SHARPpy: Skew-T and Hodograph Analysis and Research Program

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AMS Python Symposium
24 January 2012

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Hi, my name is Patrick, and I’m a python-aholic.
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It’s been less than an hour since I last coded.
Necessary Apologies

- My Family: For spending the Christmas holiday coding

@pmarshwx, @metpy
Necessary Apologies

- My Family: For spending the Christmas holiday coding
- My Wife: For spending the Christmas holiday (and then some) coding
Necessary Apologies

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- You, The Meteorological Community: For the state of the code base I’m releasing today...
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...You think I’m kidding...
Why SHARPpy?
Why SHARPpy?

... Because ...

Why SHARPpy?

... Why not? ...
Why SHARPpy?

... To prove I could do it ...
Why SHARPy?

...7 days is too long to spend with 10 family members in a single house...
Why SHARPPy?

... I’m tired of never “knowing” what I’m using ...
But it’s more than just my wants
Why SHARPpy?
Meteorologists vs. Meteorologists

BigSHARP: SPC Internal

BUFKIT: Public
Why SHARPy?
Meteorologists vs. Meteorologists

BigSHARP: SPC Internal

BUFKIT: Public
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Two weeks before my Masters defense, I discovered a bug in the CAPE routines contained in the NCAR Command Language (NCL). I had to redo every calculation and rewrite a large part of the thesis.
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Research

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(This task has never been funded.)
Why SHARPpy?

2011 Hazardous Weather Testbed Activities

Needed to visualize:
- 1100+ Point Forecast Soundings (PFCs)
- 36 Forecast Hours + 1 Initialization Hour
- 18 Different Members
- 51 Vertical Levels per Sounding
- Ultimately wrote routine to convert model text output to BUFKIT

Hazardous Weather Testbed

I’m not really sure what I’m doing with my hands!
This was a dirty hack; wanted more pythonic solution
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So over the Christmas Holidays I set out to fix that
What is SHARPpy?

- A Pure Python Implementation of the SPC’s Bigsharp
- No dependency on Numpy, Scipy, nor Matplotlib
- Graphics handled by Tkinter
- Plans are to eventually extend to Numpy, Scipy, &/or Matplotlib
SHARPpy: Observed Soundings
SHARPpy Internals

- Utilizes a custom “Profile” class

- Profile class is essentially pure python representation of 6-d array with meta data auto-generated by the class

- Profile class only requires following keyword arguments:
  - Pressure
  - Height
  - Temperature
  - Dew Point
  - U-component of Wind OR Wind Direction (degrees)
  - V-component of Wind OR Wind Speed

- Thus, it is easy to extend to new data sources
SHARPpy: Primitive Ensemble Support!
SHARPpy: STUVE
But Wait! There’s More!

- Graphical Routines rely on Numerical Routines
- Numerical Routines **do not** rely on Graphical Routines
- No need to “draw” every sounding or hodograph to do analyses!
SHARPpy: Thermodynamic Calculations
SHARPpy: Kinematic Calculations
SHARPpy: Where to Get It?

http://www.github.com/metpy/sharppy
SHARPpy: Where From Here?

- Finish Porting Bigsharp Routines
- Finish GUI Display (e.g., add parameter fields to display)
- Add Time-Height Cross Section Functionality!
- More Dynamic Control of Ensemble Members
- Utilize Numpy, Scipy, & Matplotlib
- ...To Be Continued...
Please Get Involved!

- My Github Account:
  http://www.github.com/pmarshwx

- MetPy Github Account:
  http://www.github.com/metpy

- My Website (Most Analyses and Images Done in Python):
  http://www.patricktkmarsh.com

- My Email: patrick.marsh@noaa.gov

- Twitter: @pmarshwx