

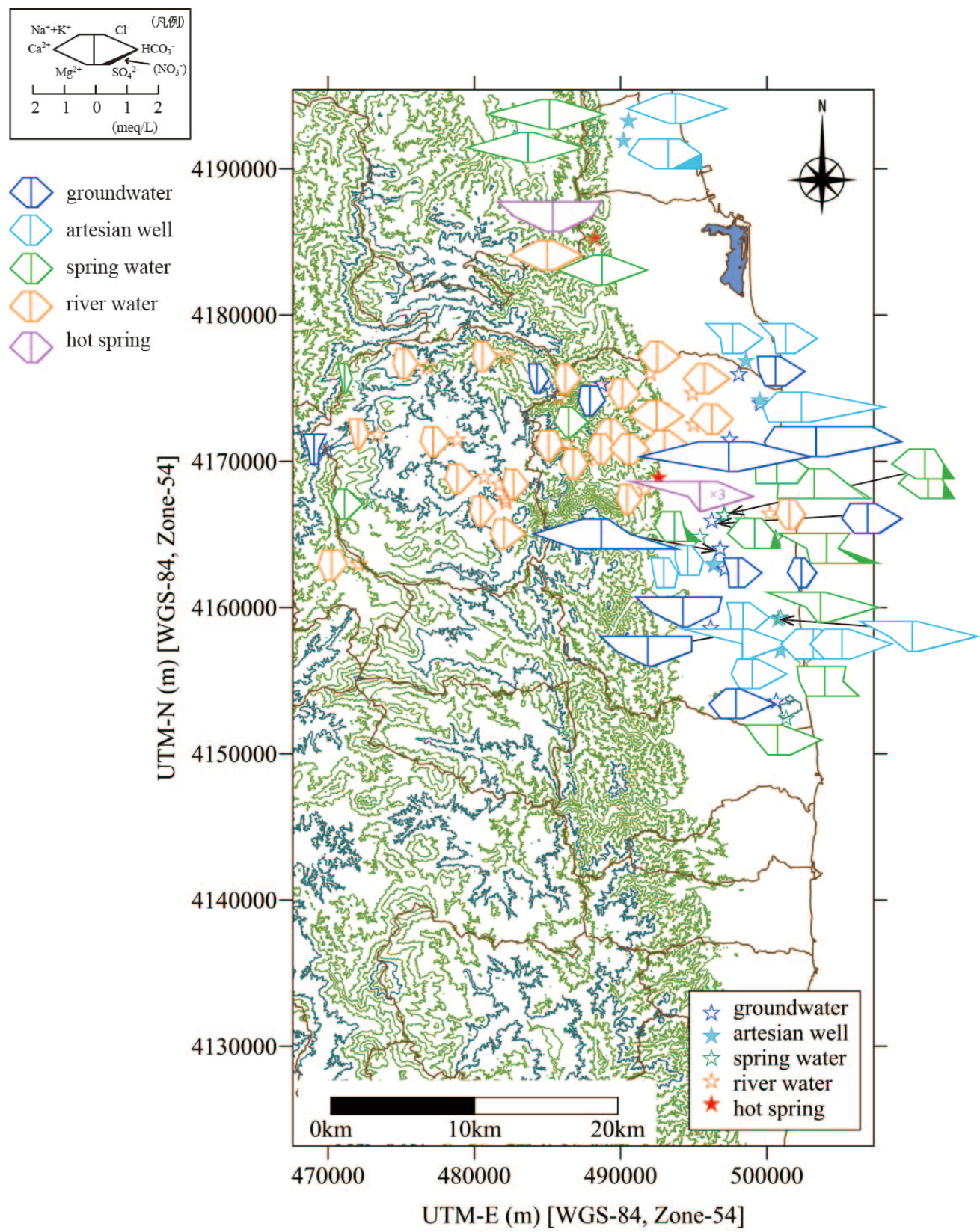
## Estimation of residence time for spring water and groundwater in coastal area of Fukushima Prefecture

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After the Great East Japan Earthquake occurred, the investigation near the coast area in northern part of Fukushima prefecture has been carried out to clarify the groundwater flow and residence time in this area. The measuring of EC, pH, water temperature, ORP and sampling of groundwater, spring water and river water have been carried out several times at Shinchu town, Soma city, Minamisoma city, Namie town, Okuma town, Iitate village and Date city since September in 2012. The water quality of shallow groundwater and spring water show mainly the  $\text{Ca-HCO}_3$  type. On the other hand, the water quality of shallow spring water which was affected by the tsunami shows  $\text{Na-(Cl+SO}_4\text{)}$  type. However, the quantity of inorganic ions (as EC value) is decrease gradually, so the influence of the tsunami decreases gradually. The water quality of the deep groundwater and spring water which are located near the coastal area show the  $\text{Na-HCO}_3$  type. It is estimated that the residence time of these deep groundwater and spring water relatively long. In some sites, the concentrations of iron and manganese in the water are high affected by the geology. As the result of CFCs and  $\text{SF}_6$  analysis, it is estimated that the residence time of shallow groundwater ( $\text{Ca-HCO}_3$  type) is about 10 years and that of deep groundwater and spring water ( $\text{Na-HCO}_3$  type) is about 60 to 70 years. This result is consistent with the  $^3\text{H}$ ,  $\delta^{18}\text{O}$  and  $\delta\text{D}$  analysis. As a result of altitude effect, it is anticipated that the recharge area of deep groundwater which shows the  $\text{Na-HCO}_3$  type is about 300 m higher than that of shallow groundwater which shows the  $\text{Ca-HCO}_3$  type. These informations of groundwater flow are useful for considering the groundwater use with revival of the coastal area. We will continue the investigation of coastal area and make clear the groundwater flow system.

Keywords: Minamisoma City, Fukushima Prefecture, groundwater flow, water quality, stable isotopes, residence time



Distribution of water quality which was investigated from 2016 to 2017