



Influence of the MOC on the tropical Atlantic circulation

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The upper layer circulation in the western tropical Atlantic can be understood as a superposition of the northward, interhemispheric flow associated with the deep meridional overturning circulation (MOC) and the shallow subtropical-tropical cells (STCs). These cells connect the subduction zones of the subtropical gyres with the equatorial regime of eastward currents. The most prominent of this currents is the equatorial undercurrent (EUC) being crucial for feeding the eastern equatorial cold tongue. STC theory indicates the cells to occur on both hemispheres, however the situation in the present day state of the Atlantic ocean is different due to the northward warm water return flow of the MOC suppressing a northern hemispheric STC. Earlier studies of ocean models which artificially suppress the MOC flow support the idea that the STC asymmetry in the Atlantic is likely to vanish with a decreasing MOC. This idea will be investigated by using ocean model output of the CMIP3 database used for the latest IPCC report: the CO₂-doubling runs of the SRES scenarios show a mean decrease of 25% of the Atlantic MOC during the 21st century. This work will focus on the analysis of the MOC and STC indices in the different climate models under CO₂-doubling conditions and discuss how robust these results are.