Concentrations of nutrients in total suspended particle (TSP) samples collected near Lake Tahoe from 2006 to 2009

Website: https://www.bco-dmo.org/dataset/856176
Data Type: Other Field Results
Version: 1
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Project
» Atmospheric Deposition Impacts on Marine Ecosystems (ADIMA)

Contributors	Affiliation	Role
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Abstract
This dataset reports concentrations of nutrients in total suspended particle (TSP) samples collected near Lake Tahoe from 2006 to 2009.

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Coverage

Spatial Extent: **Lat**:39.09231 **Lon**:-120.00275
Temporal Extent: 2006-01-17 - 2009-11-30

Methods & Sampling

TSP samples were collected between 2005 and 2010. Weekly integrated samples were collected on acid washed quartz fiber filters (10"x8", Whatman®) using a Graseby Andersen TSP High Volume Sampler. Between November 2005 and May 2007, the sampler was located near the lake at the UC Davis Field Station (Hatchery) away from any local source of disturbance. After May 2007, the sampler was relocated about 300 meters south to reduce local impacts due to remodeling at the Hatchery. The TSP sampler was placed 3.2 meters above the ground and protected by trees from direct road dust inputs. TSP samples were collected at an airflow rate of 85 cubic meters per hour. All filters were kept frozen until further analyses. To extract the soluble fraction of nutrients and trace metals in TSP samples, a 47 mm circular subsample of each filter was placed on an acid-washed filter tower, and 100 mL of MilliQ water was passed through the sample under gentle vacuum pressure exposing the sample for about 10 s to the water (Buck et al., 2006). A 100 µL of concentrated nitric acid was added to 5 mL of the MilliQ water for trace metal analysis and the rest of the sample was kept frozen for nutrient and ion chromatography analyses. The MilliQ water pH was 7 when it came out of the MilliQ system and similar to that of lake water Nitrate+nitrite (NO3+NO2), ammonium (NH4), and soluble reactive phosphorus (SRP) in the soluble fractions of TSP samples were analyzed using a nutrient autoanalyzer (QuikChem 8000 Flow Injection Analyzer). Detection limits of NO3+NO2, ammonium, and SRP are 0.29 µmol N per liter, 0.53 µmol N per liter, and 0.1 µmol P per liter, respectively.

Data Processing Description

BCO-DMO Processing:
- changed date format to YYYY-MM-DD;
- renamed fields to comply with BCO-DMO naming conventions.

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Data Files

File
lake_tahoe_tsp_nuts.csv (Comma Separated Values (.csv), 2.22 KB) MD5:363d6920eb3d96ba34af17c92a220e27 Primary data file for dataset ID 856176

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Related Publications

Buck, C. S., Landing, W. M., Resing, J. A., & Lebon, G. T. (2006). Aerosol iron and aluminum solubility in the northwest Pacific Ocean: Results from the 2002 IOC cruise. Geochemistry, Geophysics, Geosystems, 7(4), n/a–n/a. doi:10.1029/2005gc000977
Methods

Chien, C.-T., Allen, B., Dimova, N. T., Yang, J., Reuter, J., Schladow, G., & Paytan, A. (2019). Evaluation of atmospheric dry deposition as a source of nutrients and trace metals to Lake Tahoe. Chemical Geology, 511, 178–189. doi:10.1016/j.chemgeo.2019.02.005
Results

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Parameters

Parameter	Description	Units
Date	Beginning date of TSP (Total suspended particle) collection; format: YYYY-MM-DD	unitless
TSP_concentration	Concentration of TSP samples	micrograms per cubic meter (ug m-3)
Nitrate_Nitrite	Concentration of soluble nitrate+nitrite in TSP samples	nanomoles per cubic meter (nmol m-3)
Phosphate	Concentration of soluble phosphate in TSP samples	nanomoles per cubic meter (nmol m-3)
Ammonia	Concentration of soluble ammonia in TSP samples	nanomoles per cubic meter (nmol m-3)

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Instruments

Dataset-specific Instrument Name	Graseby Andersen TSP High Volume Sampler
Generic Instrument Name	Aerosol Sampler
Generic Instrument Description	A device that collects a sample of aerosol (dry particles or liquid droplets) from the atmosphere.

Dataset-specific Instrument Name	QuikChem 8000 Flow Injection Analyzer
Generic Instrument Name	Flow Injection Analyzer
Generic Instrument Description	An instrument that performs flow injection analysis. Flow injection analysis (FIA) is an approach to chemical analysis that is accomplished by injecting a plug of sample into a flowing carrier stream. FIA is an automated method in which a sample is injected into a continuous flow of a carrier solution that mixes with other continuously flowing solutions before reaching a detector. Precision is dramatically increased when FIA is used instead of manual injections and as a result very specific FIA systems have been developed for a wide array of analytical techniques.

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Project Information

Atmospheric Deposition Impacts on Marine Ecosystems (ADIMA)

Website: http://pmc.ucsc.edu/~apaytan/page_projects.html

Coverage: Gulf of Aqaba, Atlantic Ocean (Bermuda Time Series Station), Monterey Bay

Chemical components delivered to the surface ocean through atmospheric deposition influence ocean productivity and ecosystem structure thus are tightly related to the global carbon cycle and climate. Accordingly, the major aim of this project is to quantitatively estimate the variable impact of aerosols on marine phytoplankton and to determine the specific effects on various taxa. Such data could in the future be used to better understand the global impact of aerosols on the oceanic ecosystem. To accomplish this goal the PI will monitor aerosol dry deposition fluxes, determine aerosol sources, obtain the chemical composition and solubility of aerosols, and evaluate the contribution of aerosols to nutrient and trace metal budgets of seawater at two oceanographically different sites (Bermuda and Monterey Bay) representing open ocean and coastal setting. The effects of the different aerosol "types" (defined by source and chemical characteristics) on specific phytoplankton taxa will also be evaluated using pure culture and natural samples bioassays. This project is particularly important in light of the role atmospheric deposition can resume in oligotrophic and coastal settings and the predicted future global conditions of increased aridity and urbanization and associated changes in dust fluxes and composition.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-0850467

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