

GEORGE E. HARLOW
CURATOR AND FULL PROFESSOR
DEPARTMENT OF EARTH & PLANETARY SCIENCES

HIGHEST DEGREE EARNED

Ph.D.

AREA OF SPECIALIZATION

Mineralogy; crystallography; geology; particularly Jadeite rock

EDUCATIONAL EXPERIENCE

B.A. Harvard University, 1971, magna cum laude

Ph.D. Princeton University, 1977

PREVIOUS EXPERIENCE IN DOCTORAL EDUCATION

CLASSES

Graduate courses in the theory and techniques in mineralogical crystallography and crystal chemistry (once at Princeton, three times for Columbia). "Rock-forming Minerals," W4115, Columbia University

ADVISING

Robert Klimentidis, M.S.

Kyla Simons, Ph.D.

Yongshan Dai, post-doc

Aley El Shazly, post-doc

Franco Mancini, post-doc

Rondi Davies, post-doc

RESEARCH

CURRENT PROJECTS

1. Conventional and Micromineral Crystallography of Minerals

2. High pressure crystal chemistry: Large Ions in Mantle Minerals: The research is an experimental investigation at high pressure and temperature of potassium- and fluorine-rich minerals/phases that may be stable in variably hydrous environments of Earth's upper mantle.

3. Jadeitites, albitites, eclogites, metabasites and related rocks from Río Motagua, central Guatemala, and northern Myanmar: Harlow has undertaken a long-term field, petrographic, mineralogical study of the occurrence of jadeite rock, and other metasomatic inclusions in serpentinite along the Motagua Fault Zone of Guatemala. (1993-present)

4. Minerals of the Mogok Stone Tract, Mandalay District, Myanmar: Harlow visited Myanmar three times (1998, 2000, 2002) and had the opportunity to see and collect an incredibly diverse suite of mineral specimens representing a far more diverse geological

environment than is described in the modern literature. An inventory of the minerals and their parageneses is underway.

PUBLICATIONS (2003-2008)

- Davies, R.M., and Harlow, G.E. (in prep.) The high-pressure stability of K-cymrite and associated phases in the system $\text{KAlSi}_3\text{O}_8\text{-H}_2\text{O}$: A reservoir for K and H_2O in subduction zones and the upper mantle.
- Kane, R.E., Harlow, G.E. and Han Htun (in prep.) The Hkamti District Jadeite Mines Area: Nansibon, Burma (Myanmar). For: Gems and Gemology.
- Harlow, G.E., Rossman, G.R., Matsubara, S., and Miyajima, H. (in prep.) Blue omphacite in jadeitites from Guatemala and Japan. *American Mineralogist*.
- Harlow, G.E., Sisson, V.B., and Sorensen, S.S. (in prep.) Jadeitite from Guatemala: Distinctions among multiple sources.
- Brueckner, H.K., Avé Lallemant, H.G., Sisson, V.B., Harlow, G.E., Hemming, S.R., Roden-Tice, M.K., Sorensen, S.S., Tsujimori, T., Francis, A.H., Gehrels, G.E., and Blythe, A.E. (in prep) Interaction of the North American and Caribbean plates in Guatemala: Part 2. Geochronologic history. Manuscript under internal review.
- Sorensen, S.S., Sisson, V.B., Harlow, G.E., Avé Lallemant, H.G., Tsujimori, T. (in prep.) Metasomatic subduction zone fluid-rock interactions across a jadeitite-serpentinite contact, El Ciprés jade mine, Sierra de las Minas, Guatemala. *International Geology Review*.
- Francis, A.H., Avé Lallemant, H.G., Sisson, V.B., Harlow, G.E., Donnelly, T.W., Chiquin, M., Roden-Tice, M.K., Hemming, S.R., and Brueckner, H.K. (in prep.) Interaction of the North American and Caribbean plates in Guatemala: Part 1. Deformation history and consequences for the exhumation of HP/LT metamorphic rocks. Manuscript under internal review.
- Simons, K.K., Harlow, G.E., Sorensen, S.S. Brueckner, H.K., Goldstein, S.L., Hemming, N.G., and Langmuir, C.H. (in review) Lithium isotopes in Guatemala and Franciscan HP-LT Rocks: insights into the role of sediment-derived fluids in the mantle wedge. *Geochimica et Cosmochimica Acta*.
- Harlow, G.E., and Hawthorne, F.C. (in press) Herderite from Mogok, Myanmar, and comparison with hydroxyl-herderite from Ehrenfriedersdorf, Germany. *American Mineralogist*.
- Hawthorne, F.C., and Harlow, G.E. (2008) The crystal chemistry of Al-rich amphiboles: Sadanagaite and potassic-ferrisadanagaite. *Canadian Mineralogist* 46, 151-162.
- Martens, U., Solari, L., Sisson, V., Harlow, G., Torres de León, R., Ligorra, J.P., Tsujimori, T., Ortega, F., Brueckner, H., Giunta, G., Ave Lallemant, H. (2007) Field trip guide – First Field Workshop of IGCP 546 “Subduction Zones of the Caribbean:” High-pressure belts of central Guatemala: The Motagua Suture and the Chuacús Complex. 36 p.
http://www.ugr.es/~agcasco/igcp546/Guate07/IGCP546_Guatemala2007_FieldTripGuide.pdf
- Harlow, G.E., S.S. Sorensen, and V.B. Sisson. 2007. The geology of jade deposits. In L.A. Groat (editor), *The geology of gem deposits. Short Course Handbook Series 37: 207-254*. Mineralogical Association of Canada, Quebec.

