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What You Can Do About the Negative Effects of Methane

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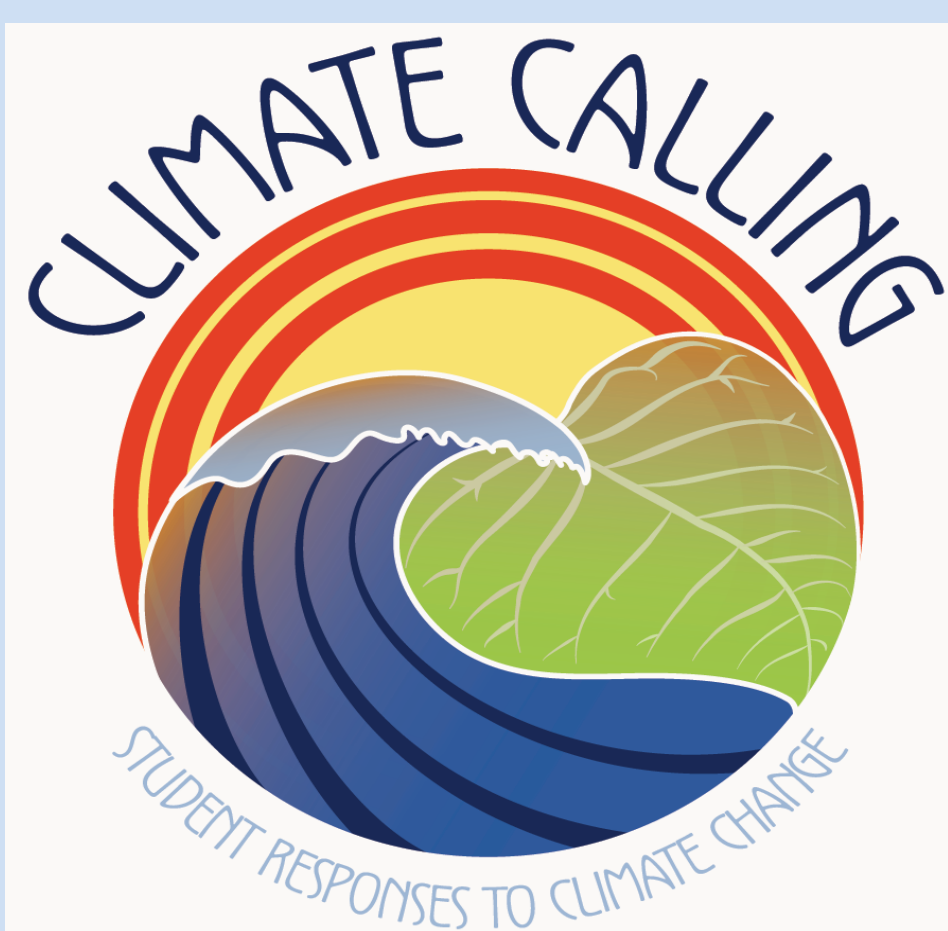
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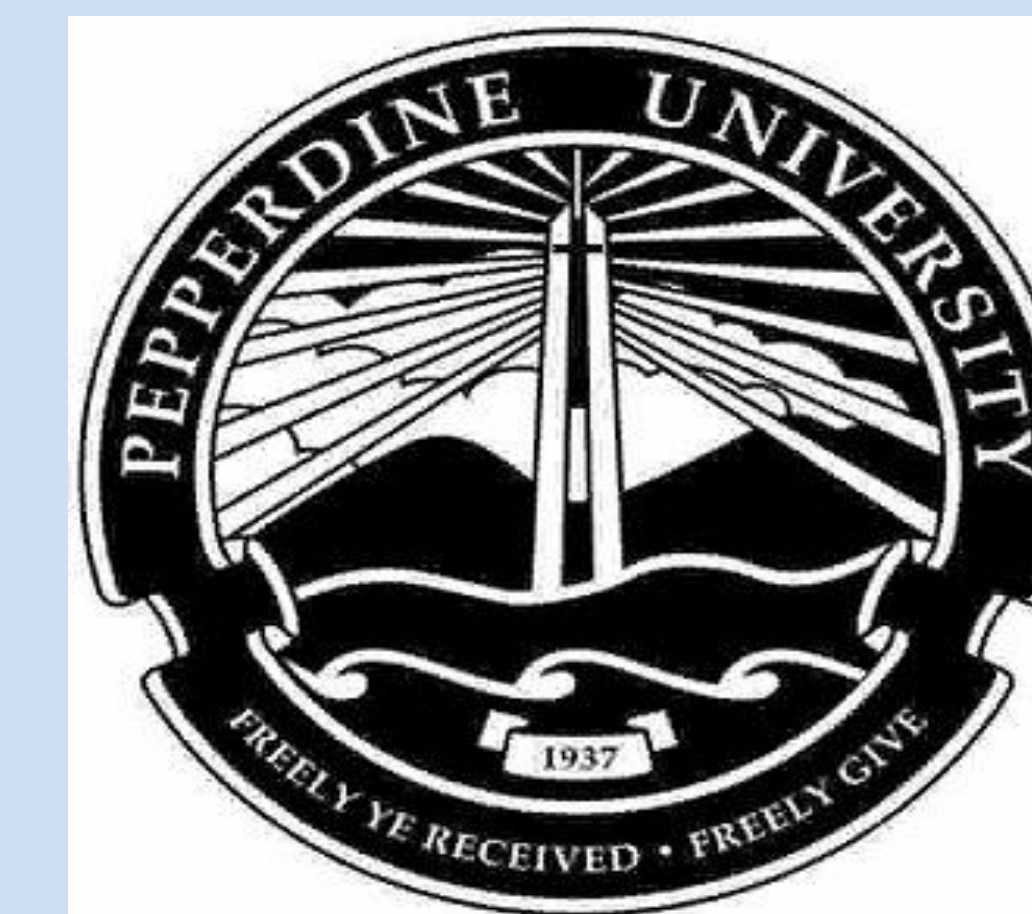
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What You Can Do About the Negative Effects of Methane



