Geophysical Research Abstracts
Vol. 20, EGU2018-8077, 2018
EGU General Assembly 2018

Effect of drag coefficient formula choice on wind stress climatology in the North Atlantic and the European Arctic

Iwona Wróbel-Niedźwiecka and Jacek Piskozub
Institute of Oceanology PAS, Physical Oceanography, Sopot, Poland (piskozub@iopan.gda.pl)

Coupled circulation models use parameterizations of air-sea fluxes, including the momentum flux (called also wind stress due to its unit being N m-2). In the case of wind stress, the difference is in the parameterization of drag coefficient, usually presented as a function of wind speed. Until recently some models even used constant drag coefficient values. Recent progress in its parameterization, including the Andreas et al (2012) formula with much less drag at low winds comparing to earlier formulas, creates the question of how different are the momentum transfer values calculated with various published parameterizations.

We studied monthly values of air-sea momentum flux resulting from the choice of different drag coefficient parameterizations, adapted it to momentum flux calculations, using its SAR wind fields, sea-ice masks, and integrating procedures and calculated monthly momentum flux averages on a 1º x 1º degree grid and derived average values for the North Atlantic, the European Arctic. We found that the spread of results resulting from the choice of drag coefficient parameterization are 14% in the North Atlantic, and globally, and higher (19%) in the tropics. On monthly time scales, the differences are larger: up to 29% in the North Atlantic and 36% in the European Arctic and even 50% locally.

This presentation, financed financed with funds from Leading National Research Centre (KNOW) received by the Centre for Polar Studies for the period 2014–2018; OceanFlux Greenhouse Gases Evolution, a project funded by the European Space Agency, ESRIN Contract No. 4000112091/14/I-LG, is meant as a homage to Ed Andreas, sadly departed before he could publish all we wanted to learn from him.