

Katherine J Dobson

Publications

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In Review

- Pistone, M., Arzilli, F., Cordonnier, B., **Dobson, K.J.**, Reusser, E., Ulmer, P., Marone, F., Whittington, A.G., Mancini, L., Fife, J.L., Blundy, J. D., Gas-driven filter pressing in magmas: Insights into melt segregation from crystal mushes. *Geology*
- Van Eyndhoven, G., Batenburg, K.J., Kazantsev, D., Van Nieuwenhove, V., Lee, P.D., **Dobson, K.J.** & Sijbers, J. An iterative model-based reconstruction algorithm for fast fluid flow imaging in dynamic CT. *Transactions on image processing*
- Dobson, K. J.**, Lin, Q., Neethling, S., Courtois, L. & Lee, P. D. Spatial heterogeneity of leaching behaviour within low grade ores: *in situ* determination of individual chalcopyrite grain volume reduction *Hydrometallurgy*
- Courtois, L., **Dobson, K. J.**, Lin, Q., Neethling, S. & Lee, P. D. Image analysis algorithms for tracking *in situ* grain size reductions *For submission to Computers & Geosciences*

In Press/Published

- Kazantsev, D., Van Eyndhoven, G., Lionheart, W.R.B., Withers, P. J., **Dobson, K.J.**, McDonald, S.A., Atwood, R., & Lee, P. D. Employing temporal self-similarity across the entire time domain in CT reconstruction. *Transactions of the Royal Society A* (accepted)
- Tomkinson, T., Lee, M. R., Mark, D. F., **Dobson, K. J.**, Lee, P. D. & Franchi, I. A. (2015) The martian meteorite Northwest Africa (NWA) 5790: an aquiclude at the top of the nakhlite pile *Meteoritics & Planetary Science* **50**, 2, 287-304
- Lin, Q., Neethling, S.J., **Dobson, K.J.**, Courtois, L., & Lee, P.D., (2015) Quantifying and minimising systematic and random errors in X-ray micro tomography based volume measurements. *Computers and geoscience* **77** 1-7
- Lindgren, P., Hanna, R. D. Lee, M, R, **Dobson, K. J.** & Tomkinson, T. The paradox between low shock-stage and evidence for compaction in CM carbonaceous chondrites explained by multiple low-intensity impacts. *Geochimica & Cosmochimica Acta* (accepted)
- Kazantsev, D., Thompson, W. M., **Dobson, K. J.**, Kaestner, A. P., Lionheart, W. R. B., Withers, P. J. & Lee, P. D. (2014) Simultaneous 4D-CT reconstruction using higher order spatial regularization and edge enhancement based on global information in temporal domain. *Inverse problems and Imaging*
- Pankhurst, M. J., **Dobson, K. J.**, Morgan, D. J., Loughlin, S. C., Thordarson, Th., Lee, P. D. & Courtois, L. (2014) Monitoring the magmas fuelling volcanic eruption in near-real time. *Journal of Petrology* **55**, 671-684.
- Gautheron, C. E., Tassan-Got, L., Ketcham, R. A., & **Dobson, K. J.** (2012) Accounting for long alpha-particle stopping distances in (U-Th-Sm)/He geochronology: 3D modelling of diffusion, zoning, implantation, and abrasion. *Geochimica & Cosmochimica Acta* **73**, 6052-6064
- Kirkpatrick, J. D., **Dobson, K. J.**, Mark, D. F., Shipton, Z. K., Brodsky, E. E. & Stuart, F. M. (2012) The depth of pseudotachylite formation from detailed thermochronology and constraints on coseismic stress drop variability. *J. Geophys. Res.*, **117**, B6, B06406: DOI:10.1029/2011JB008846
- Maino, M., Dallagiovanna, G., **Dobson, K. J.**, Gaggero, L., Persano, C., Seno, S. & Stuart, F. M. (2012) Testing models of orogen exhumation using zircon (U-Th)/He thermochronometry: insight into the Ligurian Alps, Northern Italy. *Tectonophysics* . **560-561**, 84-93
- Dobson, K. J.**, Dempster T. J. & Stuart, F. M. (2010) Constraining the post-emplacement evolution of the Hebridean Igneous Province (HIP) using low temperature thermochronology: How long has the HIP been cool? *Journal of the Geological Society of London* **167**, 973-984
- van der Beek, P. A., Valla, P. G., Herman, F., Braun, F., Persano, C., **Dobson K. J.**, Stuart, F. M. & Labrin E. (2010) Inversion of thermochronological age-elevation profiles to extract

