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Consideration for the Highest Temperature Point Movement of the Dongrae Thermal Water in the Pusan Area. (Poster)

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ABSTRACT

This study showed that the highest temperature point of the Dongrae thermal spring in Pusan was moved to the north direction of the Dongrae fault as times goes by. The Br concentration(1.5mg/L) in Dongrae thermal waters indicated the influence of 2% seawater mixing. If the simple mixing without hydrochemical reaction occurs between seawater and thermal water, the concentration of Mg will be about 20mg/L. But the low concentration(0.1 mg/L) of Mg, contrary to high concentration(10 mg/L) of surrounding groundwater not affected by thermal water, suggested the thermal water, seawater and rock interactions. The calculation of saturation index(SI) by using the geochemical code of EQ3NR showed that the Mg in thermal groundwater, which was introduced by seawater, was removed by the precipitation of Antigorite (SI: log Q/K =71.753, $Mg_{48}Si_{24}O_{85}(OH)_{62}$) and Tremolite (SI: 8.463, $Ca_2Mg_5Si_8O_{22}(OH)_2$), Talc (SI: 6.409, $Mg_3Si_4O_{10}(OH)_2$), Dolomite (SI: 2.014, $CaMg(CO_3)_2$), Chrysotile (SI: 3.698, $Mg_3Si_2O_5(OH)_4$) in the crack of fault zone. The highest temperature point in the study area will move to north direction and stop in the Jangjun area without the input of seawater.

Introduction

The phenomena that the highest temperature point of the Dongrae thermal spring in Pusan was moved to the north direction of the Dongrae fault as times goes by and the Mg contents(about 0.1mg/L) of geothermal water near

the coastal area are very low than near the cold groundwater(about 10mg/L) are interesting in the south Korea. It is estimated that Mg component have been precipitated with other components. In order to estimate the probable secondary minerals it has been carried out geochemical modeling with the Dongrae geothermal water using the EQ3NR code.

For input data the initial value of Mg is 20mg/L.

Result

The results of modeling are shown in the table 1.

Table 4. Summary of Pure Mineral Saturation States

Mineral	Log Q/K	Aff. kcal	State
Andradite	6.107	9.268	ssatd:$Ca_3Fe_2(SiO_4)_3$
Anthophyllite	3.946	5.989	ssatd:$Mg_7Si_8O_{22}(OH)_2$
Antigorite	71.753	108.890	ssatd:$Mg_{48}Si_{24}O_{85}(OH)_{62}$
Calcite	0.434	0.658	ssatd:$CaCO_3$
Chrysotile	3.698	5.612	ssatd:$Mg_3Si_2O_5(OH)_4$
Diopside	0.199	0.303	satd
Dolomite	2.040	3.096	ssatd
Dolomite-dis	0.712	1.081	ssatd
Dolomite-ord	2.040	3.096	ssatd:$CaMg(CO_3)_2$
Ferrite-Ca	1.353	2.054	ssatd:$CaFe_2O_4$
Ferrite-Mg	1.937	2.940	ssatd:$MgFe_2O_4$
Hematite	7.857	11.923	ssatd:Fe_2O_3
Magnesite	0.159	0.241	satd
Magnetite	8.182	12.417	ssatd:Fe_3O_4
Minnesotaite	3.192	4.844	ssatd:$Fe_3Si_4O_{10}(OH)_2$
Sepiolite	3.482	5.284	ssatd:$Mg_4Si_6O_{15}(OH)_{22}:6H_2O$
Talc	6.409	9.726	ssatd:$Mg_3Si_4O_{10}(OH)_2$
Tremolite	8.463	12.843	ssatd:$Ca_2Mg_5Si_8O_{22}(OH)_2$

The calculation of saturation index(SI) by using the geochemical code of EQ3NR showed that the Mg in thermal groundwater, which was introduced by seawater, was removed by the precipitation of antigorite (SI=71.753) and dolomite (SI=2.014) in the crack of fault zone.