

More greenhouse gases due to higher temperatures

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Increasing global population and the accompanying increase in energy demand has led to the necessity of developing new ways of producing energy using sustainable sources. Besides wind and solar power, waterpower is an important energy source. To make waterpower available it is necessary to build dams and thereby damming and flooding areas where terrestrial organisms used to be settled. For drinking water purposes, it is also necessary to dam rivers. The construction of reservoirs for energy or drinking water storage is becoming on the rise worldwide. However, their construction has an impact on the environment as well. Not only is the habitat of the former resident organisms greatly altered or destroyed, but the amount of available carbon in these aquatic ecosystems is massively increased, due to the submersion of biological material (e.g. trees). Furthermore, land erosion takes place, which introduces additional biological material and associated carbon into the reservoir. Under certain conditions, this carbon can be converted into the greenhouse gases carbon dioxide and methane by microorganisms. Because methane is poorly soluble in water, it bubbles up from the bottom of the reservoir. It is known that the rate at which methane is released from reservoirs varies both between sites, and over time.

In this Master's degree project I investigated probable causes of the variability of greenhouse gas emissions in a Brazilian subtropical reservoir. I found that an increase in water temperature leads to higher emissions of methane from the reservoir. Furthermore, methane ebullition originates from its production in soil that was already present when the area was flooded rather than from soil that settled down after damming.

This degree project contributes to a larger ongoing project and together with further research it will allow deeper insight into possible relations between sediment characteristics and greenhouse gas emissions of reservoirs in Brazil.