

To: Kurt Paterson, Chair, Sabbatical Leave Committee
Cc: Office of the Provost
From: G. Bluth
Date: June 28, 2006
Re: Sabbatical Leave Narrative

My sabbatical leave took place from January 1 to June 15, 2006. The majority of the sabbatical was spent in the Earth Sciences Department at the University of Bristol, where I shared an office with Matt Watson, a colleague since 2002. For the most part my intention was to be able to work in relative peace, although I did have occasional discussions with department faculty, post-docs and graduate students.

Sabbatical Timeline:

January 1-15: MTU campus.

January 15-29: in field (Nicaragua) and attending Cities on Volcanoes IV conference in Quito, Ecuador.

February 1 – May 31: Bristol University, U.K.

June 1 – 15: MTU campus

My advisorial work was largely devoted to helping four of my graduate students complete corrections to their theses (they all defended in late Fall, 2005). I also worked with some of Matt Watson's graduate students to help them with their remote sensing research, and with Matt himself on testing an ultraviolet camera system. I also was actively working on graduate student recruitment for Fall 2006.

My main research goal and accomplishment was to complete a project begun in 1996, on the SO₂ emissions of Nyamuragira volcano. Nyamuragira has been the world's largest SO₂ emitter in the last few decades at least, with at least 225 days of satellite-detected emissions since 1980. I developed a new method of analyzing daily satellite images to model continuous emissions, which allowed me to calculate a much more accurate of the emissions than had been possible – this method is applicable to other highly productive, passive volcanic emissions (such as Etna, Hekla, Mauna Loa) which are studied by non-continuous (e.g., daily) satellite or ground-based imagery.

I also completed a paper on the development of an ultraviolet camera for monitoring volcanic SO₂ emissions, based upon the Ph.D. thesis research of Jeremy Shannon. I also spent significant time working with one of Watson's students, Lizzette Rodriguez, to help her complete a paper on Montserrat SO₂ emissions.

The tangible work accomplished during my sabbatical leave is listed below:

Graduate student thesis corrections/completion:

Marika Dalton, completed M.S. Geology, January 2006 (“Investigation of the 2002 Reventador, Ecuador eruption using satellite-based remote sensing”).

Elisabet Head, completed M.S. Geology, April 2006 (“Galapagos Islands volcanic SO₂ emissions, 1979-1998”).

Samantha Reif, completed M.S. Geology, April 2006 (“Landsat TM and ETM+ time sequence of changes in channel morphology and lahar hazards on Fuego Volcano, Guatemala”).

Jeremy Shannon, completed Ph.D. Geology, April 2006 (“Development and application of new techniques for sulfur dioxide monitoring at active volcanoes”).

Presentations:

Bluth, G.J.S., E.L. Gross and S.A. Carn (2006) Exceptional sulfur dioxide emissions from Nyamuragira Volcano. Cities on Volcanoes 4, Quito, Ecuador, January 22-27, 2006.

Bluth, G.J.S., Gierke, J.S., Gross, E.L., and W.I. Rose (2006) Remote sensing for volcanic hazard mitigation in Ecuador, El Salvador, Guatemala, and Nicaragua. Cities on Volcanoes 4, Quito, Ecuador, January 22-27, 2006.

Bluth, G.J.S. (2006) Exceptional sulfur dioxide emissions from Nyamuragira Volcano, 1980-2004. University of Bristol, UK, May 26, 2006.

Carn, S.A., Bluth, G.J.S., Sawyer, G.M., Oppenheimer, C., Gross, E.L., GVO staff (2006) Continental volcanic degassing at Nyamuragira and Nyiragongo (DR Congo), IAVCEI meeting, Guangzhou, China, May 14-18, 2006.

Dalton, M.P., G.J.S. Bluth, A.J. Prata, I.M. Watson and S.A. Carn (2006) Ash, SO₂, and aerosol analysis of the November 2002 eruption of Reventador Volcano, Ecuador using TOMS, HIRS, and MODIS satellite sensors. Cities on Volcanoes 4, Quito, Ecuador, January 22-27, 2006.

Head, E.M., G.J.S. Bluth, I.M. Watson and A.J. Prata (2006) An evaluation of Galapagos Islands volcanic activity, 1978-1998. Cities on Volcanoes 4, Quito, Ecuador, January 22-27, 2006.

Watson, I.M., J.M. Shannon and G.J.S. Bluth (2006) Development of an Ultraviolet Camera for Imaging Volcanic Sulfur Dioxide Emissions. Cities on Volcanoes 4, Quito, Ecuador, January 22-27, 2006.

Manuscripts completed:

Bluth, G.J.S. and S.L. Carn (2006, in review) Exceptional sulphur degassing from Nyamuragira volcano, 1979-2005. Submitted to International Journal of Remote Sensing, Special Issue on Volcano Remote Sensing.

Rodriguez, L.A., I.M. Watson, V. Hards, G. Ryan, M. Edmonds, C. Oppenheimer, G.J.S. Bluth, and W.I. Rose (2006, in review) SO₂ conversion rates at Soufriere Hills volcano, Montserrat, B.W.I. Submitted to Journal of Volcanology and Geothermal Research.

Bluth, G.J.S., J.M. Shannon, I.M. Watson, A.F. Prata and V.J. Realmuto (2006, in review) Development of an ultra-violet digital camera for volcanic SO₂ imaging. Submitted to Journal of Volcanology and Geothermal Research.

Reviews:

3/06 – National Science Foundation proposal (M. Ramsey, PI)