- Bindi, L., R.T. Downs, G.E. Harlow, O.G. Safonov, Y.A. Litvin, L.L. Perchuk, H. Uchida, and S. Menchetti. 2006. Compressibility of synthetic potassium-rich clinopyroxene: in situ high-pressure single-crystal X-ray study. *American Mineralogist* 91: 802-808.
- Harlow, G.E., A.R. Murphy, D.J. Hozjan, C.N. de Mille, and A.A. Levinson. 2006. Pre-Columbian jadeite axes from Antigua, West Indies: description and possible sources. *Canadian Mineralogist* 44: 305-321.
- Sorensen, S., G.E. Harlow, and D. Rumble. 2006. The origin of jadeitite-forming subduction zone fluids: CL-guided SIMS oxygen isotope and trace element evidence. *American Mineralogist* 91: 979-996.
- Tsujimori T., V.B. Sisson, J.G. Liou, G.E. Harlow, and S.S. Sorensen. 2006. Very-low-temperature record in subduction process: A review of worldwide lawsonite eclogites. *Lithos* 92; 609-924. doi:10.1016/j.lithos.2006.03.054.
- Tsujimori, T., V.B. Sisson, J.G. Liou, G.E. Harlow, and S.S. Sorensen. 2006. Petrologic characterization of Guatemalan lawsonite-eclogite: direct information on eclogitization of subducted oceanic crust in a cold subduction zone. In B.H. Hacker, W.C. McClelland and J.G. Liou (editors), *Ultrahigh-pressure metamorphism: deep continental subduction*. Geological Society of America Special Paper 403: 147-168.
- Bartholomew, P.R., F. Mancini, C. Cahill, and G.E. Harlow. 2005. Zoltaiite, $\text{Ba}_{1.05}\text{V}_{11.75}\text{Ti}_{1.31}\text{Fe}_{0.49}\text{Cr}_{0.34}\text{Mg}_{0.03}\text{Al}_{0.02}\text{Si}_{2.06}\text{O}_{27}$, A new barium-vanadium orthosilicate mineral from British Columbia: description and crystal structure. *American Mineralogist* 90: 1655-1660.
- Harlow, G.E. and Sorensen, S.S. 2005. Jade (Nephrite and Jadeitite) and Serpentinite: Metasomatic Connections. In: *Serpentine and Serpentinites: Mineralogy, petrology, geochemistry, ecology, geophysics, and tectonics—a tribute to Robert G. Coleman Volume; International Book Series Vol. 8*, Geological Society of America, Boulder, pp. 76-109.
- Harlow, G.E. and Sorensen, S.S. 2005. Jade (nephrite and jadeitite) and serpentinite: Metasomatic connections. *International Geology Review* 47, 113-146.
- Harlow, G.E., and Davies, R. 2005. Diamonds. *Elements* 1(2), 67-70.
- Lu, P.J., Yao, N., So, J.F., Harlow, G.E., Lu, J., Wang, G., and Chaikin, P.M. 2005. Earliest use of corundum and diamond in prehistoric China. *Archaeometry* 47, 1-12.
- Harlow, G.E., Hemming, S.R., Avé Lallemant, H.G., Sisson, V.B., and Sorensen, S.S. 2004. Two HP/LT Serpentine-Matrix Melange Belts, Motagua Fault Zone, Guatemala: A Record of Aptian and Maastrichtian Collisions. *Geology* 32, 17-20.
- Harlow, G.E., and Davies, R. 2004. Status report on K-rich phases at mantle conditions. *Selected Papers from the Eighth International Kimberlite Conference. Volume 2: The J. Barry Hawthorne Volume*, *Lithos* 77, 647-653.
- Harlow, G.E., Quinn, E.P., Rossman, G.R., and Rohtert, W.R. 2004. Blue omphacite from Guatemala. *Gem News International section – Gems and Gemology* 40, 68-70.
- Harlow, G.E. 2004. L'Origine de jade jadéite. *Revue de Gemmologie A.F.G.* 150, 7-11.
- Taube, K.A., Sisson, V.B., Seitz, R., and Harlow, G.E. 2004. The sourcing of Mesoamerican jade: Expanded geological reconnaissance in the Motagua Region,

