

Goderis, Steven
Earth System Sciences
Vrije Universiteit Brussel
Pleinlaan 2, B-1050 Brussels, Belgium
Steven.goderis@vub.ac.be
<http://emostv.googlepages.com/>
Tel: +32-(0)2 629 33 97/ Fax: +32-(0)2 629 33 91

Current Position

PhD student, Vrije Universiteit Brussel, Research Unit Earth System Sciences and Dept. of Analytical Chemistry, Universiteit Gent, supported by an IWT (Institute for the Promotion of Innovation through Science and Technology in Flanders) fellowship. Topic: Projectile identification in terrestrial impact craters. Advisors: Prof. Dr. Ph. Claeys (VUB) & Prof. Dr. F. Vanhaecke (UGent)

Education

Master in Geosciences: 5 July 2006, Universiteit Gent, Belgium with great honor (Magna cum Laude). Thesis topic: Geochemistry and distribution of platinum group elements in the impact structures of Bosumtwi (Ghana) and Gardnos (Norway). Advisor: Prof. Dr. Ph. Claeys

Publications

In press

- Goderis S., Hertogen J., Vanhaecke F., and Claeys Ph. 2009. Siderophile elements from the Eyreville drill cores of the Chesapeake Bay impact structure do not constrain the nature of the projectile. Large Meteorite Impacts and Planetary Evolution IV: Geological Society of America Special Paper (In Press).

Published

- Paquay F.S., Goderis S., Ravizza G., Vanhaecke F., Boyd M., Surovell T.A., Holliday V.T., Haynes C.V., and Claeys Ph. 2009. Absence of geochemical evidence for an impact event at the Bølling-Allerød/Younger Dryas transition. Proceedings of the National Academy of Sciences, Vol. 106: 21505-21510.
- Goderis S., Kalleson, E., Tagle, R., Dypvik, H., Schmitt, R.-T., Erzinger, J., and Claeys, Ph. 2009. A non-magmatic iron projectile for the Gardnos impact event. Chemical Geology, Vol. 258: 145-156.
- Claeys Ph., and Goderis S. 2007. Lethal billiards. Nature, Vol. 449: 30-31.
- Goderis S., Tagle R., Schmitt R., Erzinger J., and Claeys Ph. 2006. Platinum Group Elements in the ICDP cores from the Bosumtwi Crater, Ghana. Meteoritics & Planetary Science, Vol. 42 (4-5): 731-741.
- Goderis S. 2007. Geochemistry and distribution of platinum group elements in the impact structures of Bosumtwi (Ghana, Pleistocene) and Gardnos (Norway, boundary Proterozoic-Paleozoic). Geologica Belgica, Vol. 10 (1-2): 133-135.

Abstracts

- Claeys Ph., Schryvers D., Tian H., Goderis S. 2009. Positive anomaly in platinum group elements and the presence of shocked diamonds: Two question marks at the Younger Dryas. Eos, Vol. 90, Number 52, 29 December 2009, Fall Meet. Suppl. [Abstract].
- Paquay F., Goderis S., Ravizza G. & Claeys Ph. 2009. No evidence of extraterrestrial geochemical components at the Bolling-Allerød/Younger Dryas transition. Annual Meeting Geological Society of America [Abstract #234-3].

- Ferrière L., Devouard D., Goderis, S., Vincent P., Bernon D., Lorillard R. & Saul J.M. 2009. Petrographic and geochemical study of an anomalous melt rock from the Gilf Kebir Plateau, close to the Libyan Desert Glass area, Egypt. 72nd Annual Meteoritical Society Meeting [Abstract #5384].
- Masaitis V.L., Goderis S. & Claeys Ph. 2009. Middle Paleozoic basalts of the eastern part of the Siberian platform: preliminary data on PGE content. LIPs of Asia International Symposium, Novosibirsk, Russia, August 6-9 [Abstract].
- Goderis S., Kalleeson E., Tagle R., Dypvik H., Schmitt R.-T., Erzinger J. & Claeys Ph. 2009. A geochemical characterization of the Gardnos impactor. NIR – Network on Impact Research, Gol, Norway, June 08–11 [Abstract].
- Claeys Ph., Paquay F., Goderis S., and Vanhaecke F. 2008. Do The Concentrations of Platinum Group Elements in the Younger Dryas Black Layer Really Support an Extraterrestrial Origin? Eos Trans. AGU, 89(53), Fall Meet. Suppl. Abstract P31A-1382.
- Goderis S. and Claeys Ph. 2008. Projectile identification in Terrestrial and Lunar Impact Structures. ESLAB: Cosmic Cataclysms and Life, Abstract Book, p. 16.
- Goderis S., Vanhaecke F., Hertogen J., and Claeys Ph. 2008. Platinum group element (PGE) ratios in the cored impactites of the Eyreville drill site of the Chesapeake Bay impact structure. Large Meteorite Impacts and Planetary Evolution IV [Abstract#3031].
- Goderis S., Vanhaecke F., and Claeys Ph. 2007. Characterization of the Chesapeake Bay impactor by determination of the platinum group element (PGE) ratios in the impactite samples of the 2005-2006 ICDP-USGS deep drilling project cores. Annual Meeting Geological Society of America, Vol. 39 [Paper #167-13].
- Goderis S., Tagle R., and Claeys Ph. 2007. Current situation on the characterization of the late Eocene impact structures using platinum group element (PGE) ratios. Hothouse, Icehouse, and Impacts: The Late Eocene Earth [Abstract].
- Tagle R., Goderis S., and Claeys Ph. 2007. On the nature of S-type asteroids and the terrestrial impactor population. 38th Lunar and Planetary Science Conference [Abstract#2216], Houston, Texas, CD-ROM.
- Goderis S., Tagle R., Kalleeson E., Dypvik H., and Claeys Ph. 2006. A Non-Magmatic Iron Meteorite As Projectile for the Gardnos Crater. Annual Meeting Geological Society of America, Volume 38 [Abstract #111141].
- Goderis S., Tagle R., Claeys Ph., Schmitt R., and Erzinger J. 2006. Platinum Group Elements in the ICDP cores from the Bosumtwi Crater, Ghana. 37th Lunar and Planetary Science Conference [Abstract #1305], Houston, Texas, CD-ROM.