- independent estimates of denudation and relief history – II: Application to the French Western Alps *Earth and Planetary Science Letters*. **296**, 9-22
- Persano, C. & **Dobson, K. J.** (2009) How many years can a mountain exist before it's washed to the sea? Or, Bob Dylan's theory of landscape evolution. *Scottish Geographical Journal*, **125**, 370–378
- Dobson K. J.**, Persano, C. & Stuart, F. M. (2009) Quantitative constraints on mid- to shallow crustal processes using the zircon (U-Th)/He thermochronometer. in Lisker, F., Ventura, B. & Glasmacher, U. A., (eds) Thermochronological methods: from palaeotemperature constraints to landscape evolution models. *Geological Society of London Special Publication*, **324**, 47-56
- Dobson K. J.**, Stuart F. M., Depmster, T. J. & EIMF (2008). U and Th zonation in Fish Canyon Tuff zircons: Implications for a zircon (U-Th)/He standard. *Geochimica & Cosmochimica Acta*. **72**, 4745-4755
- Foeken, J. P. T., Stuart, F. M., **Dobson, K. J.**, Persano, C. & Vilbert, D. (2006) A diode laser system for heating minerals for (U-Th)/He chronometry. *Geochemistry, Geophysics, Geosystems*. **7**, Q04015, DOI:10.1029/2005GC001190
- Kirstein, L. A., Sinclair, H., Stuart, F. M., **Dobson, K. J.** (2006) Rapid Early Miocene exhumation of the Ladakh Batholith, western Himalaya. *Geology*, **34** (12), 1049-1052

Selected published abstracts

- Dobson, K. J.**, Dingwell, D. B, Hess, K. U., Withers P. J., Lee, P.D., Pistone, M., Fife J.L., Atwood. R. (2015) Taking geology to the IMAX: 3D and 4D insight into geological processes using micro-CT. *EGU General Assembly* **Invited**
- Dobson, K.J.**, Pistone, M., Fife, J.L., Cordonnier, B., Blundy, J.D. Dingwell D.B., & Lee P.D. (2015) Quantifying dynamic rheology, phase interactions and strain localisation in deforming three phase magmas using high-speed x-ray tomography *EGU General Assembly* (oral)
- Veksler, I.V., **Dobson, K. J.** (presenting), Hess, K-U., Ertel-Ingrisch, W., Humphreys M. (2015) Quantifying melting and mobilisation of interstitial melts in crystal mushes *EGU General Assembly* (poster)
- Pistone, M., Arzilli, F., Cordonnier, B., **Dobson, K.J.**, Reusser, E., Ulmer, P., Marone, F., Whittington, A.G., Mancini, L., Fife, J.L., Blundy, J. D., Gas-driven filter pressing: insights into melt segregation from crystal mushes *EGU General Assembly* (poster)
- Moreland, W., Pankhurst, M.J., **Dobson, K. J.**, (presenting) Thordarson, T., Fitton, G., Lee, P.D., (2015) A comparison of new, old and future densiometric techniques as applied to volcanologic study *EGU General Assembly* (poster)
- Mcdonald, S.A., **Dobson, K. J.**, (presenting) Kasantsev, D, Atwood, R., Fife, J.L., Kaestener, A, Wither, P.J., Lee, P.D.. (2015) In situ real-time multi-scale quantification of flow pathways during three-phase flow through porous media *EGU General Assembly* (oral)
- Seers. T.D., Andrew, M., Bijelic, B., Blunt. M., **Dobson, K. J.**, Hodgetts, D., Lee, P.D., Menke, H., Singh, K., (2015) Imaging cross fault multiphase flow using time resolved high pressure-temperature synchrotron fluid tomography: implications for the geological storage of carbon dioxide within sandstone saline aquifers *EGU General Assembly* (poster)
- Pankhurst, M. J., **Dobson, K. J.**, Morgan, D. J., Loughlin, S. C., Thordarson, Th., Lee, P. D. & Courtois, L. *Monitoring the magmas fuelling volcanic eruption in near-real time*. (2014). EGU General Assembly.
- Lindgren, P., Lee, M. R., **Dobson, K. J.**, Hanna, R. D. & Tomkinson, T. (2012) Understanding the deformation history of Murchison (CM2): clues from calcite twin stress analysis and high resolution x-ray computed tomography. *75th Annual Meeting of the Meteoritical Society. Meteoritics and Planetary Science Supplement*, 5280
- Dobson, K. J.**, Brown, R. W., MacDonald, R., Gallagher, K. & Stuart, F. M. (2011) Constraining the Cenozoic evolution of South Africa using (U-Th)/He thermochronology: the influence of dynamic topography at a passive margin. *Geophysical Research Abstracts* **13**, EGU2011-4915.

