



**Alan Gillespie**

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Major Interests: Quaternary geology, remote sensing  
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**University of Washington**  
Department of Earth and Space Sciences  
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**Education and Degrees:**

|              |            |                                    |      |   |
|--------------|------------|------------------------------------|------|---|
| <i>Ph.D.</i> | Geology    | California Institute of Technology | 1982 | <i>Quaternary Glaciation and Tectonism in the Southeastern Sierra Nevada, Inyo County, California.</i> Caltech, Pasadena, CA. Advisor: Clarence R. Allen. |
| <i>M.S.</i>  | Geology    | California Institute of Technology | 1977 |   |
| <i>B.S.</i>  | Geophysics | Stanford University                | 1969 |   |

**Professional Experience:**

|               |  |
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| 1987- present | <u>Professor</u> and <u>Director</u> , Keck Remote Sensing Lab, Dept. Earth & Space Sci., University of Washington, Seattle, WA. |
| 1999-2000     | <u>Interim Executive Director</u> , Division of Earth & Ecological Sci., Desert Research Institute, Reno, NV.                    |
| 1975-1979     | <u>Vice President</u> , GeoImages, Inc., Altadena, CA.   |
| 1974-1975     | <u>Software Consultant</u> , Rand Corporation, Santa Monica, CA.   |
| 1969-1987     | <u>Member, Tech. Staff</u> , Image Processing Lab, Geology Group Jet Propulsion Laboratory, Pasadena, CA.                        |

**Honors and Awards:**

- NASA Group Achievement Award, 2000, ASTER Science Team.
- NASA Group Achievement Award, 1975, ERTS geological analysis & image processing team.
- Editor's Citation, 1985, *Geophysical Research Letters*, excellence in reviews.
- Editor's Citation, 1990, *Journal of Geophysical Research*, excellence in reviews.
- Distinguished Visiting Scientist, Jet Propulsion Lab., 9/1/97-8/30/1999.

**Professional Societies:**

- American Geophysical Union
- Geological Society of America
- American Quaternary Association
- American Epigraphic Society

**Service (selected):**

- Councilor, American Quaternary Association, 2002-present
- Vice Chair, GSA Quaternary Geology & Geomorphology Division, 2002-2004
- Editor, *Quaternary Research*, 2000-2006 (Assoc. Editor, 1996-2000)
- Guest Editor, *First JPL Workshop on Remote Sensing of Land Surface Emissivity*, Pasadena CA, Jan. 1999
- Guest Editor, *Geografiska Annaler* 80A (3-4), Nov. 1998
- Member, Editorial Board, *Quaternary Science Reviews*, 2004-present
- Member, Editorial Board, *Geology*, 1988-1991
- Member, GSA Quaternary Geology & Geomorphology Panel, 1992-1994
- Associate Editor, *Journal of Geophysical Research*, 1993-1995
- Member, Editorial Board, *Remote Sensing of Environment*, 1999-present
- Member, SES Panel on Remote Sensing, "Solid-Earth Science and Society," Nat'l Research Council, Nat'l Academy Press
- Chair, Board of Directors, Epigraphic Society, 2006- (Member of Board, 1996-2006)
- Member, Board of Directors, Damdin Da Intellectual Development Fund, Mongolia, 1998-present
- Chair, Landscape dynamics, evolution, and modeling panel, *Zyzyx*, CA, April 1998.
- Adjunct Professor, Humboldt State University, Arcata, CA, 1988- present
- Chair, Special Session on Hyperspectral Thermal Imaging, IGARSS, Seattle, July, 1998.
- Member, International Scientific Committee, Recent Advances in Quantitative Remote Sensing Symposium, 2002-present.
- Co-convenor, Sudden Climate Change Workshop, University of Washington, Seattle, Oct. 1988.
- Co-convenor, Spectral Mixture Analysis Workshop I, University of Washington, Seattle, Oct. 1990.
- Co-convenor, Spectral Mixture Analysis Workshop II, University of Washington, Seattle, Oct. 1992.
- Co-convenor, The glacial history of the Sierra Nevada: A symposium in Memorial to Clyde Wahrhaftig, Univ. Calif. White Mtn. Res. Stn., Sept. 1995
- Co-convenor, The geomorphic and climatic significance of rock glaciers, Absarokas, WY, Aug. 1997.
- Co-convenor, Rock Art Dating Workshop, Boulder City, NV, Oct. 1998.

