The metsymb package*

Frédéric P.A. Vogt
frederic.vogt@meteoswiss.ch

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Abstract

This package introduces commands to generate meteorological symbols. As of August 26, 2021, these include: okta symbols (○, ⏀, ◔, ...), and cloud symbols (⇀, ⌿, ⛅, ...). This package effectively introduces a new font in which each symbol is assigned to a glyph, which can then be called individually from LaTeX documents via dedicated new commands.

Contents

1 Introduction

The creation of this package was initially motivated by the fact that, as of August 24, 2021, there were no dedicated Unicode element for all of the okta symbols and the cloud genera symbols. To the best of my knowledge, no LaTeX package provides a uniform set of these symbols either[1].

This humble package is a direct attempt to remedy –in part– to this sad state of affair. A new font, created using FontForge[2], is used to generate the new symbols, and assign them to individual glyphs. Individual glyphs can then be called individually using dedicated LaTeX commands.

2 Usage

Using the metsymb package is straightforward. By importing it via a not-so-surprising `\usepackage{metsymb}` in the preamble of your documents, you will gain access to the commands listed in Table 1 and Table 2.

*This document corresponds to metsymb v1.0, dated 2021/08/24.
[1] If you know of one, please let me know and I shall list it here !
[2] https://fontforge.org/en-US/

Table 1: metsymb commands for the okta symbols.

○	\zerookta	◑	\fiveoktas
◔	\oneokta	◕	\sixoktas
◔	\twooktas	◐	\sevenoktas
◑	\threeoktas	●	\eightoktas
◑	\fouroktas	⊗	\nineoktas

Table 2: metsymb commands for the cloud genera symbols.

⟙	\cirrus	⩤	\nimbostratus
⟋	\cirrocumulus	⩧	\stratocumulus
⟋	\cirrostratus	--	\stratus
∪	\altocumulus	⩒	\cumulus
⩤	\altostratus	⩔	\cumulonimbus

2.1 Using metsymb with matplotlib

The assembly of a dedicated font to store the metsymb symbols[3] is directly motivated by the fact that matplotlib requires proper font metrics to include symbols in Python plots.

Hence, metsymb can be used to include meteorological symbols inside Python plots, provided that the use of a system-wide LaTeX installation is enabled prior to generating the plots. Modifying the `rcparams` elements is one way to do so, as illustrated in the following minimal working example (stored in `metsymb_mwe.py`; see Fig. 1 for the result):

```
# -*- coding: utf-8 -*-
"""
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Module content: minimal working example of the metsymb LaTeX package
with matplotlib figures.
"""

# Import matplotlib
from matplotlib import pyplot as plt

# Set the proper rcparams elements
plt.style.use('./metsymb_mwe.mplstyle')

# Create a basic figure with some demo text in the center.
plt.close(1)
plt.figure(1, figsize=(4, 0.5))
plt.text(0.5, 0.5,
         r'\LARGE Hello World: \threeoktas \nimbostratus',
         ha='center')
```

[3] instead of a simpler `tikz` approach, for example

```
plt.axis('off')

# Export to different format and display on-screen.
plt.savefig('metsymb_mwe.pdf')
plt.savefig('metsymb_mwe.png')
plt.show()
```

where `metsymb_mwe.mplstyle` contains:

```
text.usetex: True
text.latex.preamble: \usepackage{metsymb}
```

Figure 1: Result of the `metsymb_mwe.py` demonstration script, illustrating how the metsymb package can be used with matplotlib.

WARNING !
The use of `text.latex.preamble` in the `rcparams` of matplotlib is not an officially supported feature of that package ! Proceed at your own risks !

3 Code development and bug reports

The metsymb package is being developed inside a dedicated Github repository under the MeteoSwiss organization, located at: https://github.com/MeteoSwiss/metsymb. User contributions are welcome and will be examined in details. So are bug reports and suggestions for new symbols, which are best submitted as *Github Issues* directly on the code's repo at: https://github.com/MeteoSwiss/metsymb/issues

4 License and copyright

5 Ackowledgments

The following resources proved immensely useful to assemble the first version of this package:

- *How to Package Your LaTeXPackage*, Scott Pakin (2015): https://mirror.foobar.to/CTAN/info/dtxtut/dtxtut.pdf
- The FontForge documentation, and in particular the *FontForge and TeX* article: https://fontforge.org/docs/techref/PfaEdit-TeX.html
- The *TeX font errors: Cheatsheet*: https://texdoc.org/serve/tex-font-errors-cheatsheet/0

Several StackOverflow users also proved extremely helpful when building metsymb, in particular:

- those that provided clarifications and help in this post, in that post, and in that other post.

