

Characteristics of water quality and stable isotopes (O, H, and Sr) in 15 rivers of Sado Island, Niigata Prefecture

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The interactions between water and rocks during chemical weathering release water-soluble substances and form secondary minerals (e.g., clay minerals) with consumption of atmospheric CO₂. The determination of dissolved chemical substances in rivers gives us important information concerning chemical weathering processes including the weathering rate and amount of CO₂ consumption. Since the weathering processes is closely related to sediment disaster such as landslide and debris flow, it is significant to investigate river water quality for better understanding the weathering processes in detail. On the other hand, the Sado Island of Niigata Prefecture has been developed with a gold mine during the Edo Period. In recent years, Japanese crested ibis, a protected species, is steadily increasing by extensive breeding programs. The conservation of water environment in the island is most necessary to preserve natural animals and resources. Based on our investigation, we reveal the characteristics of water quality and isotopic composition (O, H, and Sr) in 15 rivers of the Sado Island. Our findings suggest that water quality and Sr isotopic composition (⁸⁷Sr/⁸⁶Sr) in 15 rivers were contaminated by airborne sea salt from Japan Sea surrounding the island. The values of O and H isotope ratios (d¹⁸O and dD) range from -9.34 to -8.44 per mill and from -53.48 to -47.87 per mill, respectively, and are affected by the average altitude of each watershed. Next step of this study is to investigate and analyze spatiotemporal variations in water quality and isotopic composition.

Keywords: Sado Island, river water quality, isotopic composition (O, H, and Sr)