

MPO 624- Assignment 1 Data Summary (Draft)

Brian Matilla

1 March 2016

Dataset Preview

- Variables (21 of them):
 - `variables(dimensions): float64 lat(lat), float64 lon(lon), float64 time(time), float32 H MV(time,lat,lon), float32 PREC(time, lat,lon), float32 Q(time,lat,lon), float32 T(time,lat,lon), float32 U(time,lat,lon), float32 UU(time,lat,lon), float32 V(time,la t,lon), float32 WV(time,lat,lon), float32 W(time,lat,lon), float32 WPQP(time,lat,lon), float32 WPTP(time,lat,lon), float32 WPUP (time,lat,lon), float32 WQ(time,lat,lon), float32 WT(time,lat,lon), float32 WU(time,lat,lon), float32 WW(time,lat,lon), float32 TEEF(time,lat,lon), float32 ZSKEDOT(time,lat,lon)`
- Dimensions (90 lats, 180 lons, 3044 time steps)

```
In [35]: Slide Type - ▾  
#print(Lats)  
#print(Lons-180)  
print(PREC.shape)  
  
print len(lats)  
print len(lons)  
print len(time)  
print len(HMV)  
print len(PREC)  
print len(Q)  
print len(WPQP)  
print len(WQ)  
  
(3044L, 90L, 180L)  
90  
180  
3044  
3044  
3044  
3044  
3044  
3044
```

- The 3044 time steps relate to a time period of the full GEOS-5 campaign from

Future Visions of this Project

- This project serves to take a different approach to conventional research techniques and utilize the full potential of the IDV's interactive environment.
- I would like to base this project on a more interactive note and more removed from the traditional "static" mode.
- Using the variables from before, I'll be looking at the relationship between total precipitation, mean vertical moisture flux, and precipitable water (presenting the former two for now...)

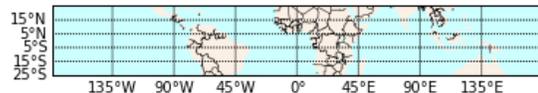
Where Are We Looking?

- Most of the GEOS-5 data that we're interested in lies within the 25 S to 25 N belt. Here's a simple map I created to illustrate this:

In [6]:

```
# Now that it's set up, let's start the plot sequence!  
# Let's begin with the variable PREC. It will be interesting to see the precipitation distribution.  
  
map = Basemap(projection='merc',llcrnrlon=-179.,llcrnrlat=-25.,urcrnrlon=179.,urcrnrlat=25.,resolution='i') # projection, lat/Lon extents and resolution of polygons to draw  
# resolutions: c - crude, l - Low, i - intermediate, h - high, f - full  
map.drawcountries()  
map.drawlsmask(land_color='Linen', ocean_color='#CCFFFF') # can use HTML names or codes for colors  
  
parallels = np.arange(-25,25,10.) # make latitude lines ever 10 degrees from 25S-25N  
meridians = np.arange(-180,180,45.) # make longitude lines every 45 degrees around the globe  
map.drawparallels(parallels,labels=[1,0,0,0],fontsize=10)  
map.drawmeridians(meridians,labels=[0,0,0,1],fontsize=10)
```

