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Interactive comment on "Trends in sea-ice variability on the way to an ice-free Arctic" *by* S. Bathiany et al.

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We thank the referee again for these constructive comments. Regarding the concern about the realism of MPI-ESM, see our reply above. Concerning the simulations we analyse, we now explain them and the selection of these simulations more explicitly. In addition, we have obtained model output from one additional comprehensive model (bcc-csm1-1) that we now also analyse. In the introduction we now write: "We also analyse eight additional comprehensive models from the Coupled Model Intercomparison Project 5 (CMIP5), using simulations of the historical period, the RCP8.5 scenario and its extension until the year 2300. The models are all the available models that lose their Arctic winter sea ice in these simulations. The level of complexity in these models is comparable to MPI-ESM, but some of them explicitly resolve several ice-thickness classes on the subgrid scale. Although one of the models (CSIRO-Mk3-6-0) also pro-

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duces an abrupt loss of winter sea-ice area, most models show a retreat of winter sea ice that is gradual (Hezel et al., 2014), though faster than the preceding summer sea-ice loss (Bathiany et al., 2016)."

In addition, we elaborate on this in Sect. 3.3: "To test this prediction, we finally analyse CMIP5 simulations from MPI-ESM and eight other comprehensive climate models. For this analysis we combine the historical simulation, the RCP8.5 simulation, and the extended RCP8.5 simulation that ends in the year 2300. In this scenario, atmospheric CO2 shows an accelerated increase until the year 2100, when a radiative forcing of approx. 8.5 W/m2 is reached. Thereafter, the CO2 concentration stabilises at almost 2000 ppm (Meinshausen et al., 2011), yielding the largest warming of all CMIP5 simulations. The extended simulations until 2300 were performed with nine models (Hezel et al., 2014). Here we analyse all models where Arctic sea-ice area falls below one million square kilometres in the full RCP8.5 scenario, no matter when this event occurs. Two of the models analysed in Hezel et al. (2014) do not lose their winter sea ice by 2300, while two other models not analysed by Hezel et al. (2014) have lost their winter sea ice already by 2100 (the nine models we analyse are therefore not identical to the nine models in Hezel et al., 2014)." While this includes a reference to Meinshausen et al (2011) as suggested by the reviewer, we do not cite the paper by Moss et al. (2010) because it does not discuss the extended RCP8.5 simulation.

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