**Students Advised (Chair or Co-Chair) (14)**

|                  |     |   |
|------------------|-----|---|
| Paul Bierman     | PhD | Department of Geological Sciences, UW             |
| Douglas Clark    | PhD | Department of Geological Sciences, UW             |
| Iryna Danilina   | PhD | Department of Earth and Space Sciences, UW        |
| Degui Gu         | PhD | Department of Geophysics, UW                      |
| Wen-Hao Li       | PhD | Department of Geological Sciences, UW             |
| Amit Mushkin     | PhD | Department of Earth and Space Sciences, UW        |
| Randall Perry    | PhD | Department of Earth and Space Sciences, UW        |
| Stephen Thompson | PhD | Department of Geological Sciences, UW             |
| Paul Zehfuss     | PhD | Department of Earth and Space Sciences, UW        |
| Kyle Bland       | MSc | Department of Geological Sciences, UW             |
| Jennifer Kay     | MSc | Department of Earth and Space Sciences, UW        |
| Stephen Martel   | MSc | Department of Earth Sciences, Stanford University |
| Matthew Smith    | MSc | Department of Earth and Space Sciences, UW        |
| Laura Trunk      | MSc | Department of Earth and Space Sciences, UW        |

**Students Advised (Committee) (31)**

|                           |     |  |
|---------------------------|-----|--|
| Rolf Aalto                | PhD | Department of Geological Sciences, UW  |
| Jennifer Francis          | PhD | Department of Atmospheric Sciences, UW   |
| Jan Heine                 | PhD | Department of Geological Sciences, UW  |
| Jennifer Kay              | PhD | Department of Earth and Space Sciences, UW                                       |
| Juan-Carlos Jiménez-Muñoz | PhD | Departament de Física de la Terra i Termodinàmica, University of Valencia, Spain |
| Kristine Crossen          | PhD | Department of Geological Sciences, UW  |
| Bretwood Higman           | PhD | Department of Earth and Space Sciences, UW                                       |
| Van Kane                  | PhD | College of Forest Resources, UW  |
| Jim Lutz                  | PhD | College of Forest Resources, UW  |
| Nir Naveh                 | PhD | Department of Civil Engineering, UW  |
| Michele Koppes            | PhD | Department of Earth and Space Sciences, UW                                       |
| Michael O'Neal            | PhD | Department of Earth and Space Sciences, UW                                       |
| Martin Pincheira          | PhD | College of Forest Resources, UW  |
| Elizabeth Safran          | PhD | Department of Geological Sciences, UW  |
| Sanjoy Som                | PhD | Department of Earth and Space Sciences, UW                                       |
| Leslie Reid               | PhD | Department of Earth and Space Sciences, UW                                       |
| Dar Roberts               | PhD | Department of Geological Sciences, UW  |
| Summer Rupper             | PhD | Department of Earth and Space Sciences, UW                                       |
| Don Sabol                 | PhD | Department of Geological Sciences, UW  |
| Eric Steig                | PhD | Department of Geological Sciences, UW  |
| Terry Swanson             | PhD | Department of Geological Sciences, UW  |
| Glenn Thackray            | PhD | Department of Geological Sciences, UW  |
| Van Kane                  | PhD | College of Forest Resources, UW  |
| Kelin Whipple             | PhD | Department of Geological Sciences, UW  |
| Byron Amerson             | MSc | Department of Earth and Space Sciences, UW                                       |
| Ronna Bowers              | MSc | Department of Geology, Humboldt State University                                 |
| Fred Fischer              | MSc | Department of Geology, Humboldt State University                                 |
| James McCaughey           | MSc | Department of Geological Sciences, University of Nevada, Reno                    |
| Doug LaFarge              | MSc | Department of Geology, Humboldt State University                                 |
| Joanna Redwine            | MSc | Department of Geology, Humboldt State University                                 |
| Maureen Timmons           | MSc | Department of Geological Sciences, UW  |