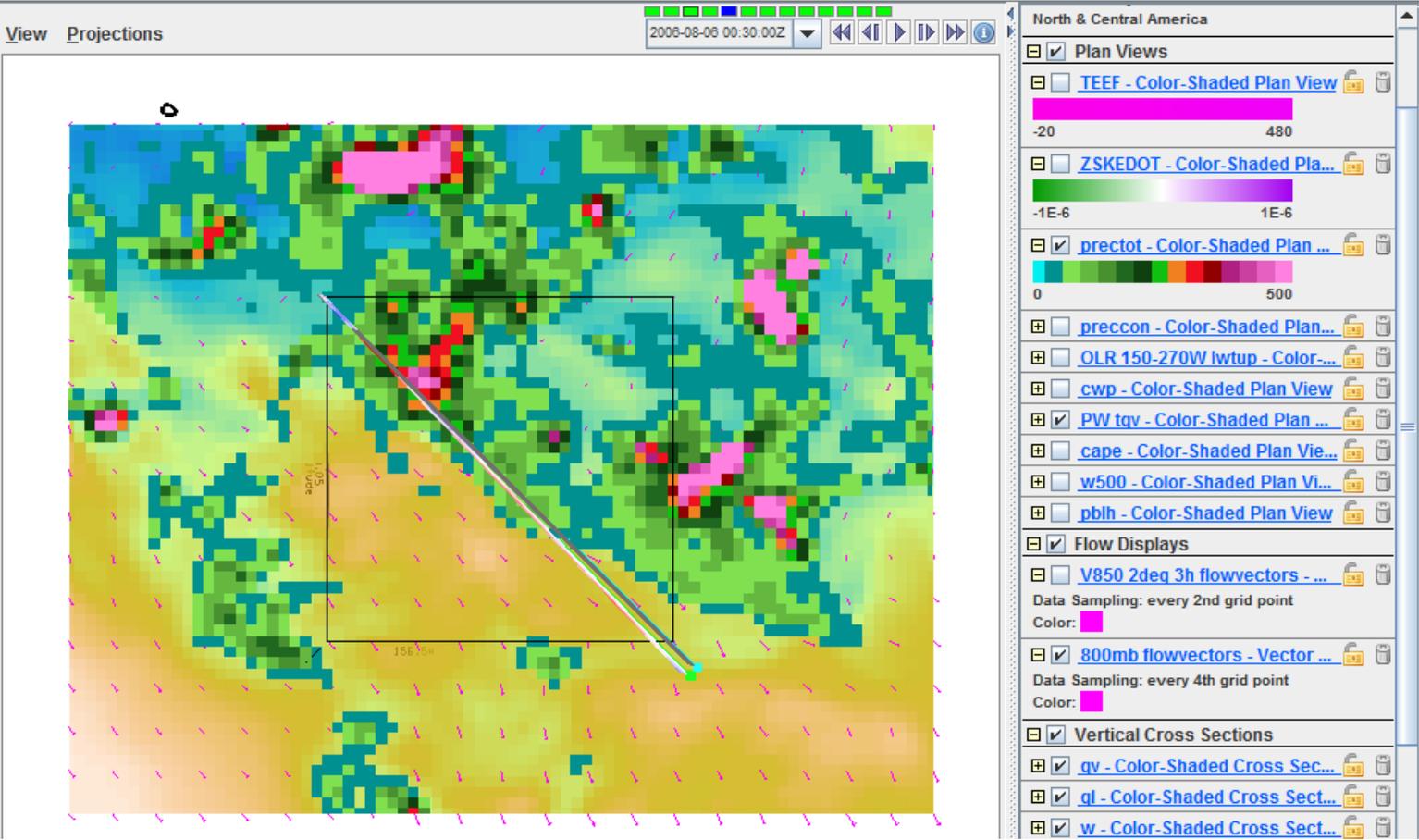
```
Out[6]: {-135.0: ([<matplotlib.lines.Line2D at 0xb722d68>],  
 [ <matplotlib.text.Text at 0xaecdd30>]),  
 -90.0: ([<matplotlib.lines.Line2D at 0xb597588>],  
 [ <matplotlib.text.Text at 0xaecd4d0>]),  
 -45.0: ([<matplotlib.lines.Line2D at 0xb597b00>],  
 [ <matplotlib.text.Text at 0xb5b4828>]),  
 0.0: ([<matplotlib.lines.Line2D at 0xb597fd0>],  
 [ <matplotlib.text.Text at 0xb5b4be0>]),  
 45.0: ([<matplotlib.lines.Line2D at 0xb5b4630>],  
 [ <matplotlib.text.Text at 0xb5b4f98>]),  
 90.0: ([<matplotlib.lines.Line2D at 0xb73c2e8>],  
 [ <matplotlib.text.Text at 0xb5d6390>]),  
 135.0: ([<matplotlib.lines.Line2D at 0xaee51d0>],  
 [ <matplotlib.text.Text at 0xb5d6748>])}
```



