

UNITED STATES DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY

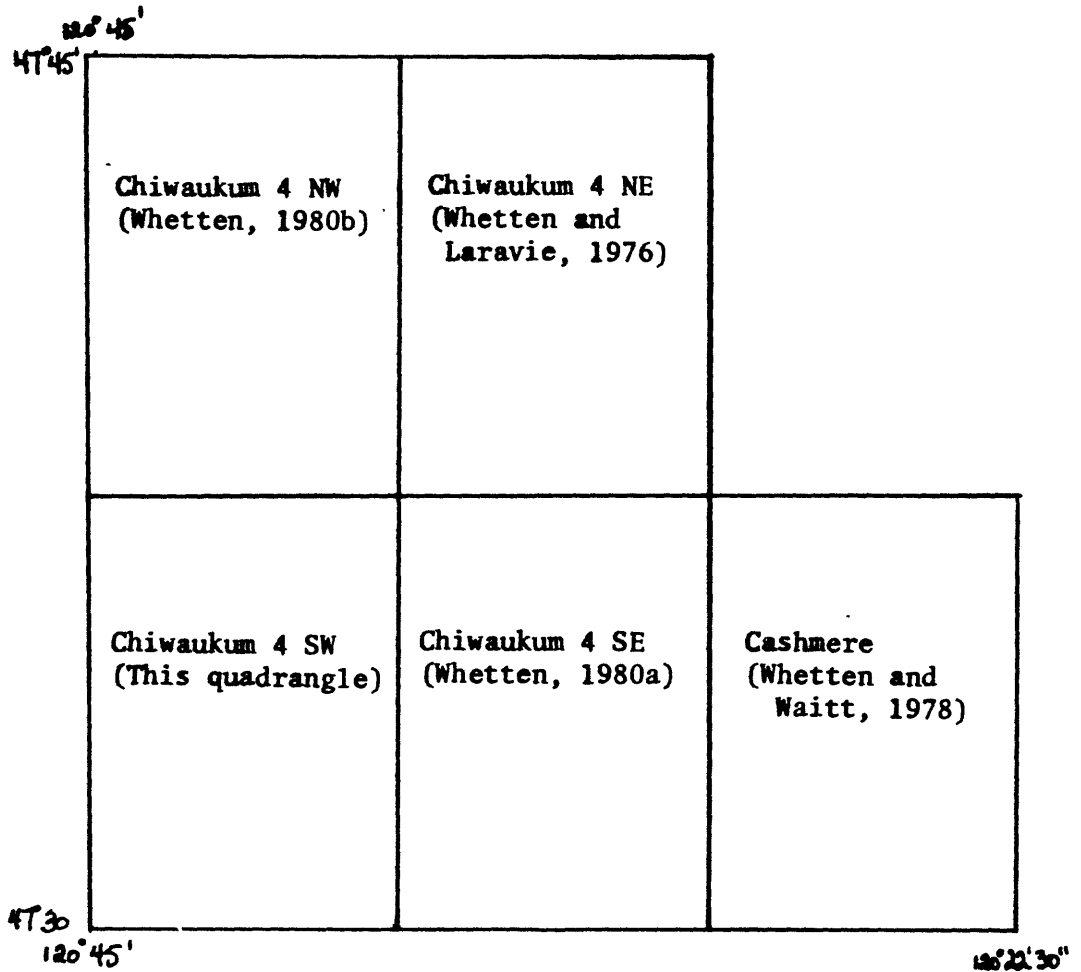
PRELIMINARY BEDROCK GEOLOGIC MAP  
OF THE EAST HALF OF THE CHIWAUKIM 4 SW QUADRANGLE  
CHIWAUKIM GRABEN, WASHINGTON

By

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Open-File Report 80-616

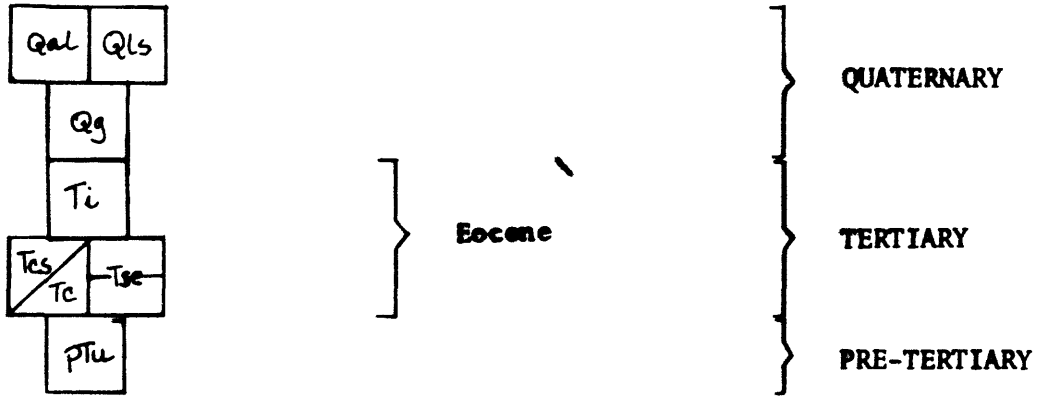
This report is preliminary and  
has not been reviewed or edited  
for conformity with Geological  
Survey standards or nomenclature



**INDEX TO GEOLOGIC MAPPING**

Geologic mapping available on a scale of 1:24,000 in the Chiwaukum graben, Chelan County, Washington.

