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SUBJECT: THE CAPABILITIES AND ACHIEVEMENTS OF FNMOC'S PNG to GIF TOOL (P2G-TOOL)

**1. Abstract.** P2G-Tool is introduced as a custom script used to convert a set of .png images to a .gif file through a standard method. P2G-Tool enables FNMOC's climatology team to generate .gif climate products for the Navy and DoD in an information assured process as climate products, in .gif format, have recently proved useful for operational climate briefs. Static example outputs of P2G-Tool are included.

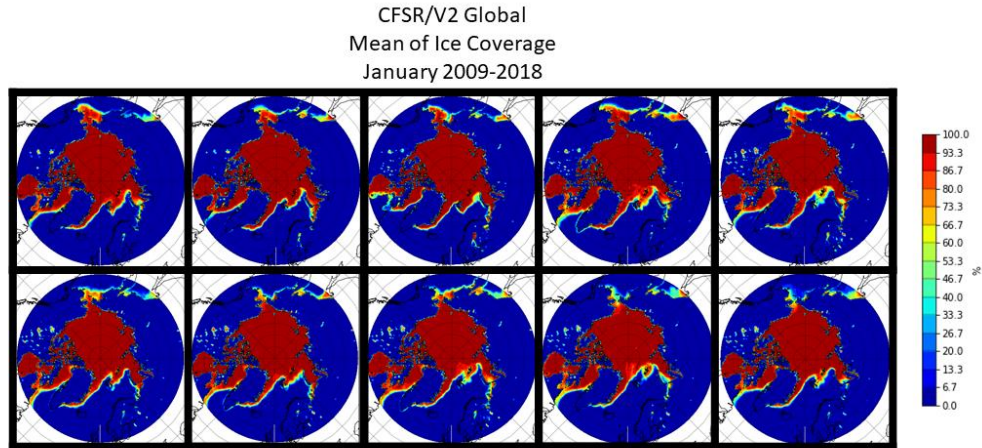
**2. Introduction.** The climatology team at Fleet Numerical Meteorology and Oceanography Center (FNMOC) maintains a plethora of premade climate products on the FNMOC Portal. Most of these products are in PowerPoint or image formats and built as ready-to-brief resources for the Navy and Department of Defense (DoD). Climate products in .gif format have recently proved useful for climate briefs in operational planning. The PNG to GIF Tool (P2G-Tool) was built in python3 to make this conversion a standard and information-assured process. While this may seem trivial, a focus on information assurance limits the use of commercial programs for sensitive products at higher classification levels thus resulting in a need for the P2G Tool.

The source code is maintained in-house at FNMOC as it has been designed, tested, built, and run on FNMOC systems using FNMOC archives. For this reason, it will not be made publically available. This project was conducted independently with no funding from outside sources.

**3. Capabilities.** P2G-Tool does not require any additional command line or hard coded inputs to run, but the time interval between each image of the produced .gif can be adjusted if the user desires. To create a .gif, all desired images must be placed in the same directory as P2G-Tool's python script with naming conventions such that, when sorted in alphabetical order, the correct sequence of images is cycled through. Once all images are placed in the directory, the script can be run from a Linux command line to produce a .gif output with an interval of 0.5 seconds per image.

**4. Example Output.** The contents of an example output is presented below in Figure 1. FNMOC's Advance Climate Analysis and Forecasting (ACAF) system was used to produce 10 years of mean ice coverage in the arctic with each image covering one year in the range 2009-2018. A side-by-side of these images are depicted in Figure 1. Please note, each image has its own legend, but for ease of display, one legend is placed to the side of the 10 images. These images were compiled into a .gif using P2G-Tool.

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**Figure 1.** All images composing an ice coverage climate product in the arctic. All images are calculated for the month of January and span from 2009 to 2018.

**5. Conclusion.** Climate products in .gif format have recently proved useful for operational climate briefs. The P2G-Tool was built in python3 to make .gif products for the Navy and DoD in a standard and information-assured process. While other methods exist to make this conversion, P2G-Tool allows this conversion to remain information assured at FNMOC by avoiding the use of commercial means.

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