Enhancements to Plotting Capabilities in MetPy

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BACKGROUND

MetPy is an open-source Python library for reading, visualizing, and performing calculations with weather data.

MetPy seeks to:

1) replicate features of GEMPAK, a legacy software package with a similar role as MetPy
2) provide support for Python users working with meteorological data

We focused on various improvements to MetPy's plotting interface that align with the above goals. All these enhancements are included in the version 1.1.0 release of MetPy.

METHODS

FEATURE REQUESTS: Many new features in MetPy, including those presented on the right, start as requests from users who propose them through MetPy's GitHub repository.

CODE DEVELOPMENT: Developers (such as ourselves) can edit MetPy code and submit it for inclusion in MetPy's next release, as was done with the features shown on the right.

DOCUMENTATION: New code must include docstrings and comments that inform other users and developers about how and why the code works the way it does.

LINTING: All new code is reviewed by Flake8, which checks that code follows accepted standards, namely Python's PEP8.

UNIT TESTS: Unit tests help ensure that new code works properly now and continues to work in the future when other changes are introduced.

LEARN MORE

Explore a Jupyter Notebook that walks through how we created the examples shown on the right.

Also available at bit.ly/3x2QMX7.

RESULTS AND DISCUSSION

These enhancements to MetPy provide users with **greater control over map design** and introduce support for **plotting additional data formats**.

EASILY ZOOM IN / OUT OF MAPS


```
MapPanel.area = 'co+'     MapPanel.area = 'co'     MapPanel.area = 'co-'
```

Simply adding a '+' or '−' suffix when specifying a region will zoom in or out of the region.

This is originally a feature from GEMPAK included in MetPy 1.1.0

PLOT COMMON FORMATS OF GIS VECTOR DATA

MetPy's new `PlotGeometry` class allows users to plot data read from geoJSON and shapefile formats.

This enables plotting products from NOAA SPC and NHC, as well as roads, interstates, cities, and more.


NOAA SPC Day 1 Convective Outlook
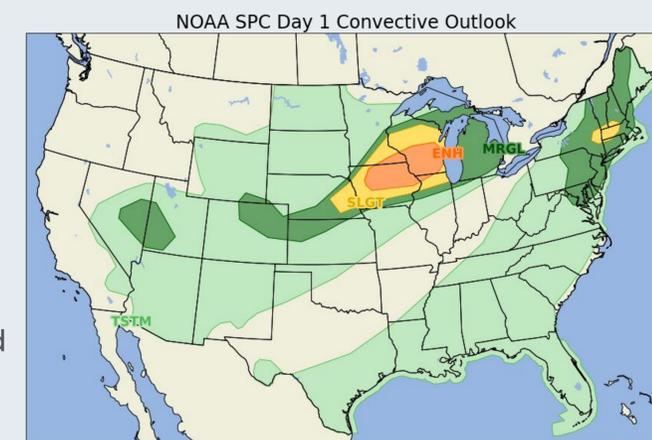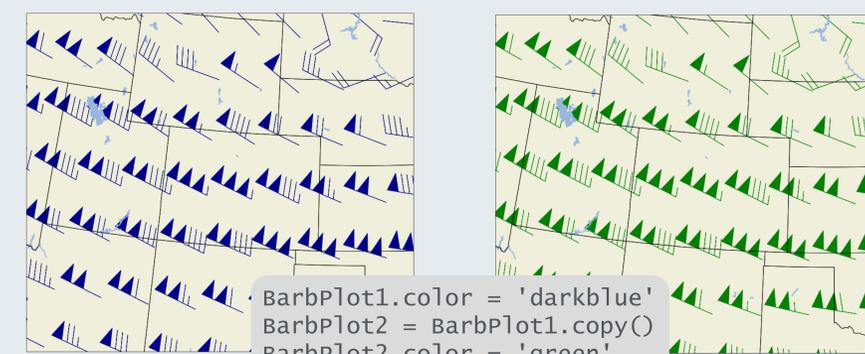
ADJUST FONT SIZES FOR TEXT IN PLOTS

MetPy 1.1.0 includes new attributes to set the font size for

- Plot titles
- Contour labels
- Color bar labels
- Station plot text (not pictured)

Mean Sea Level Pressure (hPa) and 700 hPa Relative Humidity (%)

```
MapPanel.title_fontsize = 24
ContourPlot.label_fontsize = 18
FilledContourPlot.colorbar_fontsize = 'xx-large'
```
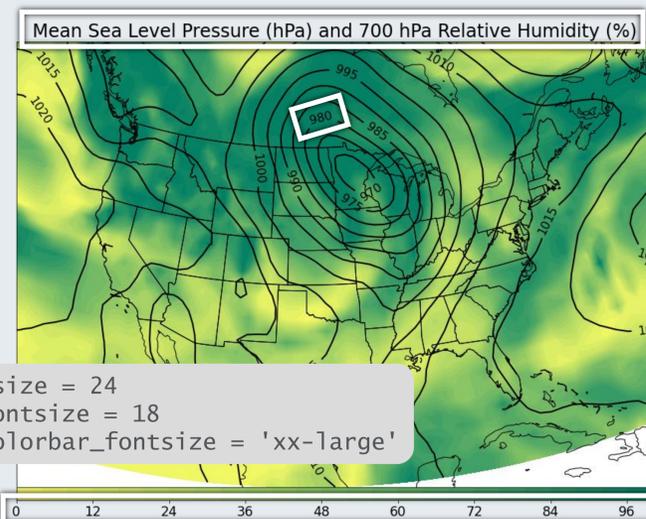
DUPLICATE PLOT OBJECTS


```
BarbPlot1.color = 'darkblue'
BarbPlot2 = BarbPlot1.copy()
BarbPlot2.color = 'green'
```

MetPy 1.1.0 introduces a `copy` method for all plot-related classes. This helps reduce code repetition for users making multiple plots with similar qualities.