# References

Angelotti, A., Ly, F., and Zille, A. (2018). On the applicability of the moving line source theory to thermal response test under groundwater flow: considerations from real case studies. *Geothermal Energy* [online].

6.1, p. 12. ISSN: 2195-9706. DOI: [10.1186/s40517-018-0098-z.](https://doi.org/10.1186/s40517-018-0098-z) [Accessed May 15, 2020].

Banks, D. (2008). *An Introduction to Thermogeology: Ground Source Heating and Cooling*. Oxford, UK: Blackwell Publishing, Ltd. DOI: [10.1002/9781444302677.](https://doi.org/10.1002/9781444302677) [Accessed Oct. 4, 2019].

Bauer, F., Michalowski, A., Kiedrowski, T., and Nolte, S. (2015). Heat accumulation in ultra-short pulsed scanning laser ablation of metals. *Optics Express* [online]. 23.2, p. 1035. ISSN: 1094-4087. DOI: [10.1364/OE. 23.001035.](https://doi.org/10.1364/OE.23.001035) [Accessed May 15, 2020].

Beamish, D. and Busby, J. (2016). The Cornubian geothermal province: heat production and flow in SW England: estimates from boreholes and airborne gamma-ray measurements. *Geothermal Energy* [online]. 4.1, p. 4.

ISSN: 2195-9706. DOI: [10.1186/s40517-016-0046-8.](https://doi.org/10.1186/s40517-016-0046-8) [Accessed Apr. 14, 2020].

Beltrami, H., Matharoo, G. S., Smerdon, J. E., Illanes, L., and Tarasov, L. (2017). Impacts of the Last Glacial Cycle on ground surface temperature reconstructions over the last millennium. *Geophysical Research Letters*. 44.1, pp. 355–364.

Brereton, R., Browne, M., Cripps, A., Gebski, J., Bird, M., Halley, D., and McMillan, A. (1988). Glenrothes Borehole: Geological Well Completion Report. Investigation of the Geothermal Potential of the UK. *British Geological Survey, Keyworth*.

Browne, M., Dean, M., Hall, H., McAdam, A., Monro, S., and Chisholm, J. (1999). *A lithostratigraphical framework for the Carboniferous rocks of the Midland Valley of Scotland*. Research report RR/99/07. British Geological Survey, p. 30.

Burley, A., Edmunds M., W., and Gale, I. (1984). *Catalogue of geothermal data for the land area of the United Kingdom*. Second revision. British Geological Survey.

Busby, J., Kingdon, A., and Williams, J. (2011). The measured shallow temperature field in Britain. *Quarterly Journal of Engineering Geology and Hydrogeology* [online]. 44.3, pp. 373–387. ISSN: 1470-9236, 20414803. DOI: [10.1144/1470-9236/10-049.](https://doi.org/10.1144/1470-9236/10-049) [Accessed May 15, 2020].

Busby, J., Gillespie, M., and Kender, S. (2015). How hot are the Cairngorms? *Scottish Journal of Geology*. 51.2, pp. 105–115.

Busby, J. (2019). Thermal conductivity and subsurface temperature data pertaining to the Glasgow Geothermal Energy Research Field Site (GGERFS).

Cameron, I. and Stephenson, D. (1985). *British regional geology: The Midland Valley of Scotland.* Keyworth, Nottingham: British Geological Survey.

Carslaw, H. S. and Jaeger, J. C. (1959). *Conduction of heat in solids*. Clarendon P.

Chen, C., Shao, H., Naumov, D., Kong, Y., Tu, K., and Kolditz, O. (2019). Numerical investigation on the performance, sustainability, and efficiency of the deep borehole heat exchanger system for building heating.

*Geothermal Energy* [online]. 7.1, p. 18. ISSN: 2195-9706. DOI: [10.1186/s40517-019-0133-8.](https://doi.org/10.1186/s40517-019-0133-8) [Accessed Apr. 14, 2020].

Entwisle, D. C. (2019). Engineering geology and geotechnical summary of central Glasgow in the vicinity of the UK Geoenergy Observatories field sites.

Erol, S., Hashemi, M. A., and François, B. (2015). Analytical solution of discontinuous heat extraction for sustainability and recovery aspects of borehole heat exchangers. *International Journal of Thermal Sciences* [online]. 88, pp. 47–58. ISSN: 12900729. DOI: [10.1016/j.ijthermalsci.2014.09.007.](https://doi.org/10.1016/j.ijthermalsci.2014.09.007) [Accessed May 15, 2020].

