



# Ground-Source Heat Pumps: Fundamentals, Experiments and Applications

By Ioan Sarbu, Calin Sebarchievici

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**Ground-Source Heat Pumps** presents the theory and some of the most recent advances of GSHPs and their implementation in the heating/cooling system of buildings. The authors explore the thermodynamic cycle with calculation, operation regimes and economic indicators and GHG emissions of a vapor compression heat pump. They go on to examine substitution strategies of non-ecological refrigerants and types of compressors and heat pumps, before delving into the different GSHP systems, as well as their compared economic, energy and environmental performances using classical and optimized adjustment for various operating modes. Surface water heat pumps and ground water heat pumps are covered, and special focus is given to both vertical and horizontal ground-coupled heat pump systems, for which modelling and simulation is discussed, and experimental systems are described. Due to its advanced approach to the subject, this book will be especially valuable for researchers, graduate students and academics, and as reference for engineers and specialists in the varied domains of building services.

- Explores fundamentals and state-of-the-art research, including ground-coupled heat pump (GCHP) systems.
- Includes performance assessment and comparison for different types of GSHP, numerical simulation models, practical applications of GSHPs with details on the renewable energy integration, information on refrigerants, and economic analysis.

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### **Editorial Review**

#### **About the Author**

Ioan Sarbu is a professor and head of the Department of Building Services Engineering at the Polytechnic University of Timisoara, Romania. He obtained a diploma in Civil engineering from the “Traian Vuia” Polytechnic Institute of Timisoara in 1975 and a Ph.D. degree in Civil engineering from the Timisoara Technical University in 1993. His main research interests are related to refrigeration systems and heat pumps. He is also active in the field of solar energy conversion, water distribution systems and numerical simulations and optimizations in building services. He has published books, chapters, and numerous articles in indexed journals and proceedings of international conferences. He is also author of five patent certificates and of up to twenty computer programs.

Calin Sebarchievici is a lecturer of the Building Services Engineering Department at the Polytechnic University of Timisoara, Romania. He obtained a diploma in Building services engineering and a Ph.D. degree in Civil engineering from the Polytechnic University of Timisoara in 2003 and 2013, respectively. His research is focused on heat pumps, refrigeration systems and solar energy conversion. He is co-author of some books, chapters, and journal and conference proceeding articles.

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