

Whole-rock major- and trace-element geochemical data for
basaltic rocks in the St. George 30' x 60' quadrangle and adjacent
areas, Washington, Iron, and Kane Counties, Utah

by

Robert F. Biek and J. Buck Ehler

2007

Utah Geological Survey Open-File Report 500

Utah Geological Survey
A division of
Utah Department of Natural Resources

Bibliographic citation for this data report:

Biek, R.F., and Ehler, J. Buck, 2007, Whole-rock major- and trace-element geochemical data for basaltic rocks in the St. George 30' x 60' quadrangle and adjacent areas, Washington, Iron, and Kane Counties, Utah: Utah Geological Survey Open-File Report 500, variously paginated, 1 plate, scale 1:100,000.

This Open-File Report makes available raw analytical data from laboratory procedures completed to determine the geochemistry of rock samples collected in support of geologic mapping partially supported by the Utah Geological Survey (UGS). The samples were collected by various geologists over the period from 1992 to 2006. The latitude and longitude of early samples were determined in the field from 1:24,000-scale topographic maps, but most sample locations were obtained from hand-held GPS units. When the coordinate system and datum were known, the location data was projected from that system to NAD27 UTM zone 12. All other data was assumed to be in GCS NAD27 and was then projected to NAD27 UTM zone 12.

Additional information about these samples is available in the references listed below. These data were prepared by ALS Chemex Labs, Inc., Sparks, Nevada, and other labs, under contract to the UGS. These data are highly technical in nature and proper interpretation requires considerable training in applicable geochemical techniques.

Additional geochemical data for these basaltic rocks is available in Embree (1970), Best and Brimhall (1970, 1974), Louder (1973), Leeman (1974), Hausel and Nash (1977), Best and others (1980), Sanchez (1995), Nelson and Tingey (1997), and Faust (2005); only the latter three papers provide latitude and longitude of samples analyzed.

Disclaimer

This Open-File release is intended as a data repository for technical analytical information gathered in support of geologic mapping in southwest Utah. These data may not conform to UGS technical or editorial standards. Therefore, it may be premature for an individual or group to take actions based on the contents of this report.

Geologic mapping of the St. George 30' x 60' quadrangle was funded by the Utah Geological Survey and the U.S. Geological Survey, National Cooperative Geologic Mapping Program through USGS STATEMAP award number 05HQAG0084. The views and conclusions contained in this document are those of the author and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. Government.

Although this product represents the work of professional scientists, the Utah Department of Natural Resources, Utah Geological Survey, makes no warranty, expressed or implied, regarding its suitability for a particular use. The Utah Department of Natural Resources, Utah Geological Survey, shall not be liable under any circumstances for any direct, indirect, special, incidental, or consequential damages with respect to claims by users of this product.

References to geologic reports that cite or explain samples analyzed in this report

Biek, R.F., 2003a, Geologic map of the Harrisburg Junction quadrangle, Washington County, Utah: Utah Geological Survey Map 191, 42 p., 2 plates, scale 1:24,000.

- 2003b, Geologic map of the Hurricane quadrangle, Washington County, Utah: Utah Geological Survey Map 187, 61 p., 2 plates, scale 1:24,000.
- 2007a, Geologic map of the Kolob Reservoir quadrangle, Washington and Iron Counties, Utah: Utah Geological Survey Map 220, 2 plates, scale 1:24,000.
- 2007b, Geologic map of the Kolob Arch quadrangle, Washington and Iron Counties, Utah: Utah Geological Survey Map 217, 3 plates, scale 1:24,000.
- Biek, R.F., and Hylland, M.D., 2007, Geologic map of the Cogswell Point quadrangle, Washington, Kane, and Iron Counties, Utah: Utah Geological Survey Map 221, 2 plates, scale 1:24,000.
- Biek, R.F., Rowley, P.D., Hacker, D.B., Hayden, J.M., Willis, G.C., Hintze, L.F., Anderson, R.E., and Brown, K.D., 2007, Interim geologic map of the St. George 30' x 60' quadrangle and the east part of the Clover Mountain quadrangle, Washington, Kane, and Iron Counties, Utah: Utah Geological Survey Open-File Report 478, 2 plates, scale 1:100,000.
- Downing, R.F., 2000, Imaging the mantle in southwestern Utah using geochemistry and geographic information systems: Las Vegas, University of Nevada, M.S. thesis, 128 p.
- Hacker, D.B., in preparation, Geologic maps of the Central East, Grass Valley, Saddle Mountain, and Signal Peak quadrangles, Washington and Iron Counties, Utah: Utah Geological Survey Miscellaneous Publication, scale 1:24,000.
- Hayden, J.M., 2004a, Geologic map of Little Creek Mountain quadrangle, Washington County, Utah: Utah Geological Survey Map 204, 2 plates, scale 1:24,000.
- 2004b, Geologic map of The Divide quadrangle, Washington County, Utah: Utah Geological Survey Map 197, 32 p., 2 plates, scale 1:24,000.
- in preparation(a), Geologic map of the Veyo quadrangle, Washington County, Utah: Utah Geological Survey Map, 2 plates, scale 1:24,000.
- in preparation(b), Geologic map of the Virgin quadrangle, Washington County, Utah: Utah Geological Survey Map, 2 plates, scale 1:24,000.
- Higgins, J.M., and Willis, G.C., 1995, Interim geologic map of the St. George quadrangle, Washington County, Utah: Utah Geological Survey Open-File Report 323, 108 p., 2 plates, scale 1:24,000.
- Lund, W.R., Pearthree, P.A., Amoroso, Lee, Hozik, M.J., and Hatfield, S.C., 2001, Paleoseismic investigation of earthquake hazard and long-term movement history

