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論文題目	Clarification of geochemical properties and flow system of geothermal fluids around the Bandung basin for geothermal-resource assessment（地熱資源評価のためのバンドン盆地周辺における地熱流体の地球化学特性と流動システムの解明）		

Geothermal fluids have various chemical compositions and are greatly influenced by geological conditions, water origin and mixing of magmatic and metamorphic gases. Hydrological condition is also an essential influence factor, because this significantly controls the degree of mixing or boiling, which can change the fluid composition. Whether heat is flowed by convection in the geothermal system or stored in the reservoir is determined by large-scale hydrological factors such as heat input and permeability. Geological conditions, in particular the basement structure, are important to control the composition and movement of geothermal fluids. To clarify characteristics of the geothermal system around the Bandung basin and the influence of the subduction process and basement lithology on the geothermal conditions, I conducted major-minor and trace element analyses, specified the fluid type and interpreted water-rock interaction processes. Stable isotope oxygen-18 and deuterium analysis was applied to reveal the elevation range of the recharge area and the mixing process of the meteoric water with magmatic or sedimentary fluids. Other stable isotope data of strontium and carbon were used to analyze the sources of geothermal gases and fluids and also, characterize the mixing processes depending on the lithology types in the study area.

This dissertation is composed of the following eight chapters. Chapter 1 is an introduction to summarize the content of my research with an overview of preceding, related researches, social background, unsolved problems and motivation for understanding the objectives of my research. Chapter 2 summarizes the general geological, structural and geodynamic settings of Indonesia, Java island and Bandung basin and described that all the settings are strongly influenced by the plate movement activities of the Indian-Australian plate in the south, the Eurasian plate in the north and the Pacific plate in the east. Also, this chapter explains the sampling locations and methods and the analytical methods for the samples. Chapter 3 explained in detail the geothermal conditions of the Tampomas field in a medium enthalpy geothermal system and clarified the effects of sedimentary basement rocks on the geochemical composition of geothermal fluids. Among the rocks, marine sediments were specified to control significantly the geochemical composition in this field.

Chapter 4 focused and revealed the geothermal conditions of the Tangkuban Parahu

geothermal field that consists of two main groups of Quaternary volcanic rocks over the Tertiary sedimentary rocks. This geothermal field was characterized by the sulfate and sulfate-chloride types with low to medium chloride content and low pH, which may originate from the volcanic gas activities. The H_2S oxidation in the vadose zones can generate high sulfate content. In addition, the dissolution process of rocks was interpreted by the water composition with high Fe and Al contents located in the upflow zones of the geothermal system. The geothermal fields in Chapters 3 and 4 are located in the northern Bandung basin, whereas the two geothermal fields in the following Chapters 5 and 6 are in the southern basin. Chapter 5 targeted the Patuha geothermal field in a vapor dominated system, derived indications about the fluid flow patterns based on the geochemical, geophysical and drilling data and interpreted the plate subduction process through the gas composition data. The Wayang Windu field, the target of Chapter 6, has a unique feature as a transition geothermal system. By a fracture system analysis, this field was revealed to be an active tectonic zone in which major structural faults are dominated by NE-SW direction. The meteoric water was interpreted as the main origin of reservoir fluids and manifestations based on the $\delta^{18}O$ and δD data.

Chapter 7 integrated all the data obtained to characterize the Bandung basin geothermal system, pointed out the important findings from this research, calculate the total geothermal potentials in the selected four geothermal fields and construct a conceptual model of the geothermal system. Common to the four fields in the northern and southern Bandung basin, the meteoric water is as a main source of reservoir fluids. The isotope oxygen shifting indicated the change of the meteoric water by mixing with the magmatic fluids and connate water supplied from marine sedimentary layers. The reservoir fluids from the meteoric water infiltrated through the permeable zones such as faults and fractures. In the northern Bandung basin, the infiltration amount of meteoric water is limited by the formation of impermeable layers of marine sedimentary rocks, whereas in the southern basin, the meteoric water can infiltrate deeply and interact strongly with basement rocks and reservoir fluids. Chapter 8 summarized the essential results of each chapter as a grand conclusion of this research and organized the important points of the results. Important future works are also discussed in this chapter to develop geochemical studies furthermore for accurate and effective geothermal exploration.