well as regional drainage shape characteristics. We use streamer tomography on a seismic survey from the St. Elias Erosion and Tectonics Project (STEEP) to determine a velocity model. We further inform our interpretation using physical properties relationships developed with data from core samples (IODP Expedition 341) taken near the seismic line. To document drainage morphology, we use smooth sheet bathymetry to identify a drainage network and query profile shapes at well distributed locations; where profile shape is determined by fit with a power function. Initial results suggest overlap between u-shaped drainage profiles towards the SE end of the Bering trough and low-velocity shallow sediments NE of the shelf break. In part, because this overlap occurs within the mapped extent of the last glacial maximum, we find our tomography results consistent with buildup of overpressure due to glacially driven loading of highly saturated sediments.

Keywords:

Bathymetry, tomography, overpressure, glaciomarine

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