

Change in groundwater quality after the Miyakejima 2000 eruption

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We observed long-term changes in the concentrations of dissolved ions in ground water before and after an eruption in Miyakejima Island, Japan. The changes are

caused by two mechanisms; leachate from new volcanic ejecta deposited on the ground surface and mixing of volcanic gas which may be derived from deep region. Water samples were collected for 15 years. The samples were analyzed for temperature, pH, major anions and cations. Because the leachate from the volcanic ejecta contained sulfate, we recorded an increase in SO₄²⁻ concentrations within the (unconfined) well water. The increase in SO₄²⁻ was initiated after less than 1.4 to 5.2 years of the eruption, showing peak concentrations from 2.4 to 6.4 years after the eruption. This delayed response reflects the transit time of downward-moving SO₄²⁻ in the vadose zone, which traveled at an apparent rate of 0.4-7.2 cm/day. On the other hands, we also recorded an increase in alkalinity, which is recognized at Tairo basin, southern part of the island. This change is currently in progress, that is, the water quality in this basin is getting worse. Such data is rare and important to develop the scenario for the change of water quality after the volcanic eruption.