

## **Description for the general public**

Earth's climate strongly depends on the circulation of water masses in the oceans. For example, the air temperatures in Europe are much higher than on the eastern coast of North America at respective latitudes thanks to the warm North Atlantic Current flowing northward along the western European coast.

One of the key regions for the global oceanic circulation is the Greenland Sea. Here, the warm water from the south releases much of its heat to the atmosphere and mixes with cold water flowing from the Arctic Ocean creating a huge whirlpool called the Greenland Gyre. In the center of this gyre the water becomes dense enough (due to its low temperature and relatively high salinity) to sink to the bottom of the ocean – a process called deep convection. This sinking water 'ventilates' the deep ocean providing it with oxygen. However, the intensity of this process changes in time.

In our study we want to investigate the evolution of the deep convection from the last ice age when it was almost completely shut down until present. We want to focus especially on the relatively warm episodes during this time interval. For this purpose we want to compare radiocarbon ages of shells of microorganisms living close to the ocean surface (plankton) with those living at the sea bottom (benthos). The age of these two groups of organisms from the same time in the past, i.e. found in the same layer of a sediment core, should be the same. However, when the deep convection slows down, it takes much time for the water to sink to the bottom. Thus, the benthic organisms live in 'older' water, relative to their planktic contemporaries and the dating of their shells yields older ages. The offset between the planktic and benthic ages from the respective samples should give us an indication on the intensity of the gyre – the lower the difference, the more intense the deep convection was.

The reconstructed evolution of the Greenland Sea deep convection will allow us to better understand the functioning of the ocean circulation system. It will also allow us to investigate the relationship between the ocean circulation and the climate as well as their modern and future changes.