Time series with python. How-to ?

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1 Introduction

This document presents the time-series part of the monitoring. This step is very important as it is the major tool to monitor the runs in almost real-time (as the 2D monitoring is much longer at present time). We describe here new tools for monitoring. Nowadays, those time-series are made using a set of matlab scripts (MONITOR_MATLAB) and this implies firstly to have a matlab licence (which is usually the case in research labs) and secondly to have someone running the time-series script on one of the lab computers after each year of the run finishes. The idea raised to perform those time-series with free tools such as python (which are available or can be installed in most of the computational centers which refuses to buy licences) in order to compute the time-series automatically after the run's current year has finished.

2 Install

First, check you have python 2.5 or newer and the matplotlib library. Then copy MONITOR_PY.tar located in

```
~rcli600/SHARE
```

in your $HOME directory and decompress using tar -xvf. No compilations are needed as it is just a collection of scripts.

3 How it works

The **monitor_python.skel.ksh** should be edited by your production machine script at the end of the computation of the mtl files (after script **mkmtl.ksh** on storage machine gaya). For example :

```
rsh $ploting_machine "cd $HOME/MONITOR_PY ; \
cat monitor_python.skel.ksh | sed -e "s/CCOONNFFIIGG/$CONFIG/g" -e "s/CCAASSEE/$CASE/g" \
 > ./RUN_$CONFIG-$CASE/monitor_python.${CONFIG}-${CASE}.ksh "
```

Then execute **./monitor_python.CONFCASE.ksh** on plotting machine.

```
rsh $plotting_machine "cd $HOME/MONITOR_PY/RUN_$CONFIG-$CASE ; \
                chmod 744 ./monitor_python.${CONFIG}-${CASE}.ksh ; \
                ./monitor_python.${CONFIG}-${CASE}.ksh"
```

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This script edits the python files in the SKELS directory, puts the resulting files in a custom **RUN_CONFCASE** directory and sequentially execute them. The computations are quickly done, less than one minute on a personal linux laptop. Data from observations are also provided in the **DATA_obs** directory. You can the automatically add the figures on your web site using a rcp command at the end of **monitor_python.skel.ksh**

4   Developement strategy

The python scripts are intended to read mtl files and have high sensibility to their content. However, some eforts were done to make the scripts more flexible so that adding or deleting variables in the mtl file does not induce a failure (this is true for some scripts and need further work). The reason why it is important is because we run several kind of configs (from global to regional) so part of the data given by a global run will not be written in a mtl file in a North Atlantic config. The architecture of the scripts is :

1. drakkar environnement

2. mtl file reading

3. default settings

4. automatic config selection w/ custom settings

5. data manipulation

6. plot cosmetics settings

7. plot general commands

8. figures saving

9. dev notes

5   To do :

1. distribution with SVN.

2. cosmetic tuning

3. al the scripts are not 100 % flexible