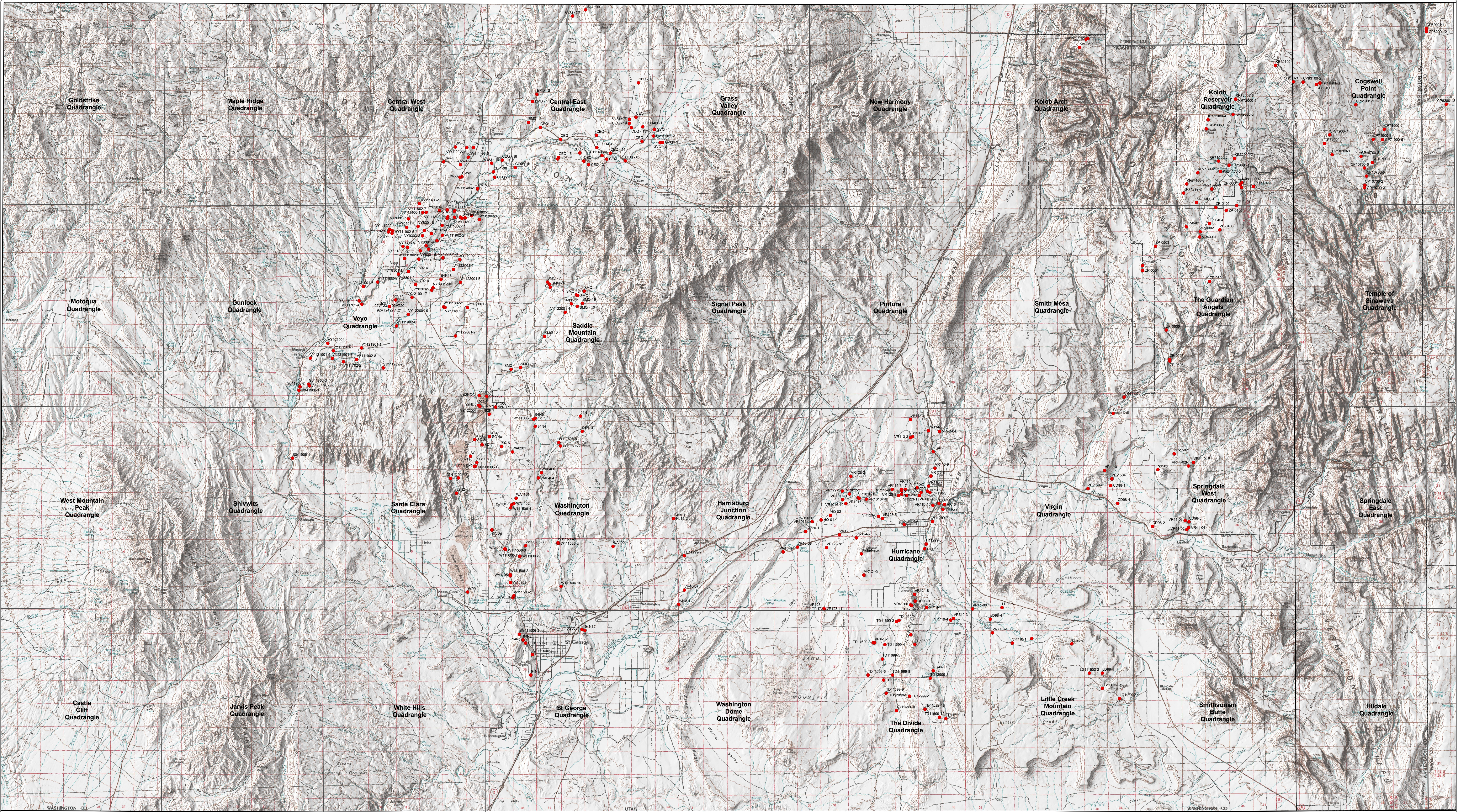
- of the Hurricane fault, southwestern Utah and northwestern Arizona – final technical report: National Earthquake Hazards Reduction Program, External Research, Program Element I, Panel NI, Award No. 99HQGR0026, 120 p.
- Willis, G.C., Doelling, H.H., Solomon, B.J., and Sable, E.G., 2002, Interim geologic map of the Springdale West quadrangle, Washington County, Utah: Utah Geological Survey Open-File Report 394, 19 p., scale 1:24,000.
- Willis, G.C., and Higgins, J.M., 1995, Interim geologic map of the Washington quadrangle, Washington County, Utah: Utah Geological Survey Open-File Report 324, 108 p., 2 plates, scale 1:24,000.
- 1996, Interim geologic map of the Santa Clara quadrangle, Washington County, Utah: Utah Geological Survey Open-File Report 339, 87 p., scale 1:24,000.
- Willis, G.C., and Hylland, M.D., 2002, Interim geologic map of The Guardian Angels quadrangle, Washington County, Utah: Utah Geological Survey Open-File Report 395, 27 p., scale 1:24,000.

