

The Emperor penguin population could shrink by 95 percent by 2100. The study's authors explain that the reason for the negative dynamics is reduce of the area of Antarctic ice. Main results published in the journal Proceedings of the National Academy of Sciences, gives BBC News.

Message titled "Antarctic Penguins and Climate Change" was made by the World Wildlife Fund (WWF) at the UN? summit on limit emissions of greenhouse gases, which took place in Bali in 2007, Indonesia, reports Reuters. According to the Fund, the melting of Antarctic ice has led to a reduction in the number of places suitable for nesting penguins, as well as a reduction of available food resources. Endangered four species of these birds, which, according to the speaker are "symbols of Antarctica": Emperor penguin (the largest penguin in the world), Papua penguins, Adelie penguins and Antarctic penguins. The report notes that the penguins have nothing to eat: people exhausted fish stocks. General Secretary of UNO Ban Ki Moun visited Antarctica and concluded that the mainland is on the brink of disaster. "Here, on King George Island, the amount of ice cover has decreased by ten percent. Some glaciers in Admiralty Bay retreated by 25 kilometers. You remember that several years ago a part of the Larsen ice broke away and disappeared within a few weeks - and we are talking about the ice in the array size of Rhode Island - 87 miles, " - said Ban Ki Moun. (Roach, John)

Emily Lewis-Brown, a spokeswoman of the Fund, noted that because of melting ice penguins are forced to leave the traditional habitat. "These symbols of the Antarctic will have to withstand the incredible battle for survival," - she said.

Recall that the ice of Antarctica is radically different from any other ice on the planet. This water, which once froze, did not leave the solid state for centuries. Study of Antarctic ice with the help of deep drilling has enabled scientists to determine what the climate on Earth was 800 thousand years ago. It was found that over the last 200 years carbon dioxide levels in the atmosphere increased unprecedentedly fast. These findings led scientists to conclude that the Earth can not cope with the increase of carbon dioxide alone. (British Antarctic Survey)

Emperor penguins (*Aptenodytes forsteri*) are the largest and most southerly representatives of the modern species of the penguins' family. These birds nest on the shores of Antarctica on the ice. During the breeding Emperor penguins go through the Antarctic winter; no more penguins do not dare such a thing. The female lays one egg on the ice, which then bears the male.

Reducing the area of ice cover has a negative impact not only on the reproduction of the penguins. Melting ice will affect the propagation of fish and crustaceans, which birds eat. To appreciate how serious would be the effects of climate change to the Emperor penguin the representative of the Institute of Oceanography Hal Caswell and his colleagues analyzed various models of changes in the dynamics of bird populations, depending on the state of the climate. For their work they used the scenario of changes in the area of ice cover developed by the Intergovernmental Panel on Climate Change. Caswell and colleagues considered only those scenarios that are consistent with recently obtained satellite data. With each of these options, they "drove" a few breeding habits of Emperor penguins. As a result, with the probability to 80 percent, the penguin population is to drop to five per cent of its present size. So, on the Earth will be about 400 pairs that can have offspring. To compare: in 1960 the world had about six thousand pairs, what newspaper "The Independent" stated. Sad prognosis is partly due to the fact that the larger birds will not be able to react quickly to climate change and behavior change strategy. (British Antarctic Survey)

In 2009, January 25, in the journal "Nature Geoscience" an article was published whose authors concluded that the increase in temperature would lead to an increase in the ocean of "dead zones" - areas with reduced oxygen content, unsuitable for the existence of fish, crustaceans and mollusks.

In the Antarctic warming occurs five times faster than the rest of the world. Currently, the ice covers an area up to 40% less than 26 years ago. This led to a decrease in penguin population by 65 percent. Higher temperatures and increasing winds forcing penguin breeds on very thin ice, and most of the eggs and young chicks are killed by having their blows wind.

According to scientists, over the past 50 years, average winter temperatures on the Antarctic Peninsula has risen by 6 ° C - it is five times greater than the average for the entire planet. Area of 87 percent of the glaciers has decreased. If the ice around the peninsula remained whole year before, now it melts in summer. The reason for reduction of the ice cover is ocean warming. Oceanologists really fix the rise of water temperature in the surface layer on the coast of the peninsula. Most of the heat comes back from the warm and salty deep waters of the Antarctic circumpolar current. Scientists say that these waters rise to the surface in the western shelf. Most likely, this flow has increased due to the fact that the strongly increased speed of winds blowing over the Southern Ocean. "Phytoplankton and zooplankton is the top of the food chain. If at this level there are changes, they pull for each other changes on other higher trophic levels. The numbers of fish, seals, whales, penguins are changing"- says Dr. Skolfield.

