The Impact of Anthropogenic Forcing on ENSO Amplitude

Ben Goldman

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Introduction

Climate Change

- Here we go...
- Bjerknes (1969)

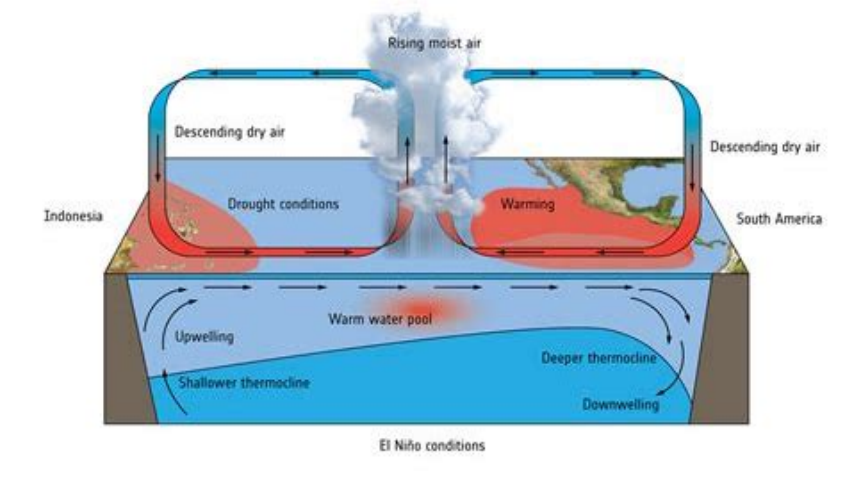

Figure 1: What A nice Figure!

El Niño

Climate Simulation

ENSO in the Future

Problem: What effect does global warming have on ENSO? Can we expect ENSO to become stronger, weaker, or neither?

Gap and Goal

Research Questions

Data and Methods

Ensembles: CESM1 and CESM2

Analysis Tools

R:

- ncdf4
- zoo
- dplyr
- ggplot2
- WaveletComp
- reshape2

Python:

- numpy
- pandas
- scipy
- matplotlib
- netCDF4

Other:

- nco

Role of Mentor and Student

Mentor:

- Suggest future methods
- Conduct parallel analysis to complement student work
- Provide raw precollected data
- Interpret data produced by student
- Review student writing

Student:

- Analyze data on computer
- Produce graphics for analysis and publication
- Write documentation
- Suggest interpretations of data

Measuring ENSO

Measuring ENSO Intensity

Signal and Noise

ENSO is Becoming Stronger

It's not That Simple

Single Forcing Ensembles

Influence of Aerosols and Greenhouse Gasses

Correlation With Ocean Temperature

Stratification

Stratification in Other Ensembles

Conclusion

Conclusions

Discussion

Acknowledgments

References

Bjerknes, J. (1969). Atmospheric teleconnections from the equatorial pacific. *Monthly Weather Review*, 97(3):163–172.

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