



Marine ecosystem decline caused by a reduction of the Atlantic Meridional Overturning (AMO) circulation

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Using a coupled climate model I investigate the influence of changes in AMO circulation on the global upper ocean ecosystem. Reductions of deep water formation and the associated shoaling of mixed layers can lead to a collapse of plankton stocks in the North Atlantic. In the Southeast Atlantic the spindown of the AMO causes an equally dramatic drop in productivity. Even remote regions in the Indian and Pacific oceans are affected through decreased upwelling of nutrient rich deep water, leading to a global decrease of productivity by about 20% in case of strongly reduced AMO. Comparison with glacial paleo-productivity records yields good agreement with the simulations. This suggests that much of the observed millennial timescale variability of productivity can be explained by thermohaline driven changes in ocean circulation. These results also indicate that a strong reduction of the Atlantic overturning due to future anthropogenic climate warming could have adverse effects on living marine resources and human food supply.