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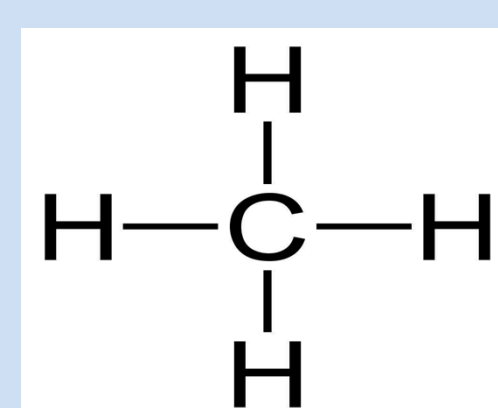
ABSTRACT

Our central objective was to investigate the apparent rise in methane emissions and whether or not they are having a negative effect on the environment. By themselves, methane emissions are natural and self-regulating (and thus do not cause damage to the atmosphere), but our thesis is that a build up of methane emissions as a result of increased human activity/negligence poses a threat to the environment, and needs to be addressed in the quest to live sustainably.

In our research, we chose to focus specifically on one source of methane emissions: permafrost, both because there is a significant amount of methane present in permafrost, and also because the rate of emissions is heavily susceptible to changes in temperature.

INTRODUCTION

- ❖ Methane has an indirect effect on climate through chemical feedbacks
- ❖ Natural processes in soil and chemical reactions in the atmosphere help remove CH_4 from the atmosphere.
- ❖ Given that gas is often found alongside petroleum, the production, refinement, transportation, and storage of crude oil is also a source of CH_4 emissions.
- ❖ More than 50% of present-day global methane emissions are anthropogenic; the largest contributors being fossil fuel production, ruminants, rice cultivation, and waste handling.
- ❖ Rising methane concentrations can cause increases in ozone and stratospheric water vapor concentrations.
- ❖ A molecule of methane is far more effective than a molecule of carbon dioxide in absorbing and radiating energy back to Earth.
- ❖ The estimated 1% annual increase in global methane is mainly attributed to human activities
- ❖ Methane concentrations have increased dramatically in the 20th century as a result of human activities, including fossil fuel use and agriculture.

