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Could there be a dramatic and abrupt change in the climate?

UBA background paper on possible tipping points in climate system

The increasing concentration of greenhouse gases in the atmosphere is causing global warming. Air temperatures of ground-level atmospheric layers are therefore also rising. If certain temperature levels are reached, the climate system could react by changing abruptly and severely, e.g. Greenland's ice could melt, sea levels could rise, Arctic sea ice would melt, the Arctic itself would become warmer, and the Amazon rainforest would continue to dry out. A new Federal Environment Agency (UBA) background paper provides insight on the possible dangers of drastic climate changes. "We risk drastic climactic changes, also in Germany, as early as this century should temperatures continue to rise", said Dr. Thomas Holzmann, Vice President of the Federal Environment Agency (UBA). "We are all part of a global experiment with our planet's atmosphere where we do not know how it will end. We must greatly reduce emissions of climate gases speedily and also adapt to climate change", Holzmann continued.

Most people associate the notion of "climate change" with a slow gradual process. However, even relatively small increases in temperature can reach a so-called tipping point where abrupt and drastic changes occur. Rising temperatures in the Arctic, for example, have led to a retreat of the ice in the last 100 years. If temperatures continue to rise, the Arctic might even be ice-free in the summertime. The tipping point for an ice-free summertime Arctic might be nigh or even passed, which would have grave consequences for the populations living there. Hunted animal species would disappear, houses and roads would become instable and damaged due to thawing soil. Continued warming could have a dramatic impact on the Amazon rainforest.

Propelled by its deforestation and the fact that roads, farmland, and grazing fields are spreading, the rainforest ecosystem might dry out and, ultimately, collapse.

When exactly such tipping points will be reached can not be determined easily by scientists since many natural processes have not been adequately researched. One thing is sure: if the changes in the climate system are too extreme and irreversible, it may be too late for humans to adapt or--at best- only with a great deal of effort and at great expense.

Determined action is therefore urgently needed. Firstly, greenhouse gas emissions to the atmosphere must be cut significantly. Secondly, we must adapt to the now inevitable consequences of climate change, for example through efficient use of water resources or development of drought-tolerant crops. This is the only way to limit and control the consequences of the changes in the climate.

A background paper titled *Kipp-Punkte im Klimasystem – welche Gefahren drohen? [Tipping points in the climate system – what dangers lurk?]* can be downloaded from <http://www.umweltbundesamt.de/uba-info-presse/hintergrund/kipp-punkte.pdf>.

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