

MEASUREMENT OF POTENTIAL AMMONIA FLUX
WITH A WETTED-WALL GAS DIFFUSION SYSTEM

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ABSTRACT

A new gas phase ammonia diffusion system was built, calibrated and tested for the assessment of an ammonia flux from seawater. The system consisted of two wetted plates facing to each other. One plate contained a free-falling laminar seawater film from which ammonia gas fluxes out. The other plate contained very slow (0.1 mL/min) deionized water flow on a mesh surface. Ammonia gas fluxed out from seawater surface was absorbed into DI water which is used as an absorption solution and the resulting ammonium concentration in the absorption solution was detected by a fluorescence detector. Flux was calculated from ammonium concentration in the absorption solution and the residence time of the solution on the plate. A preconcentration column was used as a part of flow injection analysis system and enabled to improve the sensitivity of the system.

The wetted-wall gas diffusion system presented in this thesis is designed to measure the "potential" ammonia flux directly by capturing ammonia gas emitted from seawater in the closed system. The advantage of this method is that it does not require the use of equilibrium constants which have not been determined for seawater or piston velocity which is not established for low windspeeds.

The word "potential" is applied since, unlike the natural ocean surface, the closed system operates under controlled conditions (e.g. Temperature) and has no "effective wind speed" over the water surface.