

Measurement of Total Phosphorous in AIRMoN Samples by the NADP/CAL

Lee Green and Christopher Lehmann
National Atmospheric Deposition Program
Central Analytical Laboratory (CAL), Illinois State Water Survey
Institute of Natural Resource Sustainability
University of Illinois at Urbana-Champaign
Champaign, IL 61820
leegreen@illinois.edu

Phosphorus can be present in water samples in at least three forms: orthophosphate, acid-hydrolysable phosphate and total or organic phosphorus. Organic phosphorus is changed to inorganic by bacterial action. Orthophosphate can be measured directly and the other two forms must be converted to orthophosphate prior to testing.

Total Phosphorus measurements in precipitation samples from the National Atmospheric Deposition Network (NADP) were determined by flow injection analysis (FIA) from samples received in February 2011 to present. Precipitation samples for this study were collected from the Atmospheric Integrated Monitoring Network (AIRMoN). These samples are collected within a 24 hour precipitation event, are immediately refrigerated, and remain chilled during shipment to the NADP Central Analytical Laboratory (CAL) in Champaign, IL.

These samples were tested by the CAL for Orthophosphate and Total Phosphorus within one week of arrival at the CAL. A second set of samples were collected at the Bondville, IL (IL11) site as a special study. These samples were collected side by side with the AIRMoN sample at this site but the sample was collected directly into a refrigerated compartment and never allowed to come to seasonal temperature. Only total phosphorus was analyzed on the special study samples. The total phosphorus method detection limit was determined to be 0.005 mg/L. Total conversion to orthophosphate was determined by using two quality control standards every nine samples during analysis. The recovery for a 0.025 mg/L trimethyl phosphate (TMP) was found to be 96% and a 0.05 mg/L sodium tripolyphosphate (3P) was found to be 100%. Seasonal data from this study will be presented as well as site specific total phosphorus vs orthophosphate concentrations throughout the year.