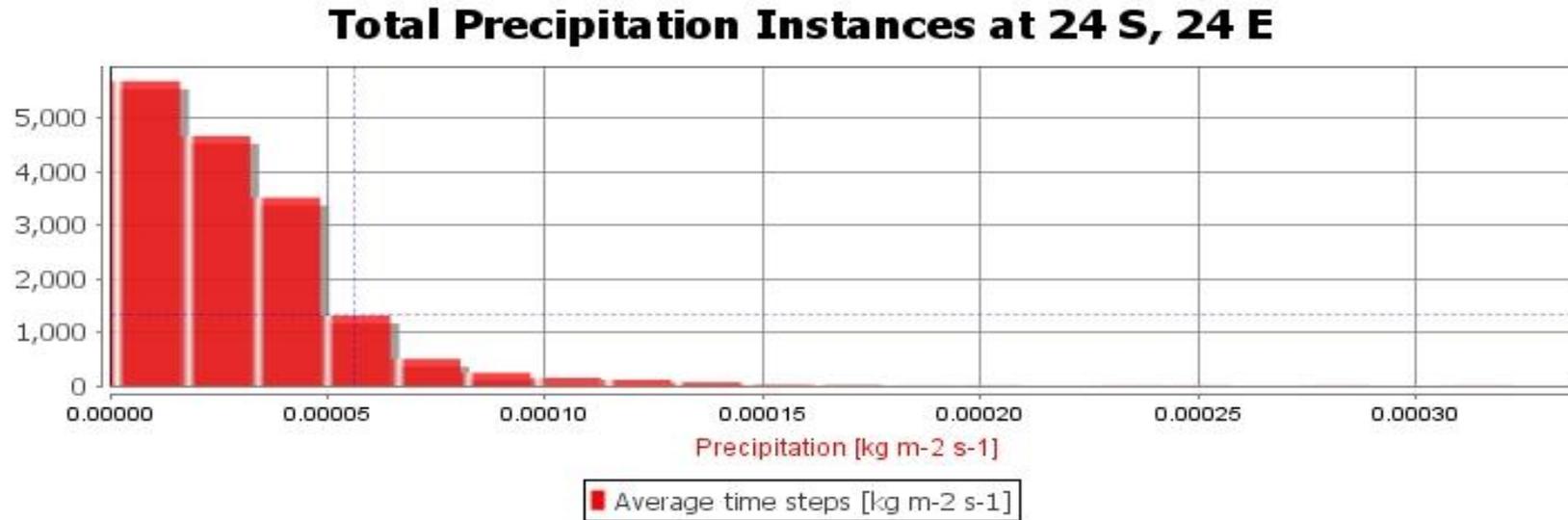
A Case Study Within the Dataset

- Because our research is intensely focused on building case studies of poorly and well-analyzed precipitation events, my project will revolve around a particular dataset from a case on 6 AUG of 2006.
- Using the powerful tools within the Interactive Data Viewer (IDV) and with the help of an ongoing project within the research team, I selected a case study to provide the framework for this particular project.

