# Magmatic $H_2O$ variations in primitive magmas of Klyuchevskoy volcano through the lens of the Ca-in-olivine geohygrometer

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The amount of $H_2O$ that cycles through convergent margins controls the path and time that magmas take from the subducting slab-mantle interface to Earth's surface. Maximum dissolved $H_2O$ content in magmas plays a pivotal role in the generation, and evolution of arc melts. A novel olivine-based hygrometer [1] utilizes the effect of magmatic $H_2O$ on CaO-partitioning (Ol/melt) and allows reconstruction of the magmatic $H_2O$ contents of partially degassed glassy melt inclusions. The low diffusivity of Ca in olivine makes Ca a more reliable recorder of original $H_2O$ contents compared to melt inclusions that may have experienced diffusive water loss during magma ascent and degassing. Here, we show how magmatic $H_2O$ contents change during primitive magma evolution by applying the Ca-in-olivine hygrometer to Klyuchevskoy volcano and comparing it to $H_2O$ in olivine-hosted MIs that have experienced presumably little $H_2O$ loss due to rapid ascent [2, 3, 4]. The two methods agree well, where our Ca-in-olivine estimates track the maximum $H_2O$ content preserved in the melt inclusions that varies with evolving Fo content of the host olivines.

[1] Gavrilenko et al. (2016) JPet. 57, 1811-1832. [2] Churikova et al. (2007) CMP 154, 217-239. [3] Portnyagin et al. (2007) EPSL 255, 53-69. [4] Auer et al. (2009) CMP 157, 209-230.