

## **Coupled Biogeochemical Cycles**

### *1. Bacterial Biodiversity Associated with Cloud Water and Snow Recovered from within Rocky Mountain Storm Clouds.*

Gary D. Franc, University of Wyoming, Randolph D. Borys, William L. Stump, Raina M. Spence.

**ABSTRACT:** Bacterial populations present in cloud water (rime) and snow samples collected from within wintertime clouds (@3210 AMSL) were characterized on nutrient agar. Bacterial results were correlated with geophysical data that included cloud liquid-water content, droplet-size distribution, air temperature, and air-mass history (trajectory). A storm collection (February 25 to February 28 , 2004) resulted in three rime samples (average = 1.48 l) and three snow samples (average = 0.72 l). Bacterial populations ranged from 1.88 to 7.26 colony forming units (cfu) ml<sup>-1</sup> (average = 4.20 cfu ml<sup>-1</sup>) and 4.77 to 13.70 cfu ml<sup>-1</sup> (average = 8.84 cfu ml<sup>-1</sup>) for cloud water and snow, respectively. Colony phenotypes recovered from cloud water and snow during the early collection period were pale and lacked obvious pigmentation. Coinciding with frontal passage and an abrupt change to a northerly air parcel history, colony phenotypes recovered from snow were brightly pigmented and contrasted sharply with those from cloud water. Therefore, a considerable diversity in bacterial colony phenotype exists for cloud water and snow samples simultaneously collected from within wintertime clouds. Results also indicate different collection efficiencies for various bacteria and/or different phenotype selection pressure(s) associated with the physical processes that occur during cloud water and snow formation.