**Post-Doctoral Research Associates**

|                  |  |
|------------------|--|
| Rebecca Handcock | Department of Earth and Space Sciences, UW |
| Charles Hibbitts | Department of Earth and Space Sciences, UW |
| Robin Weeks      | Department of Earth and Space Sciences, UW |

**Distinguished Visitors**

|               |   |
|---------------|---|
| Yehouda Enzel | The Institute of Earth Sciences, The Hebrew University, Givat Ram Campus, Jerusalem, Israel |
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**Publications** (3 books, 173 articles (59=1<sup>st</sup> author), 184 abstracts and other presentations (72=1<sup>st</sup> author))

Articles and Books (\* - reviewed)

**1970**

\*Gillespie, A. R., and Gillespie, R. W., 1970. Stonehenge and the Piri Re'is Map. *Navigation* 17, 122-123.

**1972**

\*Gillespie, A. R., and Soha, J. M., 1972. An orthographic photomap of the south pole of Mars from Mariner 6 and 7. *Icarus* 16, 522-527.

**1975**

Gillespie, A. R., 1975. Color manipulation of digital images. *Proceedings of the Society of Photographic Science and Engineering, Symposium IV, Unconventional Photographic Systems*, Washington, D.C., Nov. 20-21, pp. 35-37.

Goetz, A. F. H., Billingsley, F. C., Gillespie, A. R., Abrams, M. J., Squires, R. L., Shoemaker, E. M., Luchitta, I., and Elston, D. P., 1975. Application of ERTS images and image processing to regional geologic problems and geologic mapping in northern Arizona. *NASA-JPL Technical Report 32-1597*, May 15.

Kahle, A. B., Gillespie, A. R., Goetz, A. F. H., and Addington, J. D., 1975. Thermal inertia mapping. *Proceedings of the 10th International Symposium on Remote Sensing of the Environment*, Ann Arbor, MI, Oct. 6-10, p. 985-994.

Siegal, B. S., Kahle, A. B., Goetz, A. F. H., Gillespie, A. R., and Abrams, M. J., 1975. Detectability of geothermal areas using Skylab X-5 data. *Proceedings of the NASA Earth Resources Survey Symposium*, NASA TM X-58168, Vol. I-B, Houston, TX, pp. 625-640.

Siegal, B. S., Kahle, A. B., Goetz, A. F. H., Gillespie, A. R., Abrams, M. J., and Pohn, H. A., 1975. Final report on the detection of geothermal areas from Skylab thermal data. *NASA-JPL Technical Memorandum 33-728*, June 15.

**1976**

Abrams, M. J., Siegal, B. S., Goetz, A. F. H., and Gillespie, A. R., 1976. Computer image processing techniques applied to geologic problems. In *Applications of Computer Methods in the Mineral Industry* (R. V. Ramani, ed.), *Proceedings of the 14th International Symposium*, Pennsylvania State University, Oct. 4-8, [pdf](#).

Gillespie, A. R., 1976. Directional fabrics introduced by digital filtering of images. *Proceedings of the Second International Conference on Basement Tectonics*, University Delaware, Newark, DE, July 13-17, p. 500-507.

