Volume of magma migration estimated by amplitude of groundwater-level rises associated with the 2000 eruption of Usu volcano

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Abrupt and large rises in groundwater level were observed three days before the 2000 eruption of Usu volcano, simultaneously with an increase of seismic activity. Groundwater discharged after rising 4.07 m of the water level one day before the eruption in DT1 well, and a water level rose 0.95 m in DT2 well before the eruption. These water-level rises are produced by crustal deformation caused by magma migration, and enable us to estimate from 3.8 x 10^-7 to 1.47 x 10^-5 of compressional volumetric strain by applying wells' responses to earth and ocean tides. These strain changes are explained by from 5 x 10^6 to 1 x 10^7 m^3 of spherical inflation source model located at the Usu volcano.

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