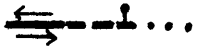
**CORRELATION OF MAP UNITS**



## DESCRIPTION OF MAP UNITS

- Qal ALLUVIUM - Gravel, sand, and silt in channels and underlying floodplains of the Wenatchee River and tributaries. Unit also includes colluvium near valley margins.
- Qls LANDSLIDE DEPOSITS - Locally derived materials downslope from source-area scar. Arrow indicates general direction of movement.
- Qg GLACIAL DEPOSIT - Mostly bouldery deposit occurring on Wenatchee River floodplain and on hillslope east of Icicle Creek. Angular to rounded boulders consist mostly of granodiorite, and are up to several m in maximum diameter. Unit east of Icicle Creek is a succession of moraines deposited by the Icicle Creek glacier (Page, 1939).
- Ti INTRUSIVE ROCK - Commonly basalt or basaltic andesite.
- Tcs CONGLOMERATIC SANDSTONE - Main part of the Chumstick Formation of Gresens and others (in press), composed of thick-bedded, light colored sandstone beds, commonly channeled and cross-bedded with minor shale. Pebbles of dacite, schist, gneiss, and rhyolite commonly occur near base of beds. Unit is thousands of meters thick.
- Tse TUFFACEOUS SANDSTONE - Mappable bed occurring within unit Tcs, up to three m thick. Zeolitized to clinoptilote, which causes the bed to weather in thin slabs. Unit indicated by a single line on the map.
- Tc CONGLOMERATE - Boulders, cobbles, and pebbles interbedded with sandstone. Unit trends parallel with Leavenworth fault and also occurs along fault in Icicle Creek. Clasts consist of unit pTu, including schist, granodiorite, and quartz, with minor amounts of volcanic and gneiss pebbles such as are found in unit Tcs. Unit probably deposited by streams and debris flows on fans grading eastward from a highland west of the faults. Contact is gradational between units Tc and Tcs.
- pTu PRE-TERTIARY ROCKS, UNDIFFERENTIATED - Includes schist, granodiorite, quartz diorite, and serpentinite, and occurs on the west side of the Leavenworth fault.

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Contact - Dashed where inferred; dotted where concealed. Thin tuffaceous sandstone and tuff beds are shown by a single line



Fault - Dashed where inferred; dotted where concealed.  
Ball and bar on downthrown side; arrows indicate  
inferred direction of movement on postulated  
strike-slip fault



Anticline - Showing crestline; dashed where approx-  
imately located, dotted where concealed



Syncline - Showing troughline; dashed where approx-  
imately located, dotted where concealed



Strike and dip of beds



Vertical beds



Strike and dip of foliation in metamorphic rocks

## SELECTED REFERENCES

- Frizzell, V. A., Jr., 1979, Petrology and stratigraphy of Paleogene nonmarine sandstones, Cascade Range, Washington: Stanford University, Ph.D. thesis, 151 p.
- Frizzell, V. A., Jr., 1979, Petrology of Paleogene nonmarine sandstone units in Washington: in Armentrout, J. M., Cole, M. R., and TerBest, H. (eds.), Cenozoic Paleogeography of the Western United States, Pacific Coast Paleogeography Symposium 3: Society of Economic Paleontologists and Mineralogists, Los Angeles, California, p. 113-118.
- Gresens, R. L., Whetten, J. T., Tabor, R. W., and Frizzell, V. A., Jr., 1977, Tertiary Stratigraphy of the central Cascade Mountains, Washington State: Geological Society of America Guidebook for 1977 Annual Meeting, Seattle, Washington, p. 84-126.
- Gresens, R. L., Naeser, C. W., and Whetten, J. T., in press, Stratigraphy and age of the Chumstick and Wenatchee Formations: Tertiary fluvial and lacustrine rocks, Chiwaukum graben, Washington: Geological Society of America Bulletin.
- Page, B. M., 1939, Geology of a part of the Chiwaukum quadrangle, Washington: Stanford University, Ph.D. thesis, 203 p.
- Page, B. M., 1940, Geology of a part of the Chiwaukum quadrangle, Washington: Stanford University Dissertation Abstracts, vol. 15, p. 118.
- Whetten, J. T., 1980a, Preliminary geologic map of the Chiwaukum 4 SE quadrangle, Chiwaukum graben, Washington: U.S. Geological Survey Open-File map, in press, scale 1:24,000.
- Whetten, J. T., 1980b, Preliminary geologic map of the Chiwaukum 4 NW quadrangle, Chiwaukum graben, Washington: U.S. Geological Survey Open-File map 80-456, scale 1:24,000.
- Whetten, J. T., and Laravie, J. A., 1976, Preliminary geologic map of the Chiwaukum 4 NE quadrangle, Chiwaukum graben, Washington: U.S. Geological Survey Miscellaneous Field Studies Map MF-794, scale 1:24,000.
- Whetten, J. T., and Waitt, R. R., Jr., 1978, Preliminary geologic map of the Cashmere quadrangle, Chiwaukum lowland, Washington: U.S. Geological Survey Miscellaneous Field Studies Map MF-908, scale 1:24,000.
- Willis, C. L., 1953, The Chiwaukum graben, a major structure of central Washington: American Journal of Science, vol. 251, p. 789-797.