Goetz, A. F. H., Abrams, M. J., Gillespie, A. R., Siegal, B. S., Elston, D. P., Lucchitta, I., Wu, S. S. C., Sanchez, A., DiPaola, W. D., Schaefer, F. J., and Jordan, R., 1976. Comparison of Skylab and Landsat images for geologic mapping in Northern Arizona. Final Report, NASA 7-100, Task Order RD-161, National Technology Information Service E76-10206, Feb. 27.

\*Kahle, A. B., Gillespie, A. R., and Goetz, A. F. H., 1976. Thermal inertia imaging: A new geologic mapping tool. *Geophysics Research Letters* 3, 26-28.

Soha, J. M., Gillespie, A. R., Abrams, M. J., and Madura, D. P., 1976. Computer techniques for geological applications. *Proceedings of the Caltech/JPL Conference on Image Processing Technology, Data Sources and Software for Commercial and Scientific Applications*, Caltech, Pasadena, CA, Nov. 3-5, pp. 4-1 through 4-21.

**1977**

\*Gillespie, A. R., and Kahle, A. B., 1977. The construction and interpretation of a digital thermal inertia image. *Photogrammetric Engineering and Remote Sensing* 43, 983-1000.

\*Offield, T.W., Abbott, E. A., Gillespie, A. R., and Loguercio, S. O., 1977. Structure mapping on enhanced Landsat images of Southern Brazil: Tectonic control of mineralization and speculations on metallogeny. *Geophysics* 42(3), 482-500.

**1979**

\*Benton, J. F., Gillespie, A. R., and Soha, J. M., 1979. Digital image processing applied to the photography of manuscripts. *Scriptorium* 33, 40-55.

Gillespie, A. R., 1979. Simulations of Stereosat data and characteristics. *Preliminary Stereosat Mission Description*, NASA/JPL Technical Report 720-33, May 30.

**1980**

\*Gillespie, A. R., 1980. Digital techniques of image enhancement. In B. S. Siegal and A. R. Gillespie, eds., *Remote Sensing in Geology*, Wiley, NY, pp. 139-226.

\*Lorre, J. J., and Gillespie, A. R., 1980. Artifacts in digital images. In *Application of Digital Image Processing to Astronomy*. *Society of Photo-Optical Instruments and Engineering* 264, 123-135.

Schildge, J. P., Kahle, A. B., Alley, R. E., and Gillespie, A. R., 1980. Use of thermal inertia properties for material identification. *Proceedings of the Society of Photo-Optical Instruments and Engineering, 24th Annual Technical Symposium, Image Processing for Missile Guidance*, SPIE 238 (T. F. Wenner, ed.), San Diego, CA, Jul. 28 - Aug. 1, pp. 350-357.

**1982**

\*Gillespie, A. R., Huneke, J. C., and Wasserburg, G. J., 1982. An assessment of <sup>40</sup>Ar-<sup>39</sup>Ar dating of incompletely degassed xenoliths. *Journal of Geophysical Research* 87, 9247-9257.

