## Effect of water on viscosity of the primary basaltic melt at high pressure-temperature conditions

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As the most common terrestrial magma, basaltic magma transports significant amount of volatiles (H2O, C, S, F, etc.) from the deep Earth to the Earth's surface [1]. Understanding its mobility and transport in the deep Earth requires the knowledge of the volatile content-dependent viscosity. Previous In-situ falling sphere experimental studies have successfully measured viscosity of basaltic magmas (e.g., MORB, alkali basalt) under high pressure-temperature conditions [2,3]. However, viscosity of hydrous basaltic magmas remains poorly constrained. In this study, we used In-situ X-ray falling sphere experiments to measure viscosity of hydrous primary basaltic melts with different water contents (0wt%, 0.5wt%, 1 wt%, 3 wt%, and 6 wt% water) up to 6 GPa and 2100 K. Our preliminary results suggest that adding water into the basaltic magma decreases its viscosity significantly by 30%-50% in the explored pressure temperature range. Our results will be used to constrain transportation and mobility of hydrous silicate melt inside Earth.

[1] Taracsák, Hartley, Burgess, Edmonds, Iddon & Longpre (2019). *Geochimica et Cosmochimica Acta 258*, 19-36.

[2] Bonechi, Stagno, Kono, Hrubiak, Ziberna, Andreozzi, Perinelli & Gaeta (2022) Scientific Reports 12, 1-12.

[3] Sakamaki, Suzuki, Ohtani, Terasaki, Urakawa, Katayama & Ballmer (2013).*Nature Geoscience 6*, 1041-1044.