

## MS36: Climate Projection with improved CGCMs

### **1. Climate projection with anomaly coupling**

UiB/UniRes (T. Demissie, N. Keenlyside, S. Koseki)

An alternative anomaly coupling (Toniazzi and Koseki, 2018, under revision) is implemented in the Norwegian Earth System Model (NorESM) and climate projection experiments have been performed under RCP8.5 scenario with/without the anomaly coupling. The model consists of 2-degree atmosphere/land and 1-degree ocean/sea ice components. The climate projection targets on the year of 2080-2099 compared to the current climate of 1980-2000.

This study revealed that the warming in the tropical Atlantic is relatively sensitive to the global warming signal with the anomaly coupling than without the anomaly coupling.

### **2. Climate projection with a new parameterization (NorESM)**

UCPH (H. Pillar, M. Jochem)

UCPH developed a new parameterization of ocean mixing layer (Pillar et al., in prep) and implemented in the NorESM. UCPH uses the same version of NorESM as UiB/UniRes. The improved parameterization successfully reduces the bias in the tropical oceans. Under RCP8.5 scenario, the climate projection experiments have been demonstrated.

With the new parameterization, the warming trend of the tropical Atlantic is relatively strong, indicating that the bias-reduced CGCM is more sensitive to the global warming. This result is consistent with that of NorESM with anomaly coupling by UiB/UniRes.

### **3. Climate projection with a new parameterization (EC-Earth)**

WU (A. L. Deppenmeier)

An improved parameterization of ocean mixing is implemented in the EC-Earth model. With this parameterization, the modeled bias is reduced. The climate projection run is 1950 to 2100 and compared the climate in 1950-1985 and 2044-2079.

In the climate projection, the inter-annual variability of the Atlantic zonal models are modified with the improved parameterization.

### **4. Climate projection with a new version of CGCM**

METEO-France, CEERFACS (A. Voldoire, E. Sanchez-Gomez)

The climate projection experiment with a new version of CNRM-CM6 has been performed comparing to CNRM-CM5. The climate projection run is 1950 to 2100 and compared the climate in 1970-1999 and 2070-2099 under scenario of RCP8.5.

Tropical Atlantic Variability modes simulated by CNRM-CM6 are less different between historical and scenario simulations than the ones simulated by CNRM-CM5. The reasons for that need to be investigated, since many mechanisms can be at play : changes in the mean state of the Tropical Atlantic climate (both in the ocean and atmosphere), changes in the teleconnections between the Pacific, the North Atlantic and the South Atlantic.