**1983**

- \*Gillespie, A. R., and Criss, R. E., 1983. Correlation of infrared reflectance ratios at 2.3  $\mu\text{m}$  /1.6  $\mu\text{m}$  and 1.1  $\mu\text{m}$  /1.6  $\mu\text{m}$  with  $\delta^{18}\text{O}$  values delineating fossil hydrothermal systems in the Idaho batholith. *International Geosciences Remote Sensing Symposium (IGARSS '83)* 1, TA-4, pp. 4.1-4.6.
- \*Gillespie, A. R., Huneke, J. C., and Wasserburg, G. J., 1983. Eruption age of a Pleistocene basalt from  $^{40}\text{Ar}$ - $^{39}\text{Ar}$  analysis of partially degassed xenoliths. *Journal of Geophysical Research* 88, 4897-5008.
- 1984**
- \*Allen, C. R., Gillespie, A. R., Han, Y., Sieh, K. E., Zhang, B., and Zhu, C., 1984. Red River and associated faults, Yunnan Province, China. *Bulletin of the Geological Society of America* 95, 686-700.
- \*Allen, C. R., Han, Y., Sieh, K. E., Zhang, B., Gillespie, A. R., and Zhu, C., 1984. Study of the Quaternary activities of the Red River Fault (I) - General survey of its contemporary activities and evidence of the active faulting. *Chinese Journal of Seismological Research* 7(1), 39-51. (In Chinese).
- \*Allen, C. R., Han, Y., Sieh, K. E., Zhang, B., Gillespie, A. R., and Zhu, C., 1984. Study of the Quaternary activities of the Red River Fault (II) - Its features of activity, slip rate and recurrence intervals of earthquakes. *Chinese Journal of Seismological Research* 7(2), 171-186. (In Chinese).
- \*Gillespie, A. R., Huneke, J. C., and Wasserburg, G. J., 1984. Eruption age of a ~100,000-year-old basalt from  $^{40}\text{Ar}$ - $^{39}\text{Ar}$  analysis of partially degassed xenoliths. *Journal of Geophysical Research* 89, 1033-1048.
- \*Gillespie, A. R., Kahle, A. B., and Palluconi, F. D., 1984. Mapping alluvial fans in Death Valley, California, using multichannel thermal infrared images. *Geophysical Research Letters* 11, 1153-1156.
- Gillespie, A. R., and Abbott, E. A., 1984. Mapping compositional differences in silicate rocks with 6-channel thermal images. *Proceedings of the 9th Canadian Symposium on Remote Sensing*, St. Johns, Newfoundland, Canada, Aug., p. 327-336.
- 1985**
- \*Budinger, F. E. Jr., Boley, J. L., and Gillespie, A. R., 1985. A reassessment of a hearth-like feature at the Calico site using TL, ESR, paleomagnetic, and  $^{40}\text{Ar}$ - $^{39}\text{Ar}$  techniques. *Current Research in the Pleistocene* 3, 40-43.
- 1986**
- \*Crook, R. Jr., and Gillespie, A. R., 1986. Weathering rates in granitic boulders measured by P-wave speeds. In S. M. Colman and D. Dethier (eds.), *Rates of Chemical Weathering of Rocks and Minerals*, Academic Press, p. 395-417.
- \*Gillespie, A. R., Kahle, A. B., and Walker, R. E., 1986. Color enhancement of highly correlated images, I. Decorrelation and HSI contrast stretches. *Remote Sensing of Environment* 20, 209-235.
- 1987**
- \*Gillespie, A. R., A. B. Kahle and R. E. Walker, 1987. Color enhancement of highly correlated images, II. Channel ratio and chromaticity transformation techniques. *Remote Sensing of Environment* 22, 343-365.
- \*Martel, S. J., Harrison, T. M., and Gillespie, A. R., 1987. Late Quaternary displacement rate on the Owens Valley Fault Zone at Fish Springs, California. *Quaternary Research* 27, 113-129.
- Gillespie, A. R., 1987. Enhancing TIMS images for photointerpretation. *Proceedings of the Workshop on Thermal Infrared Multispectral Scanner*, Jet Propulsion Laboratory Publication 36-38, Pasadena, CA, p. 12-24.
- Gillespie, A. R., 1987. Letter to the editor in response to an article by R. I Dorn. *Quaternary Research* 28, 102-103.
- Gillespie, A. R., 1987. Lithologic mapping of silicate rocks using TIMS data. *Proceedings of the Workshop on Thermal Infrared Multispectral Scanner*, Jet Propulsion Laboratory Publication 36-38, Pasadena, CA, p. 29-44.
- Smith, M. O., Adams, J. B., and Gillespie, A. R., 1987. Evaluation and calibration of AVIRIS test-flight data, Owens Valley, CA, Final Report NASA Contract No. NAGW 1135, 17 p.
- Smith, M. O., Roberts, D. A., Shipman, H. M., Adams, J. B., Willis, S. C., and Gillespie, A. R., 1987. Calibrating AIS images using the surface as a reference. *Proceedings of the 3rd Airborne Imaging Spectrometer Data Analysis Workshop*, Jet Propulsion Laboratory Publication 87-30, Pasadena, CA, pp. 63-69.
- 1988**
- \*Kahle, A. B., Gillespie, A. R., Abbott, E. A., Abrams, M. J., Walker, R. E., Hoover, G., and Lockwood, J. P., 1988. Mapping and relative dating of Hawaiian basalt flows using multispectral thermal infrared images. *Journal of Geophysical Research* 93(15), 239-15, 251.
- 1989**
- \*Adams, J. B., Smith, M. O., and Gillespie, A. R., 1989. Simple models for complex natural surfaces: A strategy for the hyperspectral era of remote sensing. *Proceedings of the International Geoscience Remote Sensing Symposium (IGARSS '89)* 1, 16-21.
- \*Gillespie, A. R., Budinger, F., Jr., and Abbott, E. A., 1989. Verification of prehistoric campfires by Ar-40/Ar-39 analysis. *Journal of Archaeological Science* 16, 271-291.
- \*Kahle, A. B., Gillespie, A. R., Abbott, E. A., Abrams, M. J., Walker, R. E., Hoover, G., and Lockwood, J. P., 1989. Relative dating of Hawaiian lava flows using multispectral thermal infrared Images: A new tool for geologic mapping of young volcanic terranes. *Journal of Geophysical Research* 93, 15239-15251.
- Gillespie, A. R., 1989. Big Pine Volcanic Field. In Smith, G. I. (ed.), *Field Guide to Eastern California*, International Geological Congress, Washington, D.C., Aug, p#.

