Abstract Submitted
for the DNP16 Meeting of
The American Physical Society

Climate Change Effects on Iron Availability to Arctic Phytoplankton MARIA TERESA MALDONADO, JINGXUAN LI, DAVID SEMENIUK, NINA SCHUBACK, University of British Columbia, CLARA HOPPE, Alfred-Wegener Institute, AWI/UBC COLLABORATION — Phytoplankton, unicellular algae, are responsible for 50% of earth's photosynthesis, and for a significant consumption of atmospheric CO_2. Iron (Fe) is essential for phytoplankton, but is extremely depleted in seawater, limiting photosynthesis in 30% of the global ocean. Oceanic Fe bioavailability is determined by physical and chemical processes. The Arctic Ocean is experiencing the greatest decrease in seawater pH (termed ocean acidification). Simultaneously, ice retreat is promoting higher light intensity in Arctic Ocean. We investigated the effects of ocean acidification and high light on Fe availability to Arctic phytoplankton. Iron uptake rates by plankton, using the radionuclide ^{55}Fe, were used as a proxy for Fe bioavailability. In an Arctic summer research cruise, we measured Fe uptake by two phytoplankton populations subjected to two light levels, as well as present CO_2 levels (400ppm) or those expected by 2100 (1100 ppm). Our results demonstrated that high CO_2 decreases Fe availability, while high light increases it, suggesting that future Fe bioavailability might be similar to present day. However, the detrimental effects of high CO_2 were more pronounced in the plankton population exposed to higher seawater temperature. Future studies should investigate the interaction among light, CO_2 and temperature on the Fe physiology of Arctic phytoplankton.

Maria Teresa Maldonado
University of British Columbia

Date submitted: 13 Jul 2016 Electronic form version 1.4