**Presentation:**

This is an outline. Don’t worry about some of the details for the presentation since I will be there to answer any questions that you don’t have an answer for. We can sit down next Monday and go over the talk as well. Aim for about 20 mintues, which means that you won’t be going into too much detail. Also, add web site info, and paths to the data where you can.

Description of data for climatology to compare with GEM-MACH data:

* Data source : ECMWF MACC Reanalysis product from 2008-2012
* Which species are available
* Are there any inconsistencies (e.g. the fact that SO2 is actually a 4-year climatology because there is no data before Oct 2008 for that species in the MACC Reanalysis database)
* Where are the data (climatologies and the original files)
* Samples of the data : plots of surface, 500hPa, 100hPa, 50 hPa and 10 hPa (don’t bother with anything above 10hPa) for several species (focus on ozone, CO, NOx and one of the dust bins) from your “atlas”

Description of data for the tropospheric and stratospheric ozone climatologies:

* Purpose – to provide an alternative data set to use for the DynOzone method for providing the regional GEM-MACH model with chemical lateral boundary conditions (CLBCs)
* Previously, using CLBCs from MACC Reanalysis updated every 6 hours has been shown to improve the surface prediction of ozone during stratospheric intrusion events
* Using a CLBC that were derived from monthly climatologies of ozonesondes that were defined for the troposphere and stratosphere separately allowed for a better definition of the ozone field in the region of the tropopause, allowing for some improvement in the surface ozone, however the tropospheric ozone was too high. This is why we have created separate tropospheric and stratospheric ozone climatologies using the MACC Reanalysis, which had a better representation of tropospheric ozone
* A few plots that show what the climatologies look like - e.g. horizontal plots of tropospheric and stratospheric climatologies at 500hPa, 100 hPa and cross sections of each for a couple of months (e.g. January and July).

Preliminary results (on hadar):

* The first results show that tropospheric ozone (and particularly the surface ozone) that was too high in the original DynOzone run are indeed much lower
* However, the impact of stratospheric intrusion is lessened since there is not as much ozone in the lower stratosphere

Figures: WLBC-TO3-all-2010041312\_009.png : Ozone along the western lateral boundary for GEM-MACH at 2010-April-13 at 21:00 GMT. The black dots are the thermal tropopause, the white line is the 2PVU surface (dynamical tropopause) according to the GEM-MACH piloting meteorology and the teal contours are the kinetic energy (showing where the jet stream is). The CLBC are the MACC Reanalysis updated every 6 hours (MACCRean), the seasonally averaged conditions based on MOZART4, the DynOzone method using the ozonesonde climatologies (DynOzoneTOST) and the DynOzone method using the MACC Reanalysis climatologies (DynOzoneMACC). You can see how the ozone is a lot higher in the DynOzoneTOST, but how there is not enough ozone just above the tropopause in the DynOzone MACC.

TO3-surf-all-2010041312\_009.png – Snapsnot of the surface at the same timestamp as above, during a stratospheric intrusion event. This is an event that the MOZART4 CLBC did a reasonable job at capturing, but the surface ozone is higher for the MACCRean and the DynOzone TOST. The impact on the ozone at the surface for DynOzoneMACC is too weak in the region of the intrusion (western US), but the surface ozone is much lower than the DynOzoneTOST case, so that’s good.

TO3-xsect2-2010041312\_009.png – Cross section at the same time stamp. Here you can see that there is still not enough ozone just above the tropopause in the DynOzoneMACC case, and that is why the impact at the surface is just too low.

Next steps:

* Test the tropospheric and stratospheric climatologies as CLBC’s for the regional GEM-MACH on the new system (using period April-June 2010)
  + Benchmark run using the existing MOZART4-based seasonal climatologies has been run (what date it is on? Is it done?)
  + Run using the new DynOzone CLBC
  + Runs on new system using MACC Reanalysis CLBC updated every six hours, and DynOzone CLBC based on the ozonesonde climatologies for the same period for comparison
  + Surface analysis to compare with the station data.

**Report**

Include a lot of same information (not the “next steps” section) but you can get more detailed and technical. Include paths to the data and to the code, info on how the code works, and what packages will be needed to run it (e.g. python-rpn, Pygeode, etc).

You can also include the full atlas here (all the plots you want to include) with a brief explanation of each set (e.g. CO climatology based on 2008-2010 for pressure levels x,xx,xxx).