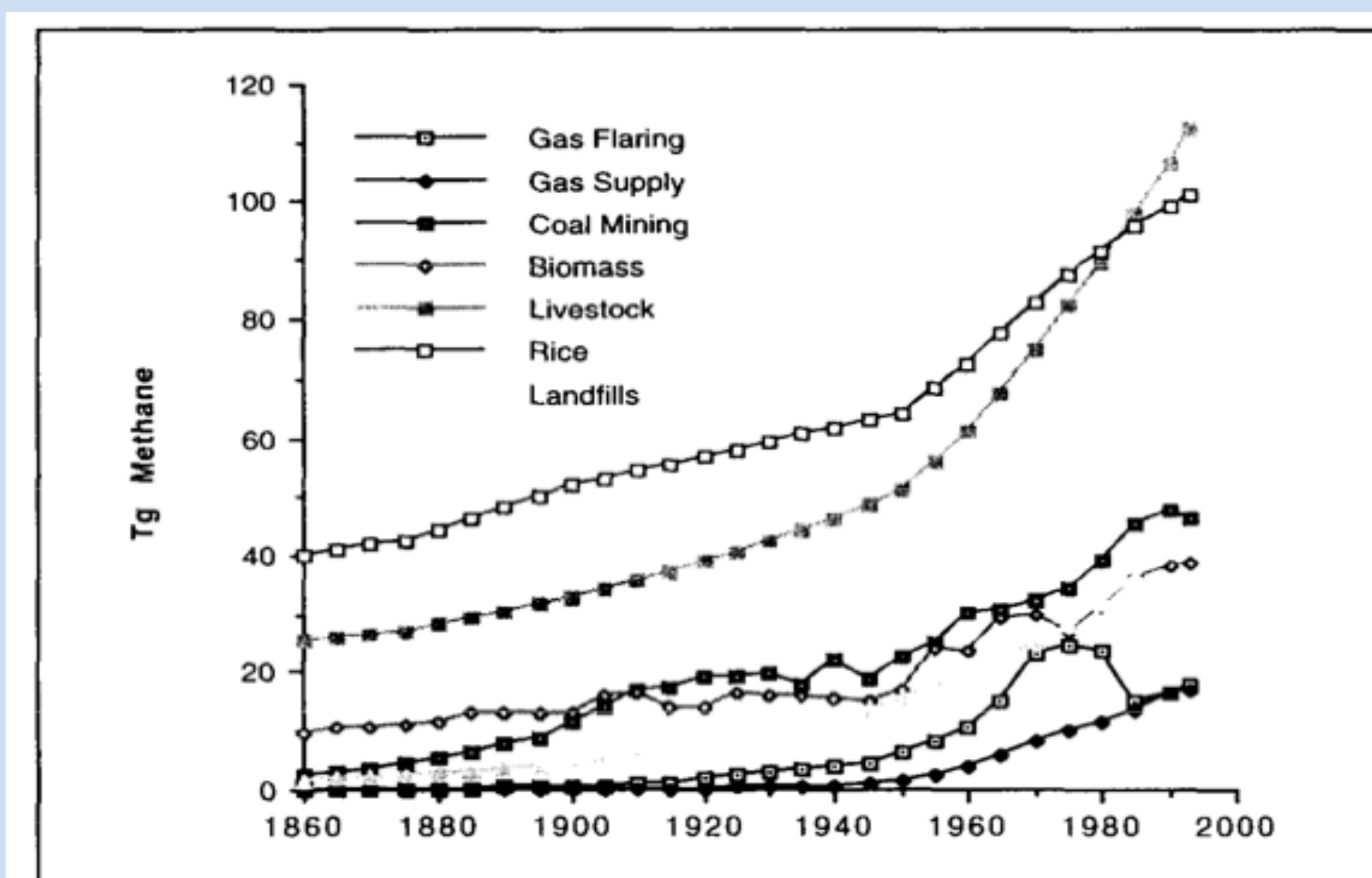
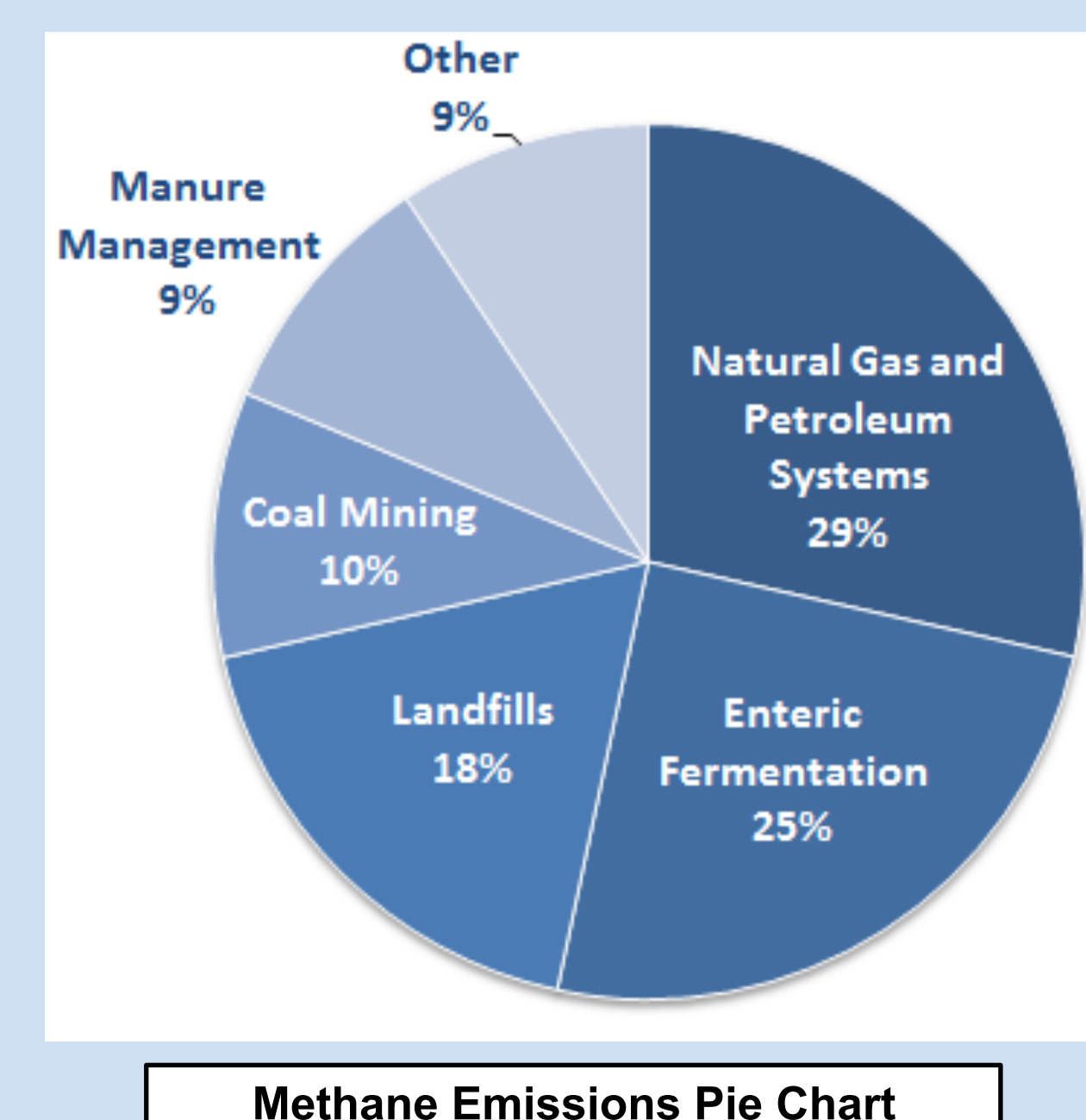
