MARTIN - The GCRF African SWIFT image viewer

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Summary
MARTIN is a simple program written in python for viewing and annotating weather forecast imagery. It has been created as part of the Global Challenges Research Fund (GCRF) African SWIFT (Science for Weather Information and Forecasting Techniques). The aim of MARTIN is to make the viewing of a very large number of forecast or case study images less awkward and facilitate the drawing of features from one variable on screen to be compared with other related fields (from the same or different model).

For the GCRF African SWIFT testbeds MARTIN has been compiled into an executable to simplify the process of using it. This means that there are no python library dependencies. Therefore, the Windows version should work on any Windows computer and the Linux version should work on any Linux computer. The python code can be made available for compilation on a Mac if required, however this has not been tested.

MARTIN is still in its very early stages. Therefore there are likely to be problems that have not been foreseen when using it. It also means that any suggestions on how to improve the MARTIN program would be appreciated.

Download

For the GCRF African SWIFT testbeds the executables (as well as some test imagery) can be downloaded from the SWIFT webspace (also where model imagery is being made available) http://homepages.see.leeds.ac.uk/~earajr/SWIFT/MARTIN .

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wget http://homepages.see.leeds.ac.uk/~earajr/SWIFT/MARTIN/MARTIN.tar.gz
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Once download untar the file where you want your MARTIN directory to be located.

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tar -xvf MARTIN.tar.gz
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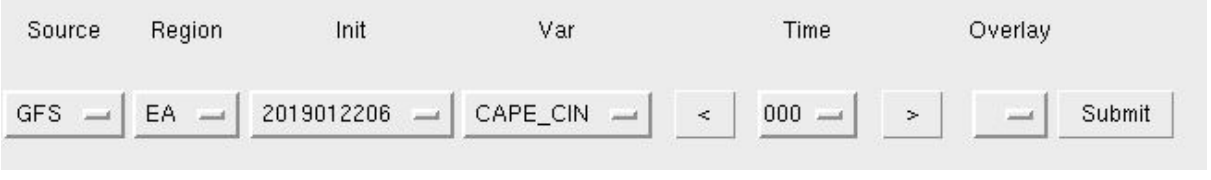
This will yield your MARTIN directory and an example directory structure. Please be aware that with a modified image directory structure it is likely that errors will occur when attempting to use MARTIN.

