

On the ability of NEMO-LIM3 to simulate sea ice dynamics using a Maxwell-elasto-brittle rheology

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Satellite observations of the Arctic sea ice reveal the existence of linear kinematic features, corresponding to quasi-linear patterns present in the strain field that stretch all across the Arctic Basin and which are associated with the development of leads. Those important characteristics of sea ice lack in most climate models. In order to refine the physical representation of sea ice dynamics in large-scale sea ice models, a new approach for sea ice rheology has been tested. This approach, based on a Maxwell-elasto-brittle rheology, is integrated in the NEMO-LIM3 global ocean-sea ice model (www.nemo-ocean.eu ; www.elic.ucl.ac.be/lim). The present study aims at : (1) evaluating the ability of NEMO-LIM3 to reproduce realistically the characteristics of sea ice dynamics using a Maxwell-elasto-brittle rheology, and (2) analysing the impact of a more accurate representation of leads allowed by the new rheology on the simulation of sea ice and air-ice-ocean fluxes in both the Arctic and Antarctic.