

Stream Water Chemistry in a Mountain Forest near the Tokyo Metropolitan Area and the Impact of Atmospheric Deposition (5)

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In the Tanzawa mountains, which is located in the western part of Kanagawa prefecture, it has been reported that fir trees decayed and surface soils were acidified. We have revealed that high concentrations of nitrate run off through stream water on Mt. Oyama (1252 m a.s.l.), which is located in the southeastern part of the Tanzawa mountains and easily affected by air pollutants transported from the Tokyo metropolitan area.

We here report stream water chemistry during the 10 years from 2007 to 2016 in the eastern Tanzawa mountains and evaluate the impacts of atmospheric deposition using stable isotopes of hydrogen and oxygen in water.

Total dissolved nitrogen (TDN) concentration (the sum of nitrate nitrogen; NN, ammonium nitrogen; AN, and dissolved organic nitrogen; DON) in stream water in the eastern Tanzawa mountains during 10 years was 1.08 mgN/L in the southeastern area on average, 0.96 mgN/L in the southwestern area, and 0.64 mgN/L in the northern area. The ratio of the TDN concentration in 2007 to that in 2016 was 0.46 in the northern area, 0.58 in the southeastern area, 0.62 in the southwestern area, respectively. TDN decreased in three areas of the eastern Tanzawa mountains, especially in the northern area. The contribution of NN decreased while the contribution of DON increased in all three areas, especially in the northern area. AN didn't have a clear trend in all areas. Decrease of TDN was due to the decrease of NN in stream water, which could be the decrease of atmospheric inorganic nitrogen deposition and/or the suppression of nitrification in surface soils.

The isotope ratios for throughfall and rainfall at the top of Mt. Oyama (1252 m a.s.l.) changed greatly throughout a year. The lower δ -excess values in summer and the higher δ -excess values in winter indicate a dominant effect of westerly air masses in winter. The stable isotope ratios and δ -excess in Oyama river were almost constant, indicating that the origin of water is mainly ground water. We will evaluate the impact of fog water deposition and transboundary air pollutants on stream water quality in Mt. Oyama.

Keywords: nitrogen saturation, stable isotope, nitrate nitrogen, fog deposition, transboundary air pollution