- Dobson, K. J.**, McDonald, R., Brown, R. W., Gallagher, K. & Stuart, F. M. Dating the emergence of the Africa Superswell: a window into mantle processes using combined (U-Th)/He and AFT thermochronology. *Geophysical Research Abstracts*. **12**, EGU2010- 5167, EGU General Assembly 2010.
- Dobson, K. J.**, Kirkpatrick, J. D., Shipton, Z. K., Mark, D. F. & Stuart, F. M. Constraining t-T conditions during palaeoseismic events - constraining the viscous brake phenomena in nature. *Geophysical Research Abstracts*. **12**, EGU2010-5624, EGU General Assembly 2010
- Dobson, K. J.**, Brown, R. W. & Coventry, A. R. & Dymock, R. Seeing subtleties: the importance of chemical composition in AFT analysis of old and complex landscapes. *Proceedings of the 11th International Conference on Thermochronology*, Alaska 2008.
- Maino, M., Dallagoivanna, G., **Dobson, K. J.**, Gaggero, L., Persano, C., Seno, S., & Stuart, F. M. Timing of final collisional stages and exhumation in orogenic belts: inferences from zircon (U-Th)/He dating of low temperature metamorphism in the Ligurian Alps, Northern Italy. *Proceedings of the 11th International Conference on Thermochronology*, Alaska 2008.
- Dobson, K. J.**, Stuart, F.M., Dempster, T. J., Persano, C., & Bell, B. R. How long has the HIP been cool? The misunderstood youth of the Hebridean Igneous Province. *Geochimica et Cosmochimica Acta*. **70**. 18. A143-A143 Goldschmidt Conference, Melbourne, 2006
- Dobson, K. J.**, Olive, V., Persano, C. & Stuart, F. M. An elegant procedure for the routine analysis of zircon (U-Th)/He ages. *Geophysical Research Abstracts*. **7**, EGU05-A-06696, EGU General Assembly 2005
- Dobson, K. J.** Stuart, F.M., Bell, B. R., & Dempster, T. J. Constraining the post-eruptive evolution of Large Igneous Provinces: low temperature thermochronology of the Hebridean Igneous Province. *Geophysical Research Abstracts*. **7**, EGU05-A-07114, EGU General Assembly 2005

Selected international conference presentations

- Dobson, K.J.**, Dingwell D.B., Hess, K-U., Marti, J. Lavallee. Y. (2015) Going down the tubes: complex kinematic indicators in tube pumices revealed by X-ray tomography *UIGG-IACVEI, Prague 2015*
- Dobson, K.J.**, Pistone, M., Fife, J.L., Cordonnier, B., Blundy, J.D. Dingwell D.B., & Lee P.D. (2015) Quantifying dynamic rheology, phase interactions and strain localisation in deforming three phase magmas using high-speed x-ray tomography (2015) *UIGG-IACVEI, Prague 2015*
- Dobson, K.J.**, Pistone, M., Arzilli, F., Cordonnier, B., Reusser, E., Fife, J.L., Ulmer, P., Blundy, J.D., Whittington, A.G., Mancini, L., Gas-driven filter pressing: insights into melt segregation from crystal mushes *UIGG-IACVEI, Prague 2015*
- Lavallee Y., Hess, K-U., Kendrick, J.E., **Dobson K.J.**, Dingwell, D.B (2015) Eruptive shear revealed by tomography *AGU-GAC-MAC-CGU Montreal*
- Milodowski, A. E., Bateman, K., Field, L. P., Shaw, S., Selby, L., **Dobson, K. J.**, Coutois, L. (2014) The mineralogical evolution of the alkaline disturbed zone of a cementitious repository, and its impact on transport properties *IGDTP Geodisposal Conference*
- Dobson K. J.**, Pistone M., Fife J. L., & Lee P. D. (2014) *Understanding melt movements in 4D: magmatic processes through in situ observation*. Volcanic & Magmatic Studies Group Annual Meeting, Edinburgh, UK.
- Hughes, E. C., Edmonds, M., Neaves, D.A., Dobson K.J. & Lee P.D (2014) Volcanic eruption dynamics of pantellerite magmas. Volcanic & Magmatic Studies Group Annual Meeting, Edinburgh, UK.
- Nicholson, E., Dobson K. J., Cashman, K. & Rust, A. (2014) Reconstructing the fragmentation mechanism of subglacial basaltic eruptions from fine ash textures. Volcanic & Magmatic Studies Group Annual Meeting, Edinburgh, UK
- Pankhurst, M. J., **Dobson, K. J.**, Morgan, D. J., Loughlin, S. C., Thordarson, Th., Lee, P. D. & Courtois, L. (2014) *Monitoring the magmas fuelling volcanic eruption in near-real time using X-ray micro-computed tomography. Advances and opportunities*. Volcanic & Magmatic Studies Group Annual Meeting, Edinburgh, UK
- Cashman K., Nicholson, E., Rust, A. **Dobson K. J.** (2014) *The Role of Thermal Stresses in Magma Fragmentation*. Nordic Geologic Meeting, Lund, Norway.
- Dobson, K. J.**, Lee, P.D., Brown D. J., Tomkinson T., Cramer, E.L., Sherlock, S.C., Puncreobutr C., Kareh K.M., (2013) *Taking geology to the IMAX: 3D and 4D insight into geological processes using micro-CT*. Annual Meeting of the Volcanic & Magmatic Studies Group, Bristol..

