In a 100,000 year cycle the earth does not move in an equal path around the sun. Orbits are by turns almost circular and elliptical. The shape of the orbit also determines the power of the sun's rays on the earth and thereby how the climate changes.

The sun emits energy and thereby warms the earth. This does not happen in a regular way. The amounts of energy can vary. These fluctuations can influence the climate on earth.

When a volcano erupts, gas and ash are flung into the atmosphere. These gases can reduce or increase the levels of thermal energy and thereby lead to warming or cooling of the earth.

When bodies, such as asteroids collide with the earth, then, like a volcanic eruption, particles are flung into the atmosphere. Gases and ashes can prevent or increase the levels of thermal energy and thereby lead to warming or cooling of the earth.

There are around 30 greenhouse gases in the atmosphere. One of them is called carbon dioxide. In principle the earth regulates the natural greenhouse effect, which keeps everything in equilibrium. This equilibrium is disturbed by the release of additional man made greenhouse gases. This causes the earth to warm up. Carbon dioxide is released amongst other things through transport, for example, when using cars and planes.

The population releases most greenhouse gases through the energy sector and industry. Globally, China is the biggest carbon dioxide producer in the world. But it is not straightforward. If you look at carbon dioxide use per head, the USA takes top place (16 tonnes per head). In second place is Russia, which has a range of extremely inefficient, fuel-intensive industries. Only then comes China and the European Union. China and USA are indeed the biggest climate polluters, but at the same time they are amongst the countries investing most in renewable energies in absolute terms.

Carbon dioxide lasts the longest in the atmosphere (up to 200 years). Carbon dioxide and nitrous oxide have the strongest effect. These gases originate both in the energy sector, and in industries such as agriculture, for example rice growing, use of fertilisers and the keeping of livestock. Cows are often described in the debate about climate change as climate killers, because methane is produced in the digestive tracts of cattle and this gas escapes from the animals around every 40 seconds.

Sea levels change for a number of reasons; ocean currents, the sinking and rising of the earth's crust, the effects of tides and the wind, and through global warming. When mountain glaciers or ice masses in the Antarctic and Greenland melt, then the sea level rises. As a result of these sea level increases, whole coastal towns and island states are in danger, for example the Maldives or Tuvalu. With an increase of just one metre, 35 million inhabitants of Bangladesh would have to leave their homes. Also in Europe, 13 million people would be threatened by sea-level, especially in the Netherlands and Denmark.

Worldwide, the ice and snow masses are reducing. Through the melting of ice, both the Arctic and the Antarctic are becoming darker and warming up more quickly. Between 1970 and 2014 the pack ice in the Arctic has reduced by 14 %. The sea also freezes later every year. Seal hunting, which is the basic livelihood of some people in Greenland, has become more and more difficult as a result. There are also negative consequences for the animal world. The existence of polar bears is threatened because they also need the ice and snow masses in order to hunt. At the same time the melting of the ice masses and glaciers makes new transport routes more easily accessible and frees up previously hidden mineral resources. In Greenland, they have already begun to mine for these rare earths.

When it is warmer, ice masses and glaciers melt more quickly in many regions of the world. In other parts of the world, deserts spread further out and longer periods of drought can be found. Without productive earth and water it is very difficult for people to build up foodstuffs. Higher temperatures and droughts in some regions of the world increase forest fires. In California alone, in 2015, at least 280 sq. kilometres were burned in forest fires. On the other hand, parts of agriculture, such as wine growing, for example in Austria, can profit from increased temperatures while in Greenland the growing season has extended.

Tropical storms are known as hurricanes, typhoons and cyclones. Where the temperature of the sea's surface increases, there are more and more powerful storms. They destroy and flood the land and as a consequence, illnesses can break out. Hurricane Katrina for example destroyed much of the low-lying areas of the city of New Orleans. Because there were breaks in the dyke system, 80 % of the regions of the city were under up to 7 metres of water. Above all, the method of house building, dykes and housing developments determines how many people are injured in a storm.

Climate change is resulting in longer and more intensive periods of rain. Floods and high water can put people in danger, destroy their houses and make them ill, because the drinking water becomes unclean and as a result diseases spread. Worldwide there have been in past years devastating floods. In the summer of 2010, in Pakistan, 20 % of the land was under water. Also, in central Europe in 2013 there were serious floods, in Germany disaster warnings were issued in 55 administrative regions. A dyke was broken, much land was flooded and sporadically sewage plants overflowed and bridges and roads were destroyed. It is difficult to say however, if these developments are down to chance weather events or the consequences of climate change.

The oceans are stores of carbon dioxide. The more carbon dioxide there is in the atmosphere, the more gets into the sea. The chemical equilibrium is therefore disturbed and the ocean can become less fertile. This has an effect on plants and animal, and on their reproduction in the sea. The temperature of the water also plays a role. How warm the water is depends on the ocean currents and global warming. Coral bleaching is a sort of panic reaction of nature. The coral bleaches and dies off, because they are deserted by the algae. Coral bleaching happened a few years ago on the famous coral reef in Australia (the Great Barrier Reef), it is now found extensively on the American coast and in the Caribbean. The corals that accommodate so many types of fish, perish in warmer water. Through the warming of the sea the habitat of fish also changes. Polar regions can really profit from this development. In Greenland they are hoping for a return of the cod.