- Martel, S. J., Harrison, T. M., and Gillespie, A. R., 1989. Adjustments to calculated Quaternary displacement rates across the Fish Springs fault, Owens Valley fault zone, California. *Quaternary Research* 32, 342-343.
- 1990**
- \*Smith, M. O., Ustin, S. L., Adams, J. B., and Gillespie, A. R., 1990. Vegetation in deserts: I. A regional measure of abundance from multispectral images. *Remote Sensing of Environment* 31, 1-26.
- \*Smith, M. O., Ustin, S. L., Adams, J. B., and Gillespie, A. R., 1990. Vegetation in deserts: II. Environmental influences on regional abundance. *Remote Sensing of Environment* 31, 27-52.
- Adams, J. B., Kapos, V., Smith, M. O., Filho, R. A., Gillespie, A. R., and Roberts, D. A., 1990. A new Landsat view of land use in Amazonia. *Proceedings of the International Symposium on Primary Data Acquisition, ISPRS, MANAUS/1990* 28(1), 177-185 (Brazil).
- Fox, L., III, Fischer, A. F., III, Gillespie, A. R., and Smith, M. O., 1990. Investigation of AVIRIS imagery for application in differentiating soil chronosequences. *Proceedings of the Second Airborne Visible/Infrared Imaging Spectrometer (AVIRIS) Workshop*, Jet Propulsion Laboratory Publication 90-54, Pasadena, CA., pp 94-99.
- Gillespie, A. R., 1990. Big Pine Volcanic Field, California. In Wood, C.A., and Kienle, J., ed., *Volcanoes of North America: United States and Canada*. Cambridge University Press, New York, p#.
- Gillespie, A. R., Burke, R. M., Fischer, A. F., III, Smith, M. O., and Fox, L., III, 1990. Distinguishing soils and surfaces in a carbonate-enriched desert chronosequence with TIMS. In E. A. Abbott (ed.), *Proceedings of the Second Thermal IR Multispectral Scanner (TIMS) Workshop*, Jet Propulsion Laboratory Publication 90-55, Pasadena, CA., p. 119-135.
- Gillespie, A. R., Smith, M. O., Adams, J. B., and Willis, S. C., 1990. Spectral mixture analysis of multispectral thermal infrared images. In E. A. Abbott, ed., *Proceedings of the Second Thermal IR Multispectral Scanner (TIMS) Workshop*, Jet Propulsion Laboratory Publication 90-55, Pasadena, CA., p. 57-74.
- Gillespie, A. R., Smith, M. O., Adams, J. B., and Willis, S. C., 1990. Spectral mixture analysis of multispectral thermal infrared images: Two test cases. *Proceedings of the 5th Australasian Remote Sensing Conference*, Committee of the 5th Australasian Remote Sensing Conference Inc. 1990, Perth, Western Australia, 8-12 Oct., Vol. 1, 381-390.
- Gillespie, A. R., Smith, M. O., Adams, J. B., Willis, S. C., Fischer, A. F., III, and Sabol, D., 1990. Interpretation of residual images: Spectral mixture analysis of AVIRIS images, Owens Valley, California. *Proceedings of the Second Airborne Visible/Infrared Imaging Spectrometer (AVIRIS) Workshop*, Jet Propulsion Laboratory Publication 90-54, Pasadena, CA., p. 243-270.