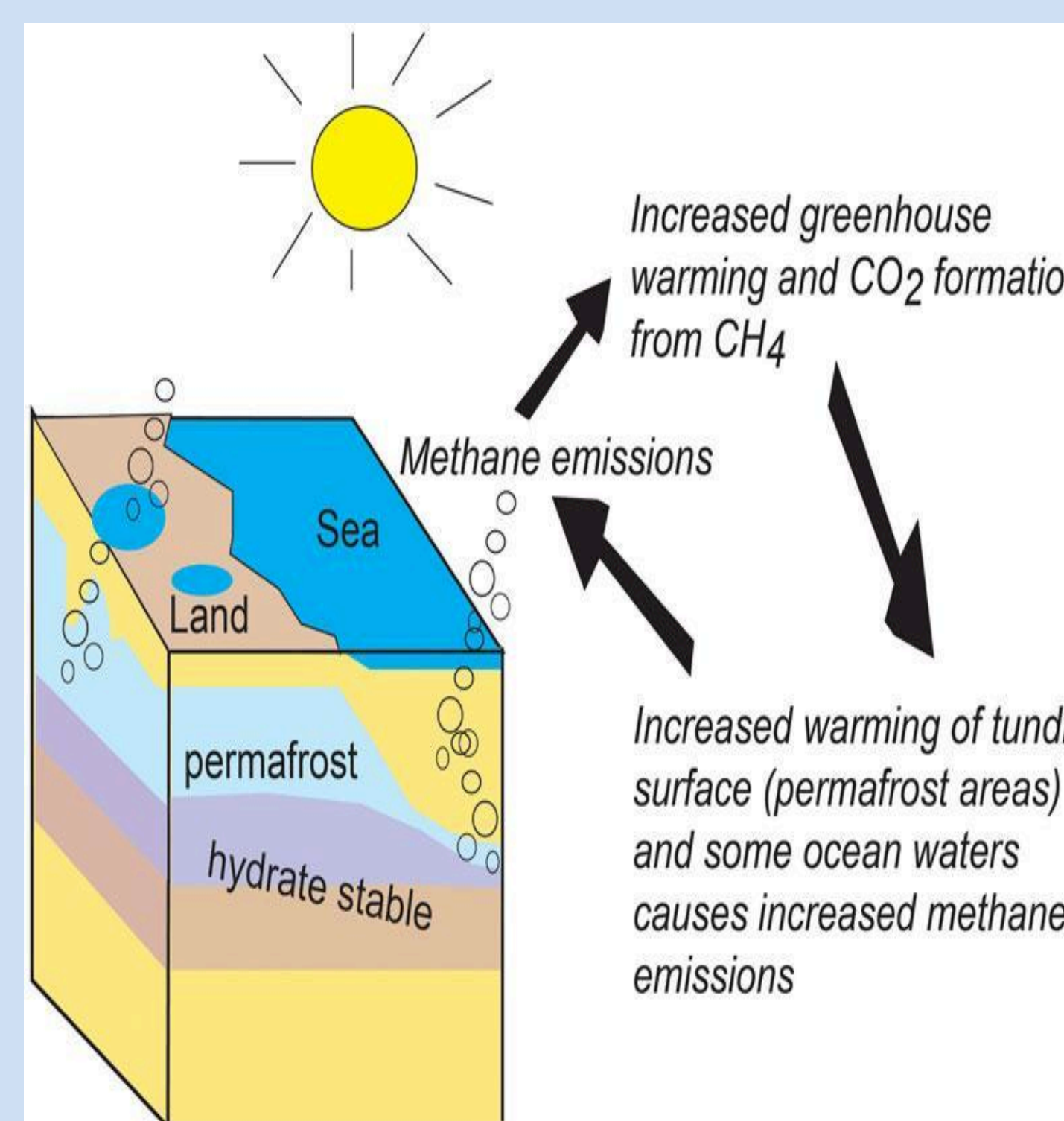


