UP 6: Kryosphäre und Ozeanographie

Time: Wednesday 11:00–11:30 Location: MAG 100

UP 6.1 Wed 11:00 MAG 100

Snow grain size and snow depth retrieval over sea ice: investigating possible synergies — •Christian Melsheimer — Institut für Umweltphysik, Universität Bremen, Otto-Hahn-Allee 1, 28359 Bremen, Germany

A snow layer on sea ice has several significant effects: (1) The snow layer strongly reduces the heat flow between the ocean underneath the ice and the atmosphere above, which affects ice growth and melting; (2) the grain size of the snow layer determines the albedo and thus affects the radiative balance.

Both snow grain size and snow depth can be determined in principle from satellite remote sensing: The snow depth (SD) on level sea ice can be retrieved from microwave radiances near 19 and 37 GHz measured, e.g. by the sensor AMSR-E on the satellite Aqua (2001–2011) or its successor AMSR2 on the satellite GCOM-W1 (since 2012). The snow grain size (SGS) can be retrieved from visible/near infrared reflectances of three channels of MODIS on the satellites Terra and Aqua.

Here we want to study the synergy of these two remote sensing methods that use completely different parts of the electromagnetic spectrum to retrieve related parameters. Fresh snow has the smallest grains which then gradually grow when the snow ages, in particular after partial melting and refreezing. Thus, snowfall events should have an effect on the retrieved SGS (small) and on the SD (increase). Furthernore, the SD retrieval yields too large results in case of large SGS, so here the SGS retrieval might help to identify areas of bad SD retrieval.

UP 6.2 Wed 11:15 MAG 100

Sensitivity of phytoplankton growth to vertical mixing along a North Atlantic transect — •Lisa Hahn-Woernle[1], Henk Dijkstr[1], and Hans van der Woerd[2] — [1]Institute for Marine and Atmospheric research Utrecht, Utrecht University, The Netherlands — [2]Institute for Environmental Studies, VU University, Amsterdam, The Netherlands

During the "Stratiphyt" cruises in Summer 2009 and Spring 2011 in-situ plankton and nutrient concentrations as well as upper-ocean turbulence characteristics were measured from Las Palmas to Reykjavik [1]. The measurements agree with previous findings that the incoming light intensity and the stratification of the upper ocean set important conditions for the initiation of the phytoplankton bloom close to the surface and also for a possible shift to a deep chlorophyll maximum below the mixed layer. To understand the influence of the upper-ocean turbulence on the meridional depth (upper 200 m) variation of the phytoplankton distributions, a advection-reaction-diffusion phytoplankton model was calibrated to fit the measured optical and biological measurements and then forced by the in-situ vertical mixing profiles. The results show, that the vertical phytoplankton distribution depends strongly on the characteristics of the applied vertical turbulence profile. [1] E. Jurado, H. van der Woerd and H. A. Dijkstra, Microstructure measurements along a quasi-meridional transect in the North Atlantic, J. Geophysical Res. Oceans, 117,(2012).