Fisch, M., Guigas, M., and Dalenbäck, J. (1998). A REVIEW OF LARGE-SCALE SOLAR HEATING SYSTEMS IN EUROPE. *Solar Energy* [online]. 63.6, pp. 355–366. ISSN: 0038-092X. DOI: [https://doi.org/ 10.1016/S0038-092X(98)00103-0.](https://doi.org/https://doi.org/10.1016/S0038-092X(98)00103-0) Available from: [http://www.sciencedirect.com/science/ article/pii/S0038092X98001030.](http://www.sciencedirect.com/science/article/pii/S0038092X98001030)

Gillespie, M., Crane, E., and Barron, H. (2013). *Study into the Potential for Deep Geothermal Energy in Scotland - Volume 2*. AEC/001/11. Scottish Government, p. 129.

Gosnold, W., Majorowicz, J., Klenner, R., and Hauk, S. (2011). Implications of post-glacial warming for northern hemisphere heat flow. *Grc Transactions*. 35.GRC1029332.

He, H., Dyck, M. F., Horton, R., Ren, T., Bristow, K. L., Lv, J., and Si, B. (2018). Development and Application of the Heat Pulse Method for Soil Physical Measurements. *Reviews of Geophysics* [online]. 56.4, pp. 567–

620. ISSN: 87551209. DOI: [10.1029/2017RG000584.](https://doi.org/10.1029/2017RG000584) [Accessed May 15, 2020].

Hein, P., Kolditz, O., Görke, U.-J., Bucher, A., and Shao, H. (2016). A numerical study on the sustainability and efficiency of borehole heat exchanger coupled ground source heat pump systems. *Applied Thermal Engineering* [online]. 100, pp. 421–433. ISSN: 13594311. DOI: [10.1016/j.applthermaleng.2016.02.039.](https://doi.org/10.1016/j.applthermaleng.2016.02.039)

[Accessed May 15, 2020].

Jaupart, C. and Mareschal, J. (2005). Production from Heat Flow Data. *The Crust*. 3, pp. 65–84.

Kolditz, O., Bauer, S., Bilke, L., Böttcher, N., Delfs, J. O., Fischer, T., Görke, U. J., Kalbacher, T., Kosakowski, G., McDermott, C. I., Park, C. H., Radu, F., Rink, K., Shao, H., Shao, H. B., Sun, F., Sun, Y. Y., Singh, A. K., Taron, J., Walther, M., Wang, W., Watanabe, N., Wu, Y., Xie, M., Xu, W., and Zehner, B. (2012). OpenGeoSys: an open-source initiative for numerical simulation of thermo-hydro-mechanical/chemical (THM/C) processes in porous media. *Environmental Earth Sciences* [online]. 67.2, pp. 589–599. ISSN: 1866-6280, 1866-6299. DOI: [10.1007/s12665-012-1546-x.](https://doi.org/10.1007/s12665-012-1546-x) [Accessed Oct. 31, 2019].

Lazzari, S., Priarone, A., and Zanchini, E. (2010). Long-term performance of BHE (borehole heat exchanger) fields with negligible groundwater movement. *Energy*. 35.12, pp. 4966–4974.

Lyu, Z., Song, X., Li, G., Hu, X., Shi, Y., and Xu, Z. (2017). Numerical analysis of characteristics of a single U-tube downhole heat exchanger in the borehole for geothermal wells. *Energy* [online]. 125, pp. 186–196.

ISSN: 03605442. DOI: [10.1016/j.energy.2017.02.125.](https://doi.org/10.1016/j.energy.2017.02.125) [Accessed Apr. 14, 2020].

Majorowicz, J., Gosnold, W., Gray, D., Safanda, J., Klenner, R., and Unsworth, M. (2012). “Implications of PostGlacial Warming for Northern Alberta Heat Flow— Correcting for the Underestimate of the Geothermal Potential”. In: Transactions - Geothermal Resources Council. Vol. 36.

Molina-Giraldo, N. (2011). “Heat transport modeling in shallow aquifers: The role of thermal dispersion in aquifers and heat conduction into confining layers”. PhD thesis. Universität Tübingen.

Monaghan, A. (2014). *The Carboniferous shales of the Midland Valley of Scotland: geology and resource estimation*. British Geological Survey for Department of Energy and Climate Change, London, UK. [Accessed Oct. 4, 2019].