Our Case Study Overview

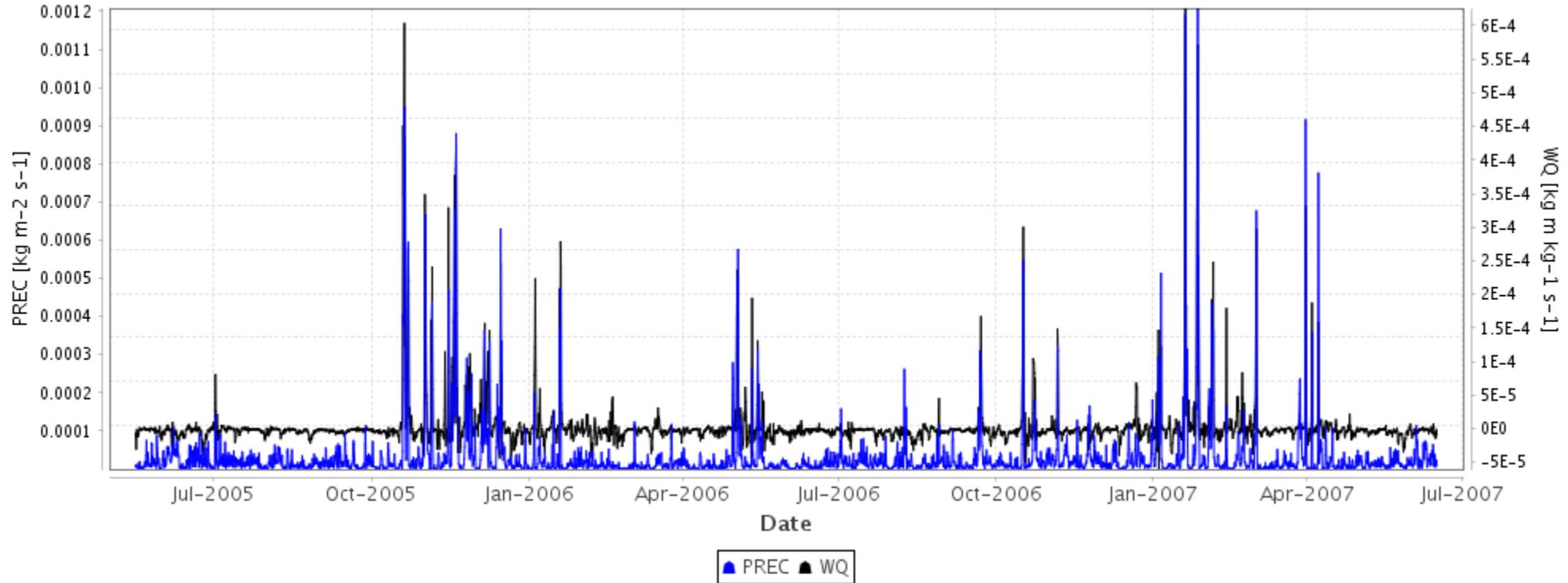


Total Precipitation Histogram

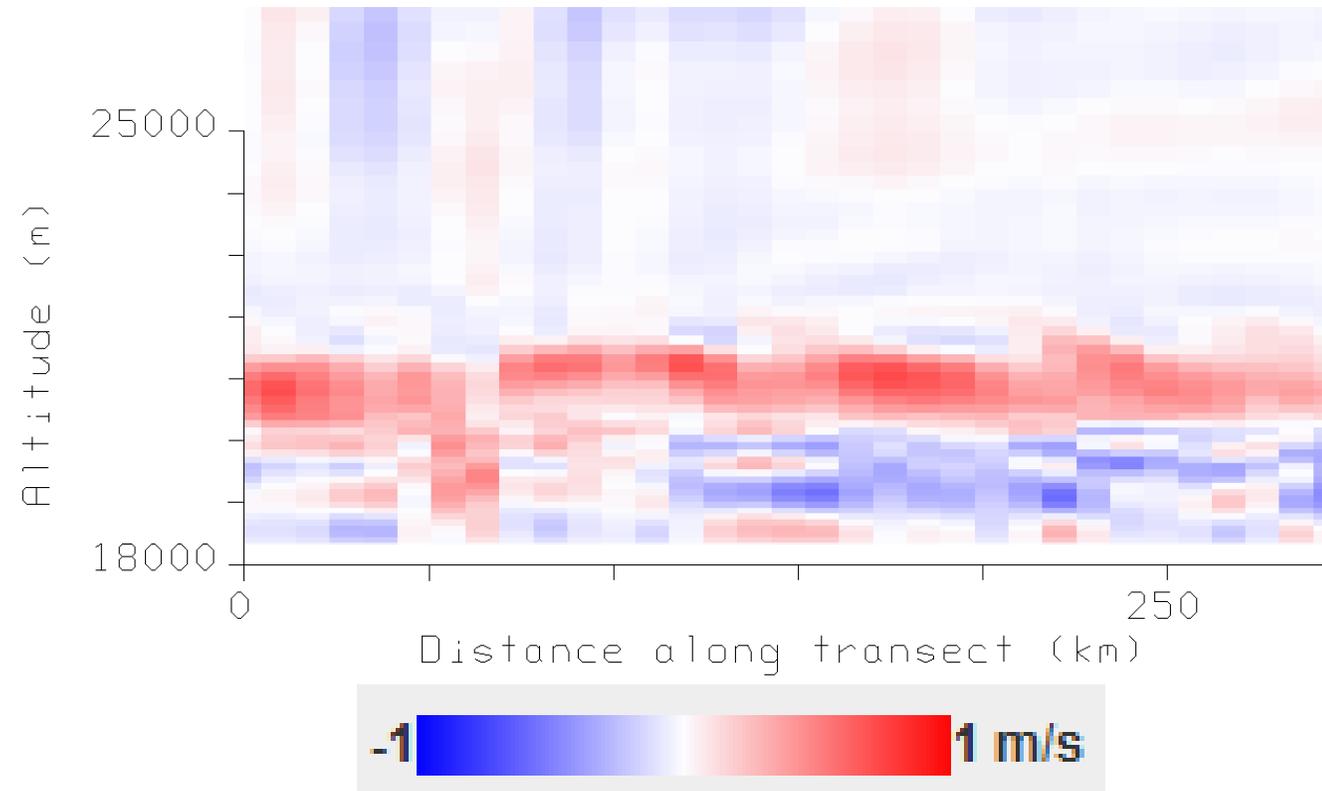


- A bulk of the precipitation data values fall into the range of ~ 0.00001 - $0.00005 \text{ kg m}^{-2} \text{ s}^{-1}$ (translates to $\sim 1 \text{ mm day}^{-1}$).
- Higher rainfall amounts of $\sim 10 \text{ mm day}^{-1}$ or greater are very rare.

Time Series (Precip vs. Vertical Moisture Flux)



Vertical Velocity



This Is Just A Glimpse

- I will continue to add plots to this discussion as I continue to learn and expand with the IDV.