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Climate Change and Commonly Overlooked Consequences

Goal: To elucidate often overlooked effect of rising global temperatures beyond reducing glaciation.

Rising Global Temperatures

The 18 warmest years in the 136 year record have all occurred since 2001, with the exception of 1998.

Ribulose-1,5-bisphosphate carboxylase/oxygenase (RuBisCO)

Evolutionarily conserved in **every** photosynthetic organism including algae, bacteria, and even some animals.

The most abundant protein on Earth.

Enzymatic activity catalyzes fixation of atmospheric carbon dioxide.

Acts as the first rate-limiting step of photosynthesis.

Temperature dependent catalytic activity of RuBisCO

Optimal temperature range for RuBisCO activity is small. Temperature increases drastically reduce or inhibit RuBisCO's activity.

Examples: RuBisCO activation by Rubisco activase was inhibited in wheat and cotton at 95F and 86F. RuBisCO inhibition was irreversible at 104F due to the formation Rubisco activase aggregates.

Rising global temperatures threaten to subsequently reduce carbon dioxide fixation in a positive feedback cycle.

Temperature dependent sex determination.

Temperature increases can irreversibly change the sex of some organisms during embryonic development.

Experienced by all species of the order crocodylia, most turtles, and 59 species of fish.

Ocean Acidification

The shell of every organism in phylum mollusa is hardened with calcium carbonate leading to their degradation as oceans acidify.

Works Cited

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