- Roberts, D. A., Smith, M. O., Adams, J. B., Sabol, D. E., Gillespie, A. R., and Willis, S. C., 1990. Isolating woody plant material and senescent vegetation from green vegetation in AVIRIS data. *Proceedings of the Second Airborne Visible/Infrared Imaging Spectrometer (AVIRIS) Workshop*, Jet Propulsion Laboratory Publication 90-54, Pasadena, CA., pp 42-57.
- 1991**
- Adams, J. B., Barron, E. E., Bloom, A. A., Breed, C., Dohrenwend, J., Evans, D. L., Farr, T. G., Gillespie, A. R., Isacks, L. B., and Williams, R. S., 1991. Report of the Panel on the Land Surface: Processes of Change. In *Solid Earth Science in the 1990s, Volume 2 - Panel Reports*. NASA Technical Memorandum 4256, v. 2, V-1 - V-28, Feb.
- \*Bierman, P. R., Gillespie, A. R., and Keuhner, S., 1991. Precision of rock varnish cation-ratio ages. *Geology*, 19, 135-139.
- \*Bierman, P. R., and Gillespie, A. R., 1991. Range fires: A significant factor in the dating and evolution of geomorphic surfaces. *Geology* 19, 641-644.
- \*Bierman, P. R., and Gillespie, A. R., 1991. Accuracy of rock-varnish chemical analyses: Implications for cation-ratio dating. *Geology* 19, 196-199.
- Bierman, P. R. and A. R. Gillespie, A. R., 1991. Lowering rates of granitic landforms determined by measurement of *in situ* produced cosmogenic nuclides. *EOS* 72(44), 575.
- Bierman, P., Gillespie, A. R., Whipple, K. X., and Clark, D. H., 1991. Quaternary geomorphology and geochronology of Owens Valley, California. In Walawender, M.J., and Hanan, B.B., (eds.), *Geological Excursions in Southern California and Mexico: Guidebook*, 1991 Geological Society of America Annual Meeting, p. 199-223.
- Gillespie, A. R., 1991. Testing a new climatic interpretation for the Tahoe glaciation. In *Natural History of Eastern California and High-Altitude Research*, edited by C. A. Hall, Jr., V. Doyle-Jones, and B. Widawski, *Proceedings of the White Mountain Research Station. Symposium 3*, 383-398.
- Gillespie, A. R., 1991. Quaternary subsidence of Owens Valley, California In *Natural History of Eastern California and High-Altitude Research*, edited by C. A. Hall, Jr., V. Doyle-Jones, and B. Widawski, *Proceedings of the White Mountain Research Station. Symposium 3*, 356-382.
- Gillespie, A. R., 1991. Trail Canyon fans: Capture history of Rock Creek. In Reheis, M. C., Slate, J. C., Sawyer, T. L., Sarna-Wojcicki, A. M., Harden, J. W., Pendall, E. G., Gillespie, A. R., and Burbank, D. M., *Guidebook for Field Trip to Fish Lake Valley, California-Nevada, Pacific Cell, Friends of the Pleistocene*, U. S. Geological Survey Open-File Report 91-290, p.178-184.
- Harden, J. W., Slate, J. L., Lamothe, P., Chadwick, O. A., Pendall, E. G., and Gillespie, A. R., 1991. Soil formation on the Trail Canyon alluvial fan. U. S. Geological Survey Open-File Report 91-291, 22 p.