Study of marine waters of Antarctica was launched in 2005. Researchers have now identified more than six thousand different species in the region, half of which are unique to the continent. According to the presentation of Griffith, in the last decade, scientists have observed an almost twofold reduction in krill populations (marine invertebrates), which feed on penguins, dolphins and whales, as it was said before. In place of krill come copepods - organisms, which is 120 times smaller. Predators in Antarctica, especially penguins, are not adapted to catch a small prey, and advantage, as scientists believe, will be animals such as jellyfish, whose number in Antarctic waters has increased.

"Marine animals have spent millions of years to adapt to the stable very cold conditions in Antarctic waters, and they are very sensitive to change. This means that from the perspective of a scientist they are excellent indicators of such changes. Biodiversity of the Arctic Ocean is very large. If any species can not move or adapt to new conditions, they may eventually die out. The loss of any unique species is the loss of global biodiversity "- concluded Griffiths.

Colonies of young penguins remain on the land, away from water, and the parents go into the ocean for fish. The fish they bring in the crop and feed the chicks. Because of warming the strip of mud originated on the bank. Not all penguins can overcome it and feed the young. The mass of penguins die on their way. The researchers note, that to avoid extinction, the emperor penguins have to adapt – to migrate or change their life-cycle. However, according to the study's authors, migration or change in the life cycle is unlikely for such species as Emperor penguins.

The penguins could have avoided extinction by changing their usual way of breeding in accordance with changing climate. However, the project manager Stephanie Jenouvrier believes that this is hardly probable. "Unlike some other species of birds in Antarctica, which have changed their way of life, penguins can not adapt quickly," - she points out. "They adapt very, very slowly at the time, as climate changes occur extremely quickly - this is the whole thing," - she added. As shown by earlier

studies, climate change may affect reproduction and geographical distribution of species. But now for the first time the forecast is made on the fate of all species.

Biologist Dan Rayman from Imperial College, London University states that these projections need to be taken seriously. The research is based on different scenarios of climate change and is based on a conservative approach. In addition, it uses a large amount of data on demography of penguins. According to the scientist, it is necessary to conduct additional studies in order to understand the impacts of climate change on other species. The same opinion is shared by Joel Cohen, head of the laboratory study of populations at Rockefeller University. "Emperor penguins is a very important form in itself. But it is also important the whole community of animals that surround them," - he said to BBC. The Penguins, he said, also draw attention to the crisis in the region. The Penguins in Antarctica are like the polar bears in the Arctic, " - he pointed out.

Studies show that even the most optimistic scenario, emissions of greenhouse gases, continued warming in the coming decades will dramatically affect Antarctica, the sub-Antarctic islands, Southern Ocean, and the penguins are dependent on these ecosystems. Kassie Siegel, director of climate change, air and energy program says that the penguins are threatened with extinction if the fumes would not be under control. It is not too late to save them, but people need to take action about global warming right now. (Ainley David et al.)

What can we do to help? We can reduce carbon dioxide emissions that cause global warming. Some measures involve walking, cycling or public transport instead of driving, using energy saving appliances and light bulbs, recycling, and more.

The greenhouse effect will be reduced if we can get rid of excess carbon dioxide in the atmosphere. In part this can be achieved by natural means. One way to do it the famous American physicist Freeman Dyson proposed a decade ago in his book "The Sun, The Genome, and The Internet: Tools of Scientific Revolution". We can reduce the growth of carbon dioxide in the atmosphere, increasing the growth of biomass in the soil. We can also use the resources of the oceans. For example, a myriad of plankton, which lives in the ocean, absorbs carbon from the atmosphere, using it to build their own skeletons and shells. (4, Global warming)

In connection with the problem, there have been three investigations that linked the characteristics of ice and population dynamics of Emperor penguins. All of them were based on data obtained from studies in the Pointe Géologie, which is most successful with respect to location of penguin colonies. Conclusions on the basis of these studies are compatible with each other. All together, they provide information on how penguins reacted, and what will be their further reaction, especially on sea ice and polynyas. Emperor penguins are forced to find new places for nesting because of the predicted decrease in the thickness of ice in many places in the mainland. In part, reducing the population is connected with the increase of air temperature in winter and sustained growth coastal polynyas. to predict the behavior of penguins in high-latitude regions of Antarctica, it is necessary to understand how they have reacted to the changes before and then make an assumption how the present physical environment (ice conditions, air temperature, winds, water surface temperature) will affect them in the future. (Ainley David et al.)

Global melting is the bleak picture of the future, but scientists believe it is inevitable unless we act, our world is changing beyond recognition and we people exacerbate this process. Ice caps are melting and sea level creeping higher and higher, which is worse that we are getting closer to a tipping point beyond which we can not stop what is happening, but there is hope. Some scientists

believe that if we act now, we can manage to stop the melting before it is too late. We can save not only penguins but a lot of flora and fauna from the disaster. If we continue doing nothing there will be no changes. Choice is for us.