Analytical experience

- PGE analyses using nickel sulfide fire-assay pre-concentration before ICP-MS (development of the procedure in Flanders)
- XRF, ICP-MS, and ICP-OES for major and trace elements
- Study of thin sections (imaging and analysis) using SEM-EDS
- Course in Laser Ablation ICP-MS: Fundamentals and Application to Geological, Environmental and Biological Problems during the 2007 Geological Society of America Annual Meeting, October 27, 2007 by Alan Koenig and Ian Ridley
- Measurement of strontium (Sr) isotope ratios in terrestrial impact ejecta layers and development of a procedure to prepare and measure chromium (Cr) isotope ratios in impact-related lithologies and meteorites using TIMS/MC-ICPMS

Fieldwork

- Several excursions in the framework of the Master thesis program of the Ghent University in Belgium (Ardennes, Cenozoic etc.) and abroad (France, Poland)
- Sampling at the Gardnos crater (Norway): 5 days in August 2005 with H. Dypvik and E. Kalleeson

- Field trip to the Ries crater in Germany with a group of French students from Nancy and Nantes in November 2006 and with a group of students from the KULeuven and UGent in May 2008
- Participant in the GSA Field Forum: Investigation of the Wetumpka impact structure, a well-preserved marine impact crater, and the K-T boundary in the Alabama Gulf Coastal Plain from the 8th to the 11th of March, 2007, Alabama, USA
- Participant in the Penrose Conference 'Hothouse, Icehouse, and Impacts: The Late Eocene Earth' with a field trip to the Massignano stratotype section, followed by sampling of several K-T boundaries in the vicinity of Coldigioco (Frontale, Fonte D'Olio, etc.) from October 3rd to 6th 2007 (Ancona, Italy)
- Two-day visit to several outcrops in the Vredefort Dome in August 2008 under the guidance of Prof. Dr. W.U. Reimold and Prof. Dr. R. Gibson in combination with a short day in the field at the Tswaing impact crater (South Africa)
- Participant in the Japanese-Belgian (JARE-51/BELARE-SAMBA) meteorite recovery program in the winter of 2009-2010 in the eastern Sør Rondane Mountains (area around Balchenfjella) of Antarctica

Awards

- The Barringer Family Fund for Meteorite Impact Research in 2007 with the project "PGE analyses for projectile identification of the late Eocene ejecta layers". This special fund was established by the Barringer Crater Company to support fieldwork by students interested in the study of impact cratering processes. It provides a small number (3 to 5) of competitive grants each year for financial support of field research at known or suspected impact sites worldwide.
- "JONGERENPRIJS 2006 - PRIX DES JEUNES 2006" of the Geologica Belgica: Award for the best Master Presentation in 2006 received during the annual meeting on Friday the 6th of October, 2006 (Thesis topic: see above).

Motivation

An ardent fascination for our Solar System and space, planetary systems, and the origin and evolution of life led me to start a Bachelor in Geosciences at the Universiteit Gent, Belgium in October 2001. In October 2004, this study continued in the form of a Master in Geosciences at the same university. Before choosing a topic for the required Master thesis at the Universiteit Gent, I visited the Vrije Universiteit Brussel, also in Belgium as I had heard Prof. Dr. Ph. Claeys was working on the geo/cosmochemistry of impact structures, a topic that - in my opinion - came closest to my juvenescent interests. The project 'Geochemistry and distribution of platinum group elements in the impact structures of Bosumtwi (Ghana) and Gardnos (Norway)' was completed successfully in July 2006, when I received my Master with great honor (Magna cum Laude). This work - including fieldwork in Norway under the guidance of Dr. E. Kalleson and Prof. Dr. H. Dypvik - has led to two peer-reviewed articles in *Meteoritics and Planetary Sciences* and *Chemical Geology* (See list above).

In January 2007, the Institute for the Promotion of Innovation by Science and Technology in Flanders granted me a PhD scholarship to continue working on projectile identification in terrestrial impact structures. In this project, I characterize the type of projectiles responsible for the formation of particular impact structures (e.g., the late Eocene Chesapeake Bay, Popigai, and Wanapitei structures) in an attempt to determine whether or not the composition and the provenance of these projectiles (meteorites) have changed through geological time. The extraterrestrial contribution, incorporated into the impacted lithologies during crater formation on a planetary body, induces a geochemical signal in these molten and/or shocked rocks that differs from the crustal signature and can be measured using isotopic [chromium (Cr)] and elemental ratios [platinum group elements (PGE)] in the 'contaminated' lithologies. This geochemical signal can first confirm the impact origin of the structure and in ideal cases determine the precise nature of the projectile or in other words, the type of impacted meteorite.

Precise characterization of the projectile can eventually link the impacted fragment to an asteroid or comet family and help determine its provenance and potential changes in sources through time.

Personal data

Born 26th of June 1983, Belgian nationality

Mother language Dutch, very good knowledge of English (to write, speak, and understand), good knowledge of French (to write, speak, and understand), notions of Spanish and German (to speak and understand)