

Ministry of Science and Higher Education of the Russian Federation

**Research Geotechnological Center
of Far Eastern Branch of the Russian Academy of Sciences**

3rd International Geothermal Conference GEOHEAT

www.igc-geoheat.com

GEOHEAT 2019

PRECONFERENCE SHORT COURSES



August 29, August 30 and September 02, 2019

Petropavlovsk-Kamchatsky, Russian Federation

**Ministry of Science and Higher Education of the Russian Federation
Research Geotechnological Center of Far Eastern Branch of the Russian Academy of Sciences**

3RD INTERNATIONAL GEOTHERMAL CONFERENCE *GEOHEAT 2019*

PRECONFERENCE SHORT COURSES

Thursday, August 29, 2019

Venue: Research Geotechnological Center of FEB RAS,
30 Severo-Vostochnoe shosse, 2th floor,
room 218, Conference Hall

Venue: Administrative building of Kamchatka State Technical
University, 35 Klyuchevskaya st., 4th floor,
room 401

**FUNDAMENTALS OF THE MAGNETOTELLURIC SOUNDING
METHOD AND ITS APPLICATION IN VOLCANIC AND
GEOTHERMAL ENVIRONMENTS**

**INTRODUCTION TO BASIC CONCEPTS OF THE DYNAMICS OF
TERRESTRIAL HYDROTHERMAL SYSTEMS AND HOW TO
EXPLORE FOR AND LOCATE THESE RESOURCES.
EXPLORATION FOR AND EVALUATION OF GEOTHERMAL
PROSPECTS. UNDERSTAND THE BASIC PROCESSES OF THE
PHYSICAL, CHEMICAL AND THERMAL DYNAMICS OF
HYDROTHERMAL SYSTEMS**

Heinrich Brasse,

Free University of Berlin, Berlin, Germany

Albert Waibel,

Columbia Geoscience, Hillsboro, Oregon, USA

09:30 – 10:30	1. Theoretical Base of Electromagnetic Sounding Methods. Part 1
10:30 – 11:00	TEA AND COFFEE BREAK
11:00 – 12:00	1. Theoretical Base of Electromagnetic Sounding Methods. Part 2
12:00 – 13:00	LUNCH
13:00 – 14:00	2. How to Achieve Good Data? Field Setup and Processing. Part 1
14:00 – 14:15	TEA AND COFFEE BREAK
14:15 – 15:15	2. How to Achieve Good Data? Field Setup and Processing. Part 2
15:15 – 15:30	TEA AND COFFEE BREAK
15:30 – 16:30	3. 1-D, 2-D and 3-D Magnetotellurics (MT)

08:30 – 09:30	1. General Introduction Section
09:30 – 10:30	2. Surface Observations. Part 1
10:30 – 11:00	TEA AND COFFEE BREAK AND INFORMAL DISCUSSION
11:00 – 11:30	2. Surface Observations. Part 2
11:30 – 12:15	3.1. What Lies Below: Volcanic Terrain
12:15 – 13:15	LUNCH
13:15 – 13:45	3.2. What Lies Below: Transcurrent and Transform Fault Zones
13:45 – 14:25	3.3. What Lies Below: Tectonic Extension
14:25 – 15:10	3.4. What Lies Below: Orogenic Terrain
15:10 – 15:40	TEA AND COFFEE BREAK AND INFORMAL DISCUSSION
15:40 – 16:40	4. Basic Integrated Geochemistry/Secondary Mineralogy. Part 1
16:40 – 17:10	Questions and open discussions

Friday, August 30, 2019

Venue: Research Geotechnological Center of FEB RAS,
30 Severo-Vostochnoe shosse, 2th floor,
room 218, Conference Hall

FUNDAMENTALS OF THE MAGNETOTELLURIC SOUNDING METHOD AND ITS APPLICATION IN VOLCANIC AND GEOTHERMAL ENVIRONMENTS

Heinrich Brasse,
Free University of Berlin, Berlin, Germany

09:30 – 10:30	4. MT in Volcanic Environments. Part 1
10:30 – 11:00	TEA AND COFFEE BREAK
11:00 – 12:00	4. MT in Volcanic Environments. Part 2
12:00 – 13:00	LUNCH
13:00 – 14:00	5. Case Studies for High-Enthalpy Reservoirs
14:00 – 14:15	TEA AND COFFEE BREAK
14:15 – 15:15	6. Problems in Assessment of Low-Enthalpy Reservoirs
15:15 – 15:30	TEA AND COFFEE BREAK
15:30 – 16:30	7. Other EM Methodologies, an Overview

