

Atlantic meridional overturning circulation (AMOC) is a key component of Earth's climate for its ability to transport heat and returning it to the atmosphere. The goal of this work was to describe the driving mechanisms and components of ocean circulation in the Atlantic, and to describe its variability and influence on European climate in the past, present and future in a form of a review. AMOC certainly played a role in major climatic fluctuations of the past 120 thousand years. In present AMOC directly affects European climate through the phases of Atlantic Multidecadal Oscillation, which might lead to a significant change of European climate in the near future. It is also explained why the Gulf stream is in reality not responsible for the winter temperature contrast between Europe and North America. Models suggest that current AMOC is in its weakest state in at least a thousand years, and that it may be near a bifurcation point. Furthermore, models indicate that AMOC will in the 21st century most likely weaken significantly. A total collapse in this century is unlikely, however by the year 2300 the probability of it happening is 50 %, which could bring generally drier climate to Europe, and a wintertime cooling of up to 30 °C in northern Europe.