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DATA PAPER

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Long-term hydrochemical monitoring in an Oyasan Experimental Forest Watershed comprised of two small forested watersheds of Japanese cedar and Japanese cypress

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Abstract Forest ecosystems are self-fertilizing systems, and development of forest stands depends on nutrient supply via biogeochemical cycling within the ecosystem. Therefore, it is important to clarify the nutrient cycle mediating growth and development. In addition, long-term hydrochemical monitoring is needed to understand the influence of environmental changes on biogeochemical cycling in forest ecosystems. The Oyasan Experimental Forest Watershed (OEFW) is located in the Field Museum Oyasan, the university forest of Tokyo University of Agriculture and Technology, in Gunma prefecture, Japan. OEFW comprises two small adjacent forested watersheds—A-watershed and B-watershed—with respective areas of 1.3 and 1.8 ha. A-watershed is a reestablished forest planted with sugi (Japanese cedar; *Cryptomeria japonica*) and hinoki (Japanese cypress; *Chamaecyparis obtusa*) in 1976, and has been managed intensively with fertilizer application. By contrast, B-watershed is an established forest planted with sugi and hinoki in 1907. No forest practices have been carried out except for thinning of suppressed trees in 1983. However, the sugi plantation on the lowest slope (18% of the watershed area) was cut in 2000, and sugi was replanted the following year. In this data paper, we present data on the daily precipitation, discharge, pH, and concentrations of major nutrients (Ca^{2+}, Mg^{2+}, K^+, Na^+, NH_4^+, Cl^-, NO_3^-, and SO_4^{2-}) in rainwater and stream water since November 1978. The arithmetical mean pH of precipitation, stream water in A- and B-watershed from the beginning of the monitoring to the present were 4.77 ± 0.67, 6.85 ± 0.41 and 6.88 ± 0.36 (average ± SD), respectively. The arithmetical mean concentrations in precipitation in $mmol_c\ L^{-1}$ were 0.030 ± 0.030 for Ca^{2+}, 0.010 ± 0.011 for Mg^{2+}, 0.009 ± 0.013 for K^+, 0.020 ± 0.024 for Na^+, 0.035 ± 0.041 for NH_4^+, 0.026 ± 0.029 for Cl^-, 0.033 ± 0.038 for NO_3^-, and 0.046 ± 0.043 for SO_4^{2-}. The mean concentrations in stream water in A-watershed were 0.180 ± 0.032 for Ca^{2+}, 0.073 ± 0.013 for Mg^{2+}, 0.018 ± 0.009 for K^+, 0.182 ± 0.024 for Na^+, 0.010 ± 0.010 for NH_4^+, 0.060 ± 0.008 for Cl^-, 0.111 ± 0.038 for NO_3^-, and 0.074 ± 0.012 for SO_4^{2-}; whereas for B-watershed the mean concentrations were 0.169 ± 0.025 for Ca^{2+}, 0.079 ± 0.016 for Mg^{2+}, 0.018 ± 0.005 for K^+, 0.192 ± 0.026 for Na^+, 0.010 ± 0.010 for NH_4^+, 0.065 ± 0.010 for Cl^-, 0.093 ± 0.025 for NO_3^-, and 0.087 ± 0.011 for SO_4^{2-}.

Keywords Forested watershed · Forest practices · Hydrochemical monitoring · Japanese cedar · Japanese cypress · Long-term monitoring · Precipitation · Stream water chemistry · Water discharge · Rainwater chemistry

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