Monzo, P. (2011). “Comparison of different Line Source Model approaches for analysis of Thermal Response Test in a U-pipe Borehole Heat Exchanger”. PhD thesis. Stockholm. 113 pp.

Ozgener, O., Ozgener, L., and Tester, J. W. (2013). A practical approach to predict soil temperature variations for geothermal (ground) heat exchangers applications. *International Journal of Heat and Mass Transfer* [online].

62, pp. 473–480. ISSN: 00179310. DOI: [10.1016/j.ijheatmasstransfer.2013.03.031.](https://doi.org/10.1016/j.ijheatmasstransfer.2013.03.031) [Accessed May 15, 2020].

Radioti, G., Sartor, K., Charlier, R., Dewallef, P., and Nguyen, F. (2017). Effect of undisturbed ground temperature on the design of closed-loop geothermal systems: A case study in a semi-urban environment. *Applied*

*Energy* [online]. 200, pp. 89–105. ISSN: 03062619. DOI: [10.1016/j.apenergy.2017.05.070.](https://doi.org/10.1016/j.apenergy.2017.05.070) [Accessed May 15, 2020].

Raymond, J. (2018). Colloquium 2016: Assessment of subsurface thermal conductivity for geothermal applications. *Canadian Geotechnical Journal* [online]. 55.9, pp. 1209–1229. ISSN: 0008-3674, 1208-6010. DOI:

[10.1139/cgj-2017-0447.](https://doi.org/10.1139/cgj-2017-0447) [Accessed Feb. 26, 2020].

Raymond, J. and Therrien, R. (2008). Low-temperature geothermal potential of the flooded Gaspé Mines, Québec, Canada. *Geothermics* [online]. 37.2, pp. 189–210. ISSN: 03756505. DOI: [10.1016/j.geothermics.2007. 10.001.](https://doi.org/10.1016/j.geothermics.2007.10.001) [Accessed Oct. 4, 2019].

Rivera, J. A., Blum, P., and Bayer, P. (2015). Analytical simulation of groundwater flow and land surface effects on thermal plumes of borehole heat exchangers. *Applied Energy* [online]. 146, pp. 421–433. ISSN: 03062619.

DOI: [10.1016/j.apenergy.2015.02.035.](https://doi.org/10.1016/j.apenergy.2015.02.035) [Accessed May 15, 2020].

Rollin, K. (1987). Catalogue of geothermal data for the land area of the United Kingdom. Third revision: April 1987. Investigation of the Geothermal Potential of the UK.

Rybach, L. and Eugster, W. J. (2010). Sustainability aspects of geothermal heat pump operation, with experience from Switzerland. *Geothermics* [online]. 39.4, pp. 365–369. ISSN: 03756505. DOI: [10.1016/j. geothermics.2010.08.002.](https://doi.org/10.1016/j.geothermics.2010.08.002) [Accessed May 15, 2020].

Saadi, M. S. and Gomri, R. (2017). Investigation of dynamic heat transfer process through coaxial heat exchangers in the ground. *International Journal of Hydrogen Energy* [online]. 42.28, pp. 18014–18027. ISSN: 03603199. DOI: [10.1016/j.ijhydene.2017.03.106.](https://doi.org/10.1016/j.ijhydene.2017.03.106) [Accessed Apr. 14, 2020].

Sandiford, M., McLaren, S., et al. (2006). *Thermo-mechanical controls on heat production distributions and the long-term evolution of the continents*. Citeseer.

Schmidt, T., Mangold, D., and Muller-Steinhagen, H. (2004). Central solar heating plants with seasonal storage in Germany. *Solar Energy* [online]. 76.1. Solar World Congress 2001, pp. 165–174. ISSN: 0038-092X. DOI: [https://doi.org/10.1016/j.solener.2003.07.025.](https://doi.org/https://doi.org/10.1016/j.solener.2003.07.025) Available from: [http://www.sciencedirect. com/science/article/pii/S0038092X03002937.](http://www.sciencedirect.com/science/article/pii/S0038092X03002937)

Signorelli, S., Kohl, T., and Rybach, L. (2005). “Sustainability of Production from Borehole Heat Exchanger Fields”. In: *Proceedings World Geothermal Congress*. World Geothermal Congress 2005. Antalya, Turkey.

