

Gabrielle VANCE , Wes WALLACE, 2013. The influence of climate and tectonics on topography in the Hayes Range, Alaska. *Acta Geologica Sinica* (English Edition), 87(supp.): 390-390

The influence of climate and tectonics on topography in the Hayes Range, Alaska

Gabrielle VANCE , Wes WALLACE

University of Alaska Fairbanks, USA

Complex feedback exists among climate, tectonics, and glacial erosion in the creation of topography: climate influences glaciation; tectonics and glacial erosion modify topography; topography influences climate. Tectonically active, glaciated mountain ranges like those in southern Alaska illustrate this complex feedback system particularly well. The high topography of the Denali massif in the western Alaska Range has been studied to some extent, but much less is known about that of the Hayes Range to the east. The main objectives of this study are to determine mean elevation distribution in the Hayes Range and identify evidence for structural, lithological, and/or erosional controls. We have used geospatial information systems (GIS) software to map mean elevation, calculate geomorphic indices from a digital elevation model (DEM), and characterize climatic/glacial, tectonic, and topographic patterns. The focus of the study is on the northern Alaska

Range between the Wood and Delta Rivers. Deformation, elevation, and erosion all increase southward into the range. In the northern part of the range, recently recognized Quaternary deformation is clearly defined by a geomorphic surface that is uplifted and deformed by doubly plunging anticlines and thrust faults. Elliptical topographic highs are clearly tectonically controlled here, where fluvial erosion dominates. Similar but larger elliptical topographic highs are present farther into the range to the south, but Quaternary structures are more difficult to identify because of greater glaciation and erosion. General patterns include correspondence between mean elevation and regional equilibrium line altitude of glaciers (ELA) and potential coupling of precipitation and variability in topographic relief and slope.

* Corresponding author. E-mail: gtvance@alaska.edu