Additional references

- Best, M.G., and Brimhall, W.H., 1970, Late Cenozoic basalt types in the western Grand Canyon region, *in* Hamblin, W.K., and Best, M.G., editors, The western Grand Canyon district: Utah Geological Society Guidebook to the Geology of Utah no. 23, p. 57-74.
- 1974, Late Cenozoic alkalic basaltic magmas in the western Colorado Plateaus and the Basin and Range transition zone, U.S.A., and their bearing on mantle dynamics: Geological Society of America Bulletin, v. 85, no. 11, p. 1677-1690.
- Best, M.G., McKee, E.H., and Damon, P.E., 1980, Space-time-composition patterns of late Cenozoic mafic volcanism, southwestern Utah and adjoining areas: American Journal of Science, v. 280, p. 1035-1050.
- Embree, G.L., 1970, Lateral and vertical variations in a Quaternary basalt flow – petrography and chemistry of the Gunlock flow, southwestern Utah: Provo, Utah, Brigham Young University Geology Studies, v. 17, part 1, p. 67-115.
- Faust, Matthew, 2005, Petrogenesis and geochemistry of Pleistocene and Pliocene basalt flows of the Pine Valley volcanic field, Utah and their relationship to the tectonics of the Utah transition zone: Las Vegas, University of Nevada, M.S. thesis, 116 p.
- Hausel, W.D., and Nash, W.P., 1977, Petrology of Tertiary and Quaternary volcanic rocks, Washington County, southwestern Utah: Geological Society of America Bulletin, v. 88, p. 1831-1842.

- Leeman, W.P., 1974, Late Cenozoic alkali-rich basalt from the Western Grand Canyon area, Utah and Arizona – isotopic composition of strontium: Geological Society of America Bulletin, v. 85, p. 1691-1696.
- Louder, G.G., 1973, Late Cenozoic transitional alkali olivine-tholeiitic basalt and andesite from the margin of the Great Basin, southwest Utah: Geological Society of America Bulletin, v. 84, p. 2293-3012.
- Nelson, S.T., and Tingey, D.G., 1997, Time-transgressive and extension-related basaltic volcanism in southwest Utah and vicinity: Geological Society of America Bulletin, v. 109, no. 10, p. 1249-1265.
- Sanchez, Alexander, 1995, Mafic volcanism in the Colorado Plateau/Basin-and-Range transition zone, Hurricane, Utah: Las Vegas, University of Nevada, M.S. thesis, 92 p., scale 1:52,000.

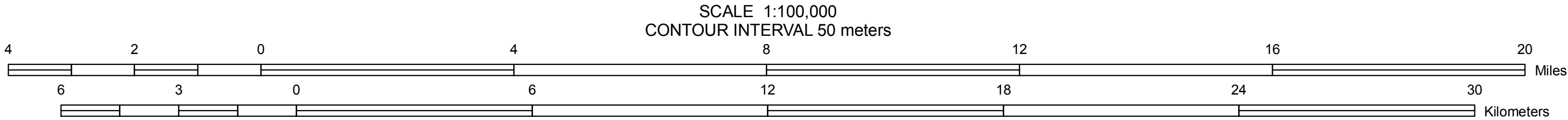
Basalt Sample Locations in the St. George - Zion Area 2007



Although this product represents the work of professional scientists, the Utah Department of Natural Resources, Utah Geological Survey, makes no warranty, expressed or implied, regarding its suitability for any particular use. The Utah Department of Natural Resources, Utah Geological Survey, shall not be liable under any circumstances for any direct, indirect, special, incidental, or consequential damages with respect to claims by users of this product.

For use at 1:100,000 scale only. The Utah Geological Survey (UGS) does not guarantee accuracy or completeness of data.

Persons or agencies using these data specifically agree not to misrepresent the data, nor to imply that changes they made were approved by the Utah Geological Survey, and should indicate the data source and any modifications they make on plots, digital copies, derivative products, and in metadata.



1. See text for information on additional geochemistry available for basaltic rocks in this area

www.geology.utah.gov

Base from USGS Kanab and St. George 30x60' quadrangles
Projection: UTM Zone 12 Units: Meters
Datum: NAD 1927 Spheroid: Clarke 1866

Compiled by Robert F. Biek
GIS data preparation by J. Buck Ehler

This map is a plot of Geographic Information System (GIS) files created to visually represent the content of the GIS data files. It is not a published map and it contains many features that do not meet UGS cartographic standards, such as automatically generated labels that may overlap other labels and lines.