Thank you also to the jklymak and anntzer.lee from the matplotlib discourse community for their clarifications in this post.

6 Font table

The complete font table for metsymb, generated via the command `pdftex testfont` with the `\sample` call, is visible in Fig. 2.

7 Implementation

The metsymb package very simply defines new commands to fetch individual glyphs from the `metsymb` font. As such, its LaTeX side is rather simple.

`\zerookta` The 0 okta symbol:

```
\newcommand{\zerookta}{{\usefont{U}{metsymb}{m}{n} 0}}%
```

`\oneokta` The 1 okta symbol:

```
\newcommand{\oneokta}{{\usefont{U}{metsymb}{m}{n} 1}}%
```

`\twooktas` The 2 oktas symbol:

```
\newcommand{\twooktas}{{\usefont{U}{metsymb}{m}{n} 2}}%
```

`\threeoktas` The 3 oktas symbol:

```
\newcommand{\threeoktas}{{\usefont{U}{metsymb}{m}{n} 3}}%
```

`\fouroktas` The 4 oktas symbol:

```
\newcommand{\fouroktas}{{\usefont{U}{metsymb}{m}{n} 4}}%
```

`\fiveoktas` The 5 oktas symbol:

```
\newcommand{\fiveoktas}{{\usefont{U}{metsymb}{m}{n} 5}}%
```

`\sixoktas` The 6 oktas symbol:

```
\newcommand{\sixoktas}{{\usefont{U}{metsymb}{m}{n} 6}}%
```

`\sevenoktas` The 7 oktas symbol:

```
\newcommand{\sevenoktas}{{\usefont{U}{metsymb}{m}{n} 7}}%
```

`\eightoktas` The 8 oktas symbol:

```
\newcommand{\eightoktas}{{\usefont{U}{metsymb}{m}{n} 8}}%
```

`\nineoktas` The 9 oktas symbol:

```
\newcommand{\nineoktas}{{\usefont{U}{metsymb}{m}{n} 9}}%
```

`\cirrus` The cirrus symbol:

```
\newcommand{\cirrus}{{\usefont{U}{metsymb}{m}{n} A}}%
```

`\cirrocumulus` The cirrocumulus symbol:

```
\newcommand{\cirrocumulus}{{\usefont{U}{metsymb}{m}{n} B}}%
```

`\cirrostratus` The cirrostratus symbol:

```
\newcommand{\cirrostratus}{{\usefont{U}{metsymb}{m}{n} C}}%
```

`\altocumulus` The altocumulus symbol:

```
\newcommand{\altocumulus}{{\usefont{U}{metsymb}{m}{n} D}}%
```

`\altostratus` The altostratus symbol:

```
\newcommand{\altostratus}{{\usefont{U}{metsymb}{m}{n} E}}%
```

`\nimbostratus` The nimbostratus symbol:

```
\newcommand{\nimbostratus}{{\usefont{U}{metsymb}{m}{n} F}}%
```

`\stratocumulus` The stratocumulus symbol:

```
\newcommand{\stratocumulus}{{\usefont{U}{metsymb}{m}{n} G}}%
```

`\stratus` The stratus symbol:

```
\newcommand{\stratus}{{\usefont{U}{metsymb}{m}{n} H}}%
```

`\cumulus` The cumulus symbol:

```
\newcommand{\cumulus}{{\usefont{U}{metsymb}{m}{n} I}}%
```

`\cumulonimbus` The cumulonimbus symbol:

```
\newcommand{\cumulonimbus}{{\usefont{U}{metsymb}{m}{n} J}}%
```

	´0	´1	´2	´3	´4	´5	´6	´7	
´06x	○	◫	◔	◔	◑	◑	◕	◐	″3x
´07x	●	⊗							
´10x		⊣	⌒	∠	◡	◿	◿	⌯	″4x
´11x	--	∩	⌅						
	″8	″9	″A	″B	″C	″D	″E	″F	

Figure 2: Complete font table for metsymb.