DENALI FAULT GEOLOGIC RELATIONS AT GUNSIGHT PASS, DENALI NATIONAL PARK, ALASKA

Geological Society of America, Abstracts with Programs, 2003, vol. .35, no. 6, p. 561

FORD, Arthur B., Menlo Park, CA (abford@aol.com), CSEJTEY, Bela, Palo Alto, CA, and WRUCKE, Chester T., Portola Valley, CA

The Denali fault (DF) of the central Alaska Range has been mapped by others as a dextral transcurrent fault from the area of Nov. 2002 M~8 seismic events westward across Gunsight Pass and ~800 km beyond to the Bering Sea, with offset estimates as much as 400 km. The previously proposed dislocation of a granodioritic body along DF near Gunsight Pass to form two discrete 38-Ma-dated bodies is widely cited to show >40-km post-Oligocene dextral offset. Our 1997 study of the well-exposed relations at the pass clearly show an intrusive relation between the granodiorite and metasedimentary rocks we correlate with the unit DOs of Csejtey and others (1992). Steep striae of a nearby shear zone only relate to nontranscurrent movements, such as by Alaska Range uplift.

New major- and trace-element studies show that the two granodioritic bodies are two discrete intrusions we call McGonagall and Foraker plutons (MP, FP), rather than a single disrupted body. In major elements, FP is more silicic and distinctly more potassic than MP (SiO2- FP, 71%, MP, 67%; alkali index- FP, 42, MP, 36). Trace elements show stronger differences and multielement plots suggest variations in tectonic setting or fractionation history: Nb (FP, 13 ppm; MP, 7 ppm); Rb (FP, 155 ppm; MP, 48 ppm); Sr (FP, 77 ppm; MP, 522 ppm); K/Ba (FP, 77; MP, 22). MP shows greater light REE-enrichment than FP (La/Yb, respectively, 15 and 10), with positive Eu anomaly (avg. Eu/Eu* = 1.62) compared to strongly negative ones for FP (avg. Eu/Eu* = 0.44). Such differences show that MP and FP are different intrusions though coeval.

The DF does not cross Gunsight Pass as a dextral transcurrent fault as mapped by others. Instead, if the fault continues westward from areas of the Nov. 2002 events it changes character from dextral transform to dominantly dip-slip just west of the westernmost epicenter.