Singh, R. K. and Sharma, R. V. (2017). Numerical analysis for ground temperature variation. *Geothermal Energy*

[online]. 5.1, p. 22. ISSN: 2195-9706. DOI: [10.1186/s40517-017-0082-z.](https://doi.org/10.1186/s40517-017-0082-z) [Accessed May 15, 2020].

Stylianou, I. I., Florides, G., Tassou, S., Tsiolakis, E., and Christodoulides, P. (2017). Methodology for estimating the ground heat absorption rate of Ground Heat Exchangers. *Energy* [online]. 127, pp. 258–270. ISSN:

03605442. DOI: [10.1016/j.energy.2017.03.070.](https://doi.org/10.1016/j.energy.2017.03.070) [Accessed Apr. 14, 2020].

Turcotte, D. L. and Schubert, G. (2002). *Geodynamics*. Cambridge university press.

Underhill, J. R., Monaghan, A. A., and Browne, M. A. (2008). Controls on structural styles, basin development and petroleum prospectivity in the Midland Valley of Scotland. *Marine and Petroleum Geology* [online].

25.10, pp. 1000–1022. ISSN: 02648172. DOI: [10.1016/j.marpetgeo.2007.12.002.](https://doi.org/10.1016/j.marpetgeo.2007.12.002) [Accessed Oct. 4, 2019].

Vincent, C. J., Rowley, W. J., and Monaghan, A. A. (2010). Thermal and burial history modelling in the Midlothian-

Leven syncline in the Midland Valley of Scotland using BasinMod and HotPot. *Scottish Journal of Geology* [online]. 46.2, pp. 125–142. ISSN: 0036-9276, 2041-4951. DOI: [10.1144/0036-9276/01-376.](https://doi.org/10.1144/0036-9276/01-376) [Accessed Apr. 14, 2020].

Wang, H., Yang, B., Xie, J., and Qi, C. (2013). Thermal performance of borehole heat exchangers in different aquifers: a case study from Shouguang. *International Journal of Low-Carbon Technologies* [online]. 8.4, pp. 253–259. ISSN: 1748-1317. DOI: [10.1093/ijlct/cts043.](https://doi.org/10.1093/ijlct/cts043) [Accessed May 15, 2020].

Westaway, R. and Younger, P. L. (2013). Accounting for palaeoclimate and topography: A rigorous approach to correction of the British geothermal dataset. *Geothermics* [online]. 48, pp. 31–51. ISSN: 03756505. DOI: [10.1016/j.geothermics.2013.03.009.](https://doi.org/10.1016/j.geothermics.2013.03.009) [Accessed Apr. 14, 2020].

Wheildon, J. and Rollin, K. (1986). *Heat Flow. 8-20 in Geothermal Energy: the Potential in the United Kingdom*. London: British Geological Survey.

Zanchini, E., Lazzari, S., and Priarone, A. (2010). Improving the thermal performance of coaxial borehole heat exchangers. *Energy* [online]. 35, pp. 657–666. DOI: [10.1016/j.energy.2009.10.038.](https://doi.org/10.1016/j.energy.2009.10.038)

Zeng, H. Y., Diao, N. R., and Fang, Z. H. (2002). A finite line-source model for boreholes in geothermal heat exchangers. *Heat Transfer Asian Research* [online]. 31.7. 2D unsteady state analytical solution and a semi analytical solution: Establishes the transient response at any point in the ground for the radial and the axial coordinates subject to a constant line heat source (FLS) in the rod., pp. 558–567. ISSN: 1099-2871, 15231496. DOI: [10.1002/htj.10057.](https://doi.org/10.1002/htj.10057) [Accessed Apr. 27, 2020].

Zhang, C., Tu, S., Zhang, L., Bai, Q., Yuan, Y., and Wang, F. (2016). A methodology for determining the evolution law of gob permeability and its distributions in longwall coal mines. *Journal of Geophysics and Engineering* [online]. 13.2, pp. 181–193. ISSN: 1742-2132, 1742-2140. DOI: [10.1088/1742-2132/13/2/181.](https://doi.org/10.1088/1742-2132/13/2/181) [Accessed May 15, 2020].

Zhao, Y., Ma, Z., and Pang, Z. (2020). A Fast Simulation Approach to the Thermal Recovery Characteristics of Deep Borehole Heat Exchanger after Heat Extraction. *Sustainability*. 12.5, p. 2021.