- Guatemala. In: Olmec Art and Dumbarton Oaks. Karl A. Taube, Pre-Columbian Art at Dumbarton Oaks, No. 2, Dumbarton Oaks, Washington, 246p; 203-228.
- Harlow, G.E., Sisson, V.B., Avé Lallemant, H.G., Sorensen, S.S. and R. Seitz 2003. High-pressure, metasomatic rocks along the Motagua Fault Zone, Guatemala. *Ofioliti* 28, 115-120.
- Harlow, G.E., Davies, R. 2003. Status report on K-rich phases at upper-mantle conditions. Extended Abstracts of the 8th International Kimberlite Conference, June 22-27, 2003, Vancouver, BC. FLA0295 on CD-ROM, pp. 5.
- Origlieri, M.J., Downs, R.T., Thompson, R.M., Pommier, C.J.S., Denton, M.B., and Harlow, G.E. 2003. High-pressure crystal structure of kosmochlor, NaCrSi₂O₆, and systematics of anisotropic compression in pyroxenes. *American Mineralogist* 88, 1025-1032.
- Giuseppe Giunta, Luigi Beccaluva, Massimo Coltorti, Daniela Cutrupia, Carlos Dengo, George E. Harlow, Byron Mota, Elisa Padoa, Joshua Rosenfeld and Franca Siena 2002. The Motagua suture zone in Guatemala – A Fieldtrip Guidebook. *Ofioliti* 27 (1), 47-72.
- Harlow, G.E. 2002. Diopside + F- rich phlogopite at high P and T: Systematics, crystal chemistry and the stability of KMgF₃, clinohumite and chondrodite. *Geological Materials Research* v4n2. (<http://gmr.minsocam.org/Papers/v4/v4n3/v4n3abs.html>)
- Mancini, F., Harlow, G.E., and Cahill, C. 2002. Potassium di-magnesium di-silicate hydrate K_{1.3}(Mg_{0.95}Cr_{0.02}Al_{0.03})₂Si₂O₇H_{0.7}: A new potential K-bearing mineral phase in the mantle. *American Mineralogist* 87, 302-306.
- Harlow, G.E. and Sorensen, S.S. 2001. Jade: Occurrence and metasomatic origin. *Australian Gemmologist* 21, 7-10.
- Mancini, F., Harlow, G.E., and Cahill, C. 2001. Crystal structure of potassium dimagnesium disilicate hydroxide, K_{1.3}(Mg_{0.95}Al_{0.03}Cr_{0.02})Si₂O_{6.4}(OH)_{0.6}. *Zeitschrift für Kristallographie NCS* 216, 189-190.
- Seitz, R., Harlow, G.E., Sisson, V.B., and Taube, K.E. 2001. 'Olmec Blue' and Formative jade sources: new discoveries in Guatemala. *Antiquity* 87, 687-688.

SPECIAL RECOGNITION/AWARDS

- Mineralogical Society of America (Fellow, 1996; Secretary 2004-2006)
- Society of Mineral Museum Professionals (president - 1993-96; secretary - 1996-2000; board - 1992-present)
- Distinguished Public Service Medal, Mineralogical Society of America, 2003