



Professor Juliet Biggs
BA, MSci(Cantab.), PhD(Oxon.)

Professor of Earth Sciences

Area of research

Continental Tectonics and Volcanic Deformation

Office IC001
Wills Memorial Building,
Queens Road, Clifton BS8 1RJ
([See a map](#))

+44 (0) 117 331 5001
juliet.biggs@bristol.ac.uk

Summary

My research primarily uses Interferometric Synthetic Aperture Radar (InSAR) to understand the physics of the processes that deform the earth's surface. Recent developments in satellite geodesy are providing a new perspective on continental tectonics and volcanic processes through observations of aseismic processes such as interseismic strain accumulation, postseismic relaxation and magma intrusion.

These measurements can identify the mechanisms controlling continental deformation and quantify the constitutive laws controlling rheology. My current areas of interest are the East African Rift and the volcanoes of Central America and the Northern Andes. Practical applications of my work include seismic and volcano hazard assessment and geothermal resources.

Biography

I received BA and MSci degrees in Natural Sciences in 2003 from the University of Cambridge where I specialised in geology and geophysics. Since then, I've been using Earth Observation data to study active tectonic processes such as earthquakes and volcanoes. I received my PhD in 2007 for my work on the earthquake cycle in Alaska. Currently, my work focusses on understanding the volcanic and magmatic processes that cause deformation over a range of timescales. In Central and South America, we are working with volcanic observatories to integrate satellite observations with traditional ground-based monitoring methods and hazard analyses. In East Africa, we are working to understand how and where magma rises and strain accumulates in an active continental rift. I was awarded the 2012 Winton Capital Award of the Royal Astronomical Society, the 2014 Lloyds of London Science of Risk Prize, the Bullerwell Lecture of the British Geophysical Association in 2016 and the American Geophysical Union (AGU) Geodesy Section Award in 2017.

Teaching

I am currently unit director for the 3rd year Global Tectonics and Geodynamics option and co-teach several other units including introductory field mapping, first year geology and the 4th year volcanic hazards option. Each year, I supervise research projects on the MSc Volcanology and MSci Geology and Environmental Geoscience programmes and encourage potential students to discuss their project ideas with me ahead of time. For 2013-2016, I was the School's Teaching Quality Officer and chair of the Staff-Student Liaison Committee.

Keywords

- magma intrusion
- postseismic relaxation
- aseismic processes
- volcanoes

Memberships

Organisations

[School of Earth Sciences](#)

Earth Sciences staff

- [Earth Sciences academic staff including research fellows](#)

Research groups

- [Geophysics](#)
- [Volcanology](#)

Research themes

- [Dynamics and Architecture of the Solid Earth](#)
- [Crustal Magmatism, Volcanism and Geological Risk](#)

Interdisciplinary groups

- [The Cabot Institute](#)

Recent publications

- Rodriguez, CA & Biggs, J, 2020, '[Deformation associated with sliver transport in Costa Rica: Seismic and geodetic observations of the July 2016 Bijagua earthquake sequence](#)'. *Geophysical Journal International*, vol 220., pp. 585-597
- Anantrasirichai, P, Biggs, J, Albino, F & Bull, D, 2019, '[A deep learning approach to detecting volcano deformation from satellite imagery using synthetic datasets](#)'. *Remote Sensing of Environment*, vol 230.
- Albino, F, Biggs, J & Syahbana, DK, 2019, '[Dyke intrusion between neighbouring arc volcanoes responsible for 2017 pre-eruptive seismic swarm at Agung](#)'. *Nature Communications*, vol 10.
- Fagereng, E & Biggs, J, 2019, '[New perspectives on 'geological strain rates' calculated from both naturally deformed and actively deforming rocks](#)'. *Journal of Structural Geology*, vol 125., pp. 100-110
- Johnson, J, Poland, M, Anderson, K & Biggs, J, 2019, '[A Cautionary Tale of Topography and Tilt from Kilauea Caldera](#)'. *Geophysical Research Letters*, vol 46., pp. 4221-4229
- Anantrasirichai, N, Biggs, J, Albino, F & Bull, D, 2019, '[The application of Convolutional Neural Networks to Detect Slow, Sustained Deformation in InSAR Timeseries](#)'. *Geophysical Research Letters*.
- Jones, JR, Stamps, DS, Wauthier, C, Saria, E & Biggs, J, 2019, '[Evidence for Slip on a Border Fault Triggered by Magmatic Processes in an Immature Continental Rift](#)'. *Geochemistry, Geophysics, Geosystems*, vol 20., pp. 2515-2530
- Biggs, J & Annen, CJ, 2019, '[The lateral growth and coalescence of magma systems](#)'. *Philosophical Transactions of the Royal Society A: Physical and Engineering Sciences*, vol 377.
- Arnold, DW, Biggs, J, Dietterich, HR, Vargas, SV, Wadge, G & Mothes, P, 2019, '[Lava flow morphology at an erupting andesitic stratovolcano: A satellite perspective on El Reventador, Ecuador](#)'. *Journal of Volcanology and Geothermal Research*, vol 372., pp. 34-47
- Hodge, M, Biggs, J, Fagereng, E, Elliott, A, Mdala, H & Mphepo, F, 2019, '[A semi-automated algorithm to quantify scarp morphology \(SPARTA\): Application to normal faults in southern Malawi](#)'. *Solid Earth and Discussions*, vol 10., pp. 27-57

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Courses

Professor Biggs currently teaches 5 courses: