Project: 798

Project title: Coupled ocean - atmosphere feedbacks in Arctic and northern North Atlantic

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We performed the ensemble simulations for the future climate change scenarios RCP4.5 and RCP8.5. For the experiments 3 different coupled setups were taken into account (Fig.1). For each setup 5-member ensemble simulations for the period 2006-2099 for both RCP's were carried out.



Fig.1. ROM setups. Colored spherical rectangles denote the following REMO domains: Arctic (violet), Asia (green), Atlantic (red). Thin black lines – MPIOM grid (every 12th grid line)

Simulated Arctic sea ice decline (Fig.2) demonstrates different behaviour for the different setups. Whereas in "Arctic" setup sea ice extent in RCP4.5 scenario remains by ca. $3.5-4 \times 10^{6} \text{ km}^{2}$ in the "Asia" setup it is almost two times less.



Fig.2 Sea ice area in Arctic Ocean ($x10^6$ km²): March (green), September (red), Annual mean (blue). Thin solid lines – ensemble members, thick solid lines – ensemble means

Following Sein et al. 2014 we analysed the future climate variability. An example for RCP8.5 scenario is demonstrated on Fig.3. The relative variability index (RVI) described in Sein et al., 2014 shows the relation between the variability, generated inside the coupled model area and variability induced from outside the model domain. Comparing these results with similar historical simulations (Sein et al., 2014) we can conclude that predictability of the Arctic climate in the case of RCP8.5 scenario will significantly increase.



Fig. 3 MSLP variability. 2050-2099. RCP8.5

Results obtained in the project require further data analysis.

References

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