Stable chlorine isotope analysis and saline water diffusion model in Yatsushiro Bay,

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Distributions of saline and brackish groundwater at many coastal areas show very complicated spatial patterns. Understanding the mechanism of solute transport becomes important to properly evaluate the groundwater movement at the wastal area. The authors have attempted to evaluate long term behavior of saline groundwater by analyzing chloride concentration, chlorine isotopic ratio, and by diffusion applying model at Yatsushiro Bay, Kumamoto prefecture. Differences in diffusion coefficients caused by the difference in molecular mass of the isotopes create isotope fractionations. Because chlorine ions do not react with sediments grain and are not affected by biologic processes in sub-surface environment, chlorine isotope fractionation controlled by diffusion can be measurable and can be useful as a direct evidence of diffusion. This study indicates that a downward diffusion is a dominant process on the migration of solutes in the study area.