HYDROCHEMISTRY OF UNDERGROUND WATERS FROM SHMAKOVKA AREA. FAR EAST OF RUSSIA, PRIMORYE REGION.

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On the Shmakovka area located in the central part of Primorye two different types of cold groundwater are distinguished: high PCO_2 springs and fresh spring waters. The pressure CO_2, calculated using the water analyses data, are 1 atm in the high CO_2 springs, whereas in fresh water ones are 10-2 atm. Both types of water are used like a source of potable bottled water and belong to Ca-Mg-HCO_3 type. The contents of Ca, HCO_3, Fe_2+ are drastically increased in high PCO_2 springs, while K content is depleted relative to fresh waters.

The waters are located in the faulted zones of Proterozoic high grade metamorphic rocks, such as gneiss, granite, diorite.

The results of thermodynamic calculations by WATEQ4F denote that all groundwaters are in equilibrium with halsedone and supersaturated with clay minerals and quarts. Fresh waters are equilibrated with calcite, meanwhile high PCO_2 waters are undersaturated with calcite. Stability diagrams exhibit that waters fall in the field of stability of montmorillonite and kaolinite.

The data prove that meteoric water is the source of both type of waters. The dominant factor controlling chemical composition of ones is water-rock interaction. The primary source of Ca_2+, Mg_2+, Fe_2+, Al_3+, Si in waters are allumosilicates, although some calcium in high PCO_2 waters may be add by carbonate dissolution. Ion-exchange reactions are also very important in forming chemical composition of the waters. The enrichment with the elements in high CO_2 springs are caused by the aggressive nature of these waters and, therefore, deeper lixivation of the bedrocks.