Guide for Mars Climate Project

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Introduction

This document provides a simple map for anyone wanting to familiarize themselves with this project. This can be used for review or as a guide. While I was working on my project alone, I was in a team with Audrey Durham and Benjamin Carpenter which was supervised by Professor Lei Wang ([website](https://www.eaps.purdue.edu/people/profile/wanglei.html)) and graduate student Zhaoyu Liu of Purdue Earth, Atmospheric, and Planetary Sciences (EAPS).

Principle topics

A great resource for this is the AMS glossary, which allows you to search up any atmospheric/planetary science word and it’ll tell you the definition of it

[Glossary of Meteorology](https://glossary.ametsoc.org/wiki/Welcome) ← Underline indicates a clickable link

1. NetCDF ([Unidata](https://www.unidata.ucar.edu/software/netcdf/)) ([Tutorial](https://www.youtube.com/watch?v=XqoetylQAIY))
   1. Panoply ([Video](https://www.youtube.com/watch?v=XQ9Rmiw6m1o))
   2. You can also read NetCDF files through Python/R, but it’s easier to use Panoply
2. Rossby Waves ([NOAA](https://oceanservice.noaa.gov/facts/rossby-wave.html#:~:text=Rossby%20waves%2C%20also%20known%20as,naturally%20occur%20in%20rotating%20fluids.)) ([wikipedia](https://en.wikipedia.org/wiki/Rossby_wave))
3. Annular Modes ([AMW](https://www.atmos.colostate.edu/~davet/ao/introduction.html))
   1. Also, look into Southern Annular Modes (SAMs)
4. Eddies ([Wikipedia](https://en.wikipedia.org/wiki/Eddy_(fluid_dynamics)))

This is a tight-knit community, so knowing and contacting the big names in this field is crucial. After knowing the big names, you’ll come across some of their research and books, which will have many technical words you’ll need to understand to get a good understanding of the paper. This would be a great time to use the AMS Glossary.

The big names

1. Adam Showman ([Page](https://www.lpl.arizona.edu/faculty/adam-showman))
   1. Read this great [paper](https://arxiv.org/pdf/0911.3170.pdf)
2. Juan M. Lora ([Page](https://people.earth.yale.edu/profile/juan-lora/about))
3. Michael Battalio ([Website](https://battalio.com/)) ([youtube](https://www.youtube.com/@Battalio))
4. Wanying Kang ([website](https://wanyingkang.com/))
   1. <https://eapsweb.mit.edu/people/wanying>

Important notes: <https://atmos.washington.edu/~dennis/552_Notes_ftp.html>

Although I didn’t finish my project, I had many interesting thoughts that I would like to share here, in case it interests anyone! What are the similarities of the Rossby waves on mars compared to Earth? Can we somehow, just from knowing the Rossby waves on a planet, derive other properties that don’t seem connected?