Methane chemical structure

THESIS

- ❖ As a result of human negligence, methane emissions have started to pose a negative effect on our environment over time.
- ❖ As larger amounts of permafrost melt and increase CH_4 levels, we must reduce other forms of methane producing activities in order to live sustainably.

MATERIALS & METHODS



PRIMARY EMPIRICAL STUDY

In the article by Christensen et al., scientists found that there has been a steady warming trend from 1975-2002 in the Abisko region of subarctic Sweden, causing the ecosystems there to become wetter (from the degradation of the permafrost), and releasing the methane stored in the permafrost into the atmosphere. This warming period has been observed in arctic Canada and Alaska as well.

The implication of this, then, is that as our planet experiences a rise in temperature, and permafrost around the world begins to degrade, that we will experience a significant increase in the concentration of atmospheric methane. Because methane is a potent greenhouse gas (it has a larger effect than carbon dioxide, although it lasts for a shorter period of time), an increase in atmospheric emissions will have a negative effect on our atmosphere if this increase is not checked.

DISCUSSION & CONCLUSION

As shown in our research, methane emissions are rising significantly and it is important that our society notice this trend and work to combat further percentage growth. In general we see that over time methane emissions have increased, notably growing beginning around the time of the human industrialization period.

Based on literature and our results, the growth of methane emissions over time is another factor that could be contributing to the global climate changes we are facing today. As noted in our graphs a significant amount of methane emissions are anthropogenic, or of human origin; thus, since we have clear evidence of this relationship, we as humans must become more aware of the negative effects of our activities on our environment, particularly as it pertains to methane emissions. Specifically with the amount of permafrost projected to melt in the coming years, we must intentionally reduce other forms of methane producing activities in order to check this imbalance in atmospheric methane that will occur.

Similarly stated in the literature on methane emissions, we find this constant increase in methane emissions to pose further threats to our plants and the environment as a whole. What we have concluded is that we need to be further considering and implementing management processes to mediate the rate and growth of methane emissions in order to impact climate change. In a broader sense, this indicates that we as humans must be more aware and conscious of our activities and their effects on our global world. If we hope to live sustainably, monitoring and reducing methane-emission behaviors, which are relative to the growth in methane emissions, must become habit.

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