



The Evolution of Climate Change

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ABSTRACT

The continuing rise of global temperature over centuries has impacted both biotic and abiotic processes. The most significant increase in temperature occurred between 1975 and now, rising approximately 0.15-0.20°C per decade. At this rate of increase, earthly processes cannot adapt and experience stress. When abiotic stress is too high, pieces of ice shelves break into the ocean, geological functions such as plate tectonic activity increase and the oceans chemical properties are altered. These environmental changes also impact the stress of biological processes. When biological stress is too high, species fitness decreases, making biota unable to reproduce. If fitness decreases beyond reproductive abilities, species start to go extinct. Climate change is more obvious individually when local weather conditions are more erratic. Terrestrial impacts are seen more quickly than oceanic impacts since the atmospheric temperature changes quicker than water. Irreversible consequences are certain if human production of carbon dioxide does not decrease.

INTRODUCTION

From the beginning of Earth's history, its global climate flows through periods of warmer temperatures and colder temperatures. While this process is natural, the rise of human-made CO₂ starting in the industrial revolution, has expedited the process of heating. Local and global weather conditions have changed in response. Hurricanes and other extreme weather events are becoming for frequent and stronger than history records. Numerous studies of these changes and their impact on fauna have been performed, both extreme weather events and long term climate effects [10]. In some cases there are climate change hot-spots, areas of the globe that have reacted more extremely to the changing climate than others [4]. Using these hot-spots, further predictions can be made on how regional climate change is driven. Climate change at a local environment standpoint is difficult to understand. Local weather still remains "normal", warm summers and cold winters, however the transition into each season has been changing [6]. The study of phenology, seasonal changes to flora and fauna, has become increasingly popular to help understand these local changes. Studies related to phenology can also help predict biological changes with further climate change [12]. While the changes that are happening around the globe may not seem obvious to everyone, flora and fauna everywhere are feeling some impact from the exaggerated climate change.



Figure 1: Diagram describing impacts of climate change around the world [13].

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DATA SCIENCE RELATION

Environmental data is one of the largest and most frequently recorded data sets. Daily and even hourly accurate temperature, humidity and radar data is available. Radar forecasting is improving with daily additions of data to improve models. Readings of carbon dioxide from historic times to now is also available, making it easy to use data science to correlate different environmental factors with the increase of CO₂ levels. In comparison, prediction models can be used to 'see the future' of how CO₂ continues to rise and how environmental factors could change with it.

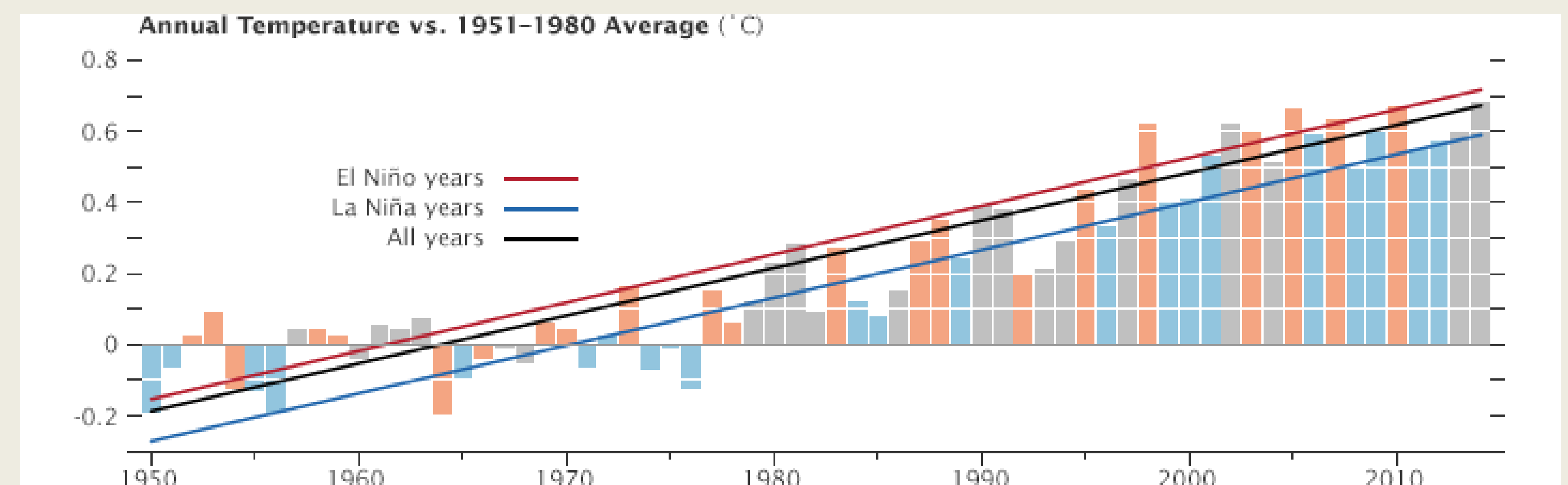


Figure 2: Graph depicting the rise and fall of temperatures from 1950 to 2014. Y-axis is the degrees difference from the 1951-1980 average. The lines indicate the slope of increase of year classifications [18].

CONCLUSIONS

There is only one planet we can successfully live on that is currently known to us. That is Earth. Our species has grown from a seed to a forest when it comes to technology, transportation, and sustaining ourselves. However, for centuries we have cared more about ourselves as a whole than the planet that houses us. You must take care of your house to continue to live in it or it will fall apart. The increase in our power usage and need for food has forced the environment to bend in ways that are not comfortable. One of the largest contributors to CO₂ is the food industry. Many new systems to provide clean food and energy are forming in response to research done on climate change. Continuing into the future we are able to recover from this increase and move to a more stable ebb and flow of global climate. While is the responsibility of each and every one of us, it is also the responsibility of large companies to be aware of the impact being made and want to partner with our planet to help both the planet and the humans that live on it thrive for centuries to come.

DELIVERABLE PRODUCT

- A historical and present description of conditions of floral and fauna impacted by changing temperatures and climate
- A prediction of future conditions of environmental factors and how they impact flora and fauna
- Options for improvement of current systems and processes that may be negatively impacting the environment
- Potential algorithms that could be used in further prediction and analysis of environmental factors such as temperature
- Analysis of extreme weather events both historical and present and the change through time

ACKNOWLEDGEMENTS

Thank you to all the researchers who have tirelessly fought for recognition about this climate problem. Also to companies that are committed to changing policies and ways of thinking to more environmental methods. It is my hope that in the future the earth will be able to return to a more natural ebb and flow of global temperatures, less impacted by humans.