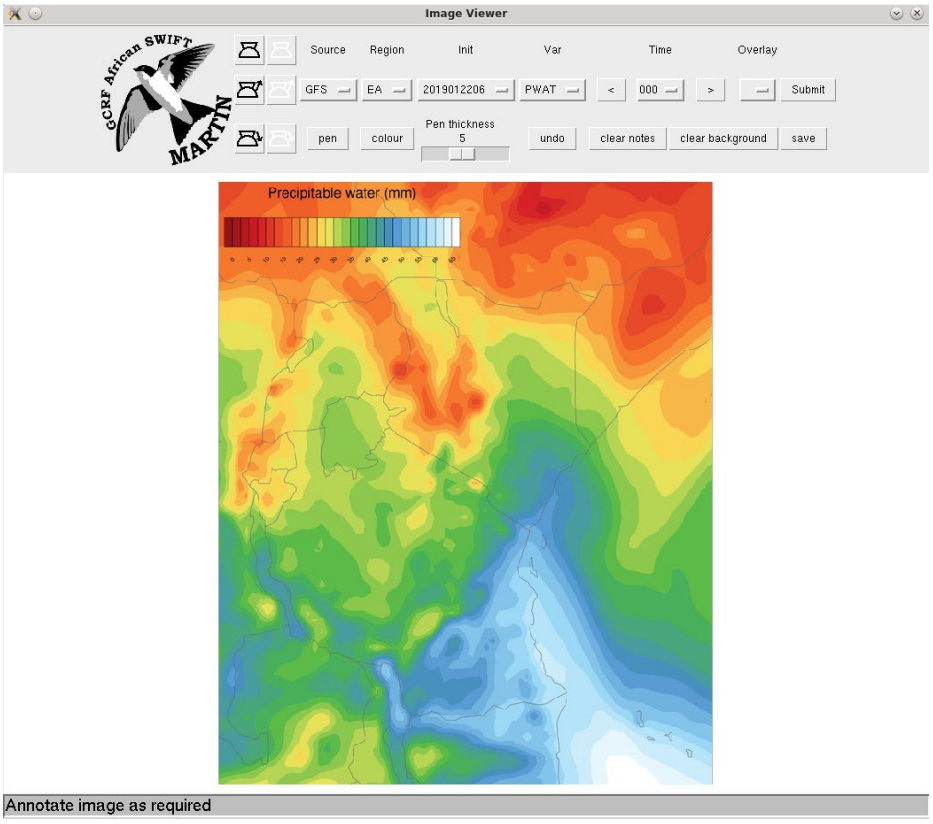
Use

Once you have unpacked the directories the program should be ready to use. Navigate to your newly unpacked MARTIN directory. Inside you will find a Windows .exe file and a Linux executable as well as a number of subdirectories relating to different models. By executing the appropriate file MARTIN should start and create a screen which looks like the image shown below.

By choosing options from drop down menus at the top of the window you can select the “Source” (model from which images were generated), “Region” (for testbed 1a these are EA; East Africa, WA; West Africa and TropA; Tropical Africa), “Init” (initiation time of simulation), “Var” (variable you want to see image of and “Time” (the forecast time e.g. 000 indicates the analysis step while 009 indicates a 9 hour forecast. Once selected you can either press the “Submit” button or one of the time forward or back arrows to load an image.



The example below shows precipitable water over the EA region from GFS at the 0600 UTC analysis step on 22nd Jan 2019.



As well as being able to skip forwards and backwards through forecast imagery and be able to switch easily to other variables there is also the functionality to add annotations on top of the images.

Annotations

There are 3 different annotation methods available with MARTIN. These are Overlays, stamps and pen.

*****Note overlays can only be used with GFS in EA and WA regions currently*****

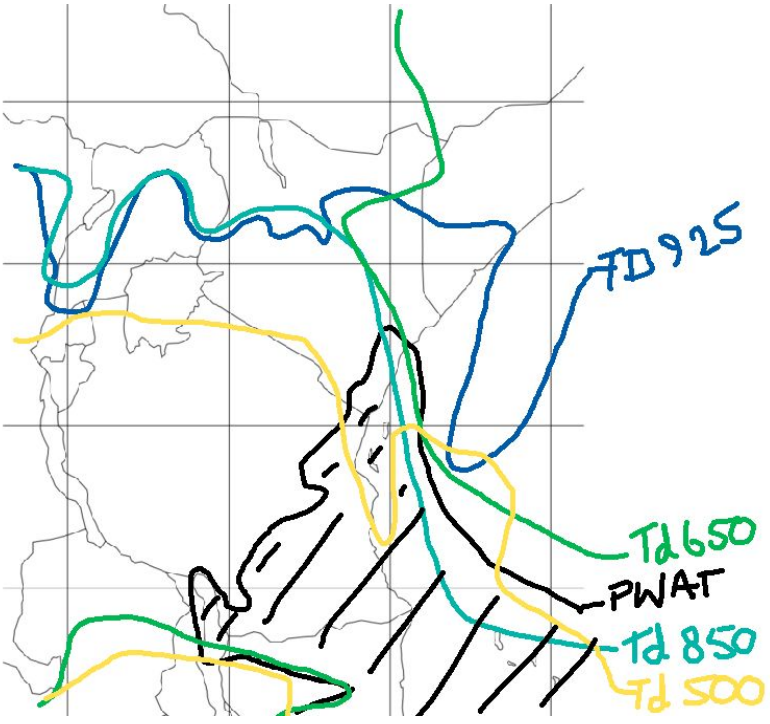
The overlay button gives the option of 4 region specific overlays either white or black grid or maps. When added these can be removed either by using the undo button or the clear notes button.

Currently the stamp function has 6 options (all very similar symbols) it is likely that in the development of MARTIN that further stamps with more weather types will be available. To use a stamp press the required stamp button and then click where you would like it positioned. If you need to undo a stamp press the undo button.

The pen function is likely the most useful of the annotation features. It should be automatically selected when MARTIN opens, however if you have used the stamps you will need to press the “pen” button to return to using the pen. Colours and pen thickness can be selected. Once you have used the pen, stokes can be undone by the use of the undo button.

