Supporting Information for

Extreme flood events and their frequency variations during the middle to late Holocene recorded in the sediment of Lake Suigetsu, central Japan

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Estimation of the residence time of detrital material in Lake Mikata.

If the rainfall(R) of 100mm/day continued around this region, the residence time (T: day) of the rainfall water in Lake Mikata (Area: Am=3.4km^2 and average depth: D=1.5m), drained from catchment of Lake Mikata (Area: Ac=60km^2) can be estimated by the equation below,

$$T = \frac{Am \times D \times 1000}{Ac \times R}$$

When substituting the R = 100mm/day, the residence time T is 0.85 (>0.75 day). Here, setting velocity of particles in the water can be derived from Stokes low shown below;

$$Vs = \frac{{D_p}^2(\rho_p - \rho_f)g}{18\eta}$$

V_s is settling velocity, D_p is the diameter of the particle. The ρ_p and ρ_r is the density of particle and water (assumed as 2.65g/cm^2 and 1g/cm^2). The g is gravitational acceleration (9.8 m/s^2) and η is the viscosity of the water (1.138 mPa･s on 15 °C).

Maximum Vs(m/day) for coming out from Lake Mikata of 1.5m depth within the residence time of 0.75 day is 2.0 m/day. Substituting these values, into the Stokes Low, we can estimate maximum D_p as 5.42μm, detrital grains smaller than this value can go out from Lake Mikata and flow into Lake Suigetsu.