



Assessing the energy balance of Arctic sea ice in a CMIP5 model

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In order to make robust projections of future changes in Arctic sea ice, it is important to have a good understanding of model strengths and weaknesses in this region. In this study, we calculate components of the sea ice energy balance in HadGEM2-ES, one of the models submitted to CMIP5. Annual cycles of surface ice melt, bottom ice melt and growth and surface radiative and turbulent fluxes to the ice are computed for the period 1980-1999. These are compared to a wide variety of observational sources, including estimates derived from simple models (e.g. Maykut 1982, Lindsay 1998) and pure observational sources such as the SHEBA field campaign and the Arctic's network of ice mass balance buoys.

Areas in which the fluxes differ consistently from observational estimates are identified: these include excess net SW radiation in late spring and early summer, and too great a conductive flux. The likely effect of these discrepancies on future projections of Arctic sea ice loss is discussed.