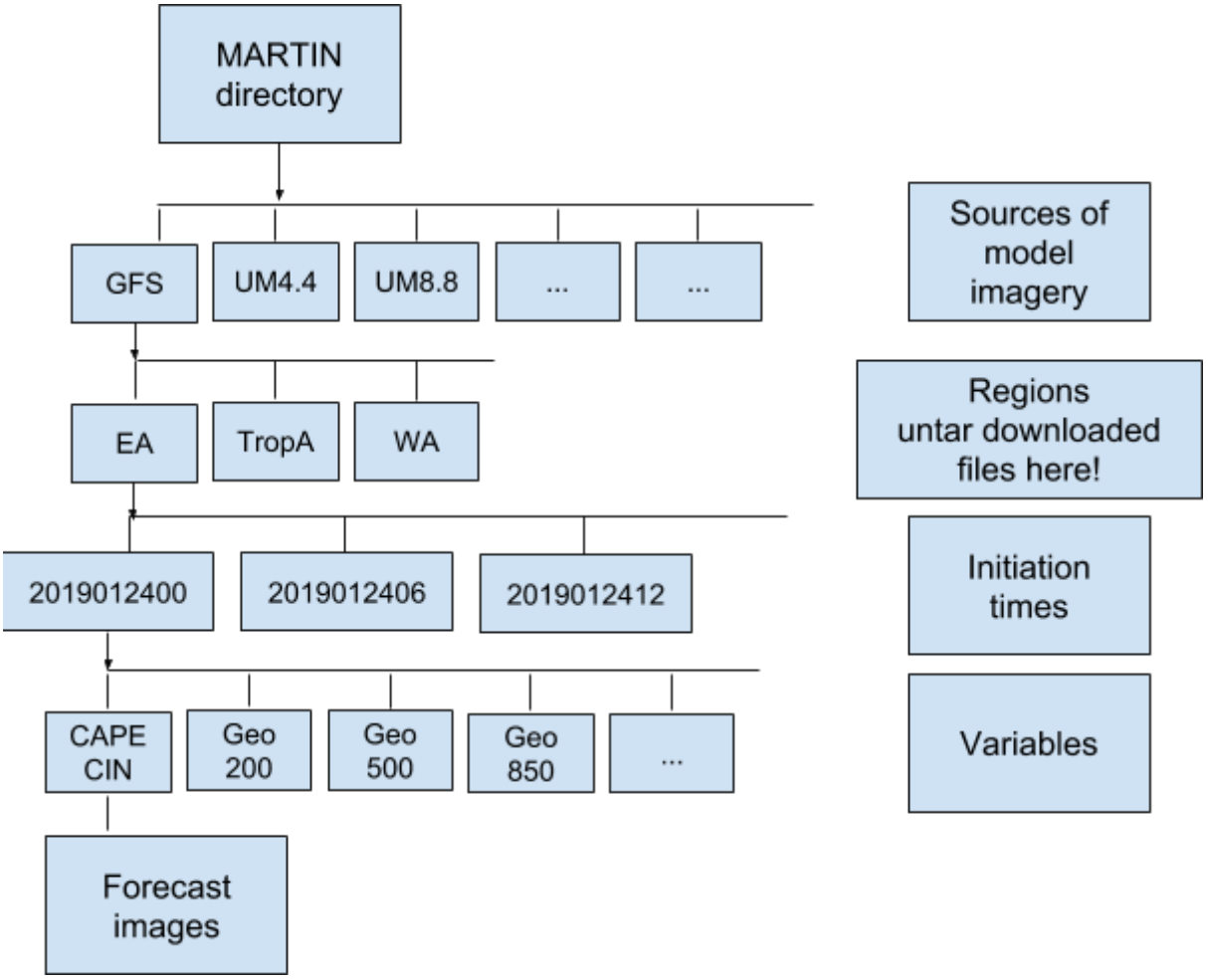
Please be aware that the “clear notes” button will remove all annotations (pen, stamps and overlays). Switching the background image has no effect on annotations. In fact by switching to different variables you can annotate features at different levels or that might be key to understanding the meteorology.

Once an image has been annotated you will be able to save it by using the “save button” and choosing the location where you would like to save your image. If you wish to save only the annotations then you can remove the current background image by pressing the “clear background button”. An example of this can be seen below.



Images

The available imagery for Testbed 1a is from the GFS and Met Office models. These can be downloaded from http://homepages.see.leeds.ac.uk/~earajr/SWIFT/ . Once the tar.gz files have been downloaded untar them into the appropriate model and region directory. The tar files contain the correct directory structure for initiation time and variables.



Known issues

Save issues in Linux - It has been noticed that sometimes when saving an image in a Linux environment the print screen utility built into MARTIN saves what is behind the MARTIN window rather than the image that the user has generated. In the Windows version a different python library was used (to avoid this problem). Therefore when saving images it is advised that you open your saved image to make sure it is as expected before closing the MARTIN window or clearing your annotations.