Geophysical Research Abstracts
Vol. 17, EGU2015-2974, 2015
EGU General Assembly 2015

Analyzing consistency of interannual variability in air-sea sensible and latent heat fluxes in CMIP5 model simulations

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Surface turbulent heat fluxes are critically important in climate model experiments, since they represent a language of communication of the ocean and atmosphere. Interannual variability of surface turbulent heat fluxes is believed to be the major contributor to the changes in the ocean surface heat balance, at least in mid latitudes. Being relatively well assessed and validated in reanalyses, surface turbulent heat fluxes always were of a lesser attention in diagnostics of climate model experiments. We analysed interannual variability of sensible and latent heat fluxes in historical climate simulations with several CMIP5 models. Variability in surface turbulent sensible and latent heat fluxes in model simulations has been analysed during several last decades (from 1950s to 2005) with the emphasis on different scales of variability (short-term, interannual, decadal). At all scales has been found a little consistency between the changes in turbulent surface fluxes diagnosed by reanalyses and blended data sets (OA-FLUX) on one hand and model simulations on the other. Furthermore, some models (e.g. ECHAM, IPSL) surprisingly demonstrate large regions with negative correlations between sensible and latent heat fluxes, which is not the case in observational data sets (reanalyses and OAFLUX). Interestingly, variability in air temperature and surface humidity (which could be potentially considered as the reason for autocorrelation between sensible and latent fluxes) demonstrates consistency with each other at most scales. Further we discuss potential reasons for the discovered phenomenon.