Venue: Administrative building of Kamchatka State Technical
University, 35 Klyuchevskaya st., 4th floor,
room 401

INTRODUCTION TO BASIC CONCEPTS OF THE DYNAMICS OF TERRESTRIAL HYDROTHERMAL SYSTEMS AND HOW TO EXPLORE FOR AND LOCATE THESE RESOURCES. EXPLORATION FOR AND EVALUATION OF GEOTHERMAL PROSPECTS. UNDERSTAND THE BASIC PROCESSES OF THE PHYSICAL, CHEMICAL AND THERMAL DYNAMICS OF HYDROTHERMAL SYSTEMS

Albert Waibel,
Columbia Geoscience, Hillsboro, Oregon, USA

08:30 – 10:00	4. Basic Integrated Geochemistry/Secondary Mineralogy. Part 2
10:00 – 10:30	TEA AND COFFEE BREAK AND INFORMAL DISCUSSION
10:30 – 12:00	5. Exploration Strategies
12:00 – 12:30	Discussions, questions, closing remarks
12:30 – 13:30	LUNCH

SOME GEOCHEMICAL BASICS APPLIED TO GEOTHERMAL EXPLORATION

Alain Gadalia,
BRGM, French Geological Survey, Orléans, France

13:30 – 15:30	1. Geochemical Toolbox. 2. Geothermal Loop at Its Different Geochemical Steps
15:30 – 16:00	TEA AND COFFEE BREAK
16:00 – 17:00	3. Geochemical Exploration of Three Geothermal Systems

Venue: Administrative building of Kamchatka State Technical
University, 35 Klyuchevskaya st., 4th floor,
Conference Hall

LOCAL THERMAL NON-EQUILIBRIUM INSIDE THE POROUS ROCK-WATER SYSTEM*

Mario-Cesar Suarez-Arriaga,
International Geothermal Association & Mexican Geothermal Association, Morelia, Mexico

08:30 – 10:00	1. Mathematics and Numerical Techniques. Part 1
10:00 – 10:30	TEA AND COFFEE BREAK
10:30 – 12:00	1. Mathematics and Numerical Techniques. Part 2
12:00 – 12:30	2. Heat Transfer in Porous Rocks. Part 1
12:30 – 13:30	LUNCH
13:30 – 14:00	2. Heat Transfer in Porous Rocks. Part 2
14:00 – 15:00	3. Fluid Flow in Porous Rocks
15:00 – 15:30	4. Local Thermal Non-Equilibrium Conditions (LTNE). Part 1
15:30 – 16:00	TEA AND COFFEE BREAK
16:00 – 17:30	4. Local Thermal Non-Equilibrium Conditions (LTNE). Part 2

Monday, September 02, 2019

Venue: Administrative building of Kamchatka State Technical University, 35 Klyuchevskaya st., 4th floor, room 401

**LOCAL THERMAL NON-EQUILIBRIUM INSIDE
THE POROUS ROCK-WATER SYSTEM***

Mario-Cesar Suarez-Arriaga,

International Geothermal Association & Mexican Geothermal Association, Morelia, Mexico

- 09:00 – 11:00** 5. Practical Application Examples
- 11:00 – 11:30** **TEA AND COFFEE BREAK**
- 11:30 – 13:30** 6. Uncoupled Radial Flow Poroelastic Model with Local Thermal (Non) Equilibrium. Part 1
- 13:30 – 14:30** **LUNCH**
- 14:30 – 15:30** 6. Uncoupled Radial Flow Poroelastic Model with Local Thermal (Non) Equilibrium. Part 2

* The participants will need to use personal computers for the course. Lector will provide a copy of the necessary software in Windows 10 and his own programs. Participants are asked to bring their laptops.