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Impact of the integration of a Maxwell-elastic-brittle rheology in NEMO-LIM3

Jonathan Raulier (1), Thierry Fichefet (1), Vincent Legat (2), Jérôme Weiss (3), and Véronique Dansereau (3)

(1) Earth and Life Institute, Université Catholique de Louvain (UCL/ELIC), Center for Earth and Climate Research (TECLIM), Louvain-la-Neuve, Belgium, (2) Institute of Mechanics, Materials and Civil Engineering, Université catholique de Louvain, Louvain-la-Neuve, Belgium, (3) Laboratoire de Glaciologie et Géophysique de l'Environnement, CNRS - Université Joseph Fourier, Grenoble, France

Satellite observations of the Arctic sea ice show the existence of a dense mesh of leads constantly opening and closing over short time scales. Those leads are highly linked to the presence of linear kinematic features which are quasi linear patterns present in the strain field that stretch all across the Arctic basin. Current sea ice models fail to reproduce those linear kinematic features and the observed statistical distribution of deformation rate. In order to refine the physical representation of sea ice dynamics into sea ice models, a new approach has been adopted for the rheology of sea ice. This approach, based on a Maxwell elasto-brittle rheology, is being integrated in the NEMO-LIM3 global ocean-sea ice model (www.nemo-ocean.eu ; www.elic.ucl.ac.be/lim). In the present study, we examine the influence of the new rheology on the statistical characteristics of the simulated deformation rate and on the ability of the model to reproduce the existence of leads within the ice pack. We will also address the impact of the representation of leads on the fluxes between atmosphere and ocean.