

**Figure S1.** Effect of DOC on the ozone decay and OH radical formation and reaction parameters (IOD, ksec, RCt, and Ω) in the raw lake (left) and sand-filtered waters (right). The water samples were adjusted to have the same water temperature (15 °C), pH (7.0), and alkalinity (100 mg/L as CaCO3) while allowing variation of the DOM parameter (i.e., DOC and characteristics).



**Figure S2.** Calculated OH radical yields (i.e., molar ratio of OH radical formation from ozone consumption) during ozonation of the sand-filtered water samples (February, 2013, pH = 6.7, DOC = 0.7 mgC/L, and alkalinity = 34 mg/L as CaCO3). The OH radical yield () was calculated using the following equation ( = ) that can be obtained by re-arrangement of Eq 6 in the main text. The ∑k•OH/Si[Si] represents the OH radical reaction rate with the water matrix components and can be calculated in the given water matrix as ∑k•OH/Si[Si] = k•OH/DOC[DOC] + k•OH/HCO3-[HCO3-] + k•OH/CO32-[CO32-] + k•OH/*p*CBA[*p*CBA] and k•OH/DOC = 2.5×104 (mgC/L)-1 s-1, k•OH/HCO3- = 8.5×106 M-1 s-1, k•OH/CO32- = 4.0×108 M-1 s-1, and + k•OH/*p*CBA = 5×109 M-1 s-1. The temperature dependence of the all OH radical reactions in the calculations was assumed to be the same considering the fact that the activation energies of OH radical reactions are usually similar (see the discussions in the main text).