

What Are the Consequences of a Possible Gulf Stream Breakdown?

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Regardless of their primary cause (whether they are human-made or natural), climate and environmental changes have many negative consequences. One of the current topics of concern is changes occurring in the Gulf Stream, its slowdown, and possible breakdown. The Gulf Stream is a part of the Atlantic Meridional Overturning Circulation (hereinafter the AMOC) and has an essential role in shaping the climate in countries where, due to their geographical location, severe winters should be. Hence, it is crucial to investigate the consequences of its possible breakdown to develop a necessary prevention plan.

In the first place, it is necessary to understand the Gulf Stream and how it affects the climate in several geographical locations. Robinson Meyer (2017, para. 11) proposes to compare mild winters without severe snowfalls typical for Berlin to the snow-covered city of Punta Arenas with their equal remoteness from the equator. Such a difference is a manifestation of the AMOC's proper operations when the Gulf Stream brings in warm waters; the United Kingdom and northwestern European cities are territories affected by equator water circulations due to the existence of the AMOC system (Best Documentary, 2017). Furthermore, the marine flora and fauna are also more adapted to warm waters, and people from the above-mentioned cities have an opportunity to grow fruits and vegetables atypical for their region. From another perspective, people and ecosystems are not ready for the severe climate changes caused by a possible Gulf Stream breakdown.

Disturbing news about the Stream's slowdown became widespread in 2015. Nevertheless, as an environmental problem, the instability of the AMOC has appeared almost together with the introduction of global warming and "has been a subject of research since the 1980s" ("The underestimated dangers...", 2017, para. 2). As a result, leading experts are

constantly developing models and scenarios under conditions of which the collapse of the AMOC system might occur and how it will affect subsequent existence. Wei Liu with a group of colleagues assessed predictions and estimated their calculations to demonstrate that the breakdown of the Gulf Stream, which is “bringing heat equivalent to the output of a million power stations” (Connor, 2015, para. 2), would cause a significant decrease in temperature during winter. They mentioned the United Kingdom, Iceland, and northwest Europe as an example where it might happen “to greater than 7°C” (Liu et al., 2017, p. 4). In addition, the cooling will cause the expansion of the sea ice area, which in its turn will affect marine flora and fauna.

The leitmotif of all the consequences of a possible breakdown is climate change that might alter the perspective on the global warming issue. In his article “Crippled Atlantic currents triggered ice age climate change,” Eric Hand (2016, para. 2) emphasize notes from a research report, encouraging to think about *probably not just a mere* coincidence: the Gulf Stream currents have weakened “suddenly and drastically [...] just before several periods of abrupt climate change.” Whereas the malfunction of the AMOC system might be one of the reasons for global climate change, there also might be related processes, as the general slowing down is caused by an increased amount of freshwater from Greenland: it is lighter and violates the natural flow of salty water (Connor, 2015, para. 6-7). The local ecosystem and sea level will be negatively affected, and together with it, coastal cities and people who make a living from fishing will suffer from significant financial loss (PIK, 2015). Apart from that, it is key to remember that the AMOC “is a part of a larger global conveyor system” (Harvey, 2017, para. 13). With the Gulf Stream breakdown, consequences will be adverse for such cities as Boston and Brazil, with significant changes in annual precipitation: somewhere rains will be more than

usual, while other cities will suffer from drought. The documentary *Gulf Stream and the Next Ice Age* (40:00-42:00) also offers to think about social and economic changes related to the possible Gulf Stream breakdown. Climate change will affect the quantity and quality of the yields and available drinking water, for instance. People from affected cities and countries will be forced to migrate to other places where there are no problems with food and water. All of these issues will cause epidemics of disease and social discontent in addition to global climate problems and the extinction of species due to severe changes in habitat.

Summarizing everything mentioned above, the possible Gulf Stream breakdown has one general consequence, which is divided into several specific ones related to affected places. It is the climate change for countries with mild winters atypical for remoteness from the equator. Apart from that, whereas one place is predicted to suffer from a dramatic temperature decrease, another place will be exposed to temperature increases and the rising of the sea level. Consequently, local ecosystems will be affected, and people will suffer from a shortage of food and water. Scientists still can not predict when the Gulf Stream breakdown might occur, as it is difficult to consider all possible variables. Nevertheless, when it happens, the consequences will be global (not only for the United Kingdom and northwestern Europe) and irreversible with adverse environmental, social, and economic issues.

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