- Cramer, E.L., Sherlock, S.C. Halton, A.M., Blake, S., Barry T.L., **Dobson, K.J.**, Kelley, S.P., Jolley D.W, Lee, P.D. (2013) *Understanding $^{40}\text{Ar}/^{39}\text{Ar}$ age variations in basalt lavas: A geochemical, petrographic and X-ray computed tomographic study of the Faroe Islands Basalt Group*. 47th Annual Meeting of the Volcanic & Magmatic Studies Group, Bristol, Jan 2013.
- Cramer, E.L., Sherlock, S.C. Halton, A.M., Blake, S., Barry T.L., **Dobson, K.J.**, Kelley, S.P., Jolley D.W, Lee, P.D. (2013) *Understanding $^{40}\text{Ar}/^{39}\text{Ar}$ age variations in basalt lavas: A combined geochemical, petrographic and X-ray computed tomographic study*. Basalt 2013, Gorlitz, Germany
- Dobson, K. J.**, Brown D. J. & Drake, S. Quantifying the internal structures in ignimbrites: new insights from X-ray micro computed tomography. Annual Meeting of the Volcanic & Magmatic Studies Group, Durham, Jan 2012.
- Dobson, K. J.**, Brown, R. W., MacDonald, R., Gallagher, K. & Stuart, F. M. (2011) Constraining the Cenozoic evolution of South Africa using (U-Th)/He thermochronology: the influence of dynamic topography at a passive margin. Geophysical Research Abstracts 13 EGU2011-4915.
- Dobson, K. J.**, McDonald, R., Brown, R. W., Gallagher, K. & Stuart, F. M. Dating the emergence of the Africa Superswell: a window into mantle processes using combined (U-Th)/He and AFT thermochronology. Geophysical Research Abstracts. 12, EGU2010- 5167, EGU General Assembly 2010.
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- van der Beek, P. A., Valla, P. G., Herman, F., Braun, J., Persano, C., Labrin, E., **Dobson, K. J.** & Stuart, F. M. Extracting quantitative information on denudation and relief history from thermochronological age-elevation profiles: an example from the French Western Alps. Geophysical Research Abstracts. 11, EGU General Assembly 2009
- Dobson, K. J.**, Brown, R. W. & Coventry, A. R. & Dymock, R. Seeing subtleties: the importance of chemical composition in AFT analysis of old and complex landscapes. Proceedings of the 11th International Conference on Thermochronology, Alaska 2008.
- Maino, M., Dallagoivanna, G., **Dobson, K. J.**, Gaggero, L., Persano, C., Seno, S., & Stuart, Timing of final collisional stages and exhumation in orogenic belts: inferences from zircon (U-Th)/He dating of low temperature metamorphism in the Ligurian Alps, Northern Italy. Proceedings of the 11th International Conference on Thermochronology, Alaska 2008.
- Dobson, K. J.**, Stuart, F.M., Dempster, T. J., Persano, C., & Bell, B. R. How long has the HIP been cool? The misunderstood youth of the Hebridean Igneous Province. Geochimica et Cosmochimica Acta. 70. 18. A143-A143 Goldschmidt Conference, Melbourne, 2006
- Dobson, K. J.**, Olive. V., Persano, C. & Stuart, F. M. An elegant procedure for the routine analysis of zircon (U-Th)/He ages. Geophysical Research Abstracts. 7, EGU05-A-06696, EGU General Assembly 2005