- Roberts, D. A., Smith, M. O., Adams, J. B. and Gillespie, A. R., 1991. Spectral mixture analysis of AVIRIS data: Leaf spectral types, residuals and canopy shade. *Proceedings of the Third Airborne Visible/Infrared Imaging Spectrometer (AVIRIS) Workshop*, Jet Propulsion Laboratory Publication 91-28, Jet Propulsion Laboratory, Pasadena, CA., p. 43-50.
- Sabol, D. E., Adams, J. B., Smith, M. O., and Gillespie, A. R., 1991. Target detection thresholds using imaging spectrometer data. *Proc. of the Third Airborne Visible/Infrared Imaging Spectrometer (AVIRIS) Workshop*, Jet Propulsion Laboratory Publication 91-28, Jet Propulsion Laboratory, Pasadena, CA., p. 99-108.

### 1992

- \*Gillespie, A. R., 1992. Enhancement of multispectral thermal infrared images: Decorrelation contrast stretch. *Remote Sensing of Environment* 42, 147-155.
- \*Gillespie, A. R., 1992. Spectral mixture analysis of multispectral thermal infrared images. *Remote Sensing of Environment* 42, 137-145.
- Bierman, P. R., and Gillespie, A. R., 1992. Accuracy of rock-varnish chemical analyses: Implications for cation-ratio dating. Reply to comment by T. A. Cahill. *Geology* 20, 469-472.
- Bierman, P. R., and Gillespie, A. R., 1992. Accuracy of rock-varnish chemical analyses: Implications for cation-ratio dating. Reply to comment by R. I. Dorn. *Geology* 20, 471-472.
- Bierman, P. R., and Gillespie, A. R., 1992. Range fires: A significant factor in the dating and evolution of geomorphic surfaces. Reply to comment by R. I. Dorn. *Geology* 20, 283-285.
- Bierman, P., Gillespie, A., Harrington, C., Raymond, R., McFadden, L. and Wells, S., 1992. Throwing rocks. *American Scientist* 80, 110-112.
- Gillespie, A. R., Smith, M. O., and Sabol, D., 1992. A field technique for measuring the shadow fraction in spectral mixture analysis. *Proceedings of the Airborne Science Workshop: AVIRIS*, Jet Propulsion Laboratory, Pasadena, CA., 1-5 June.

### 1993

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## TASKS

### A) support DRI

- 1) Database population (Crouvi et al.)
- 2) Lithologic mapping with spectral remote sensing (Gillespie and Mushkin)
- 3) Parent material mapping using ASTER (Sabol et al.)
- 4) Parent material mapping with airborne MASTER - YPG (Minor et al.)

### B) investigate remote sensing to supplement data base

#### 1) Mapping

- i) Compositional mapping of playas - Yotvata (Gillespie et al.)
- ii) Compositional mapping - Raham Fan (Crouvi et al.)
- iii) Relative dating - Plains of Paran (Amit et al.)
- iv) Basin hydrology - Qom Playa (Gillespie et al.)
- v) Loess (Crouvi)

#### 2) Surface properties

- i) Subpixel roughness (Mushkin & Gillespie)
- ii) Soil moisture - Soda Lake (Sabol et al.)
- iii) Differential thermal inertia (Gillespie et al.)
- iv) Rock varnish (Hibbitts et al.)