
FRE Version History

Amy Langenhorst <Amy.Langenhorst@noaa.gov>

This document describes the version history of FRE, the FMS Runtime Environment. For usage information, see <http://www.gfdl.noaa.gov/fms/fre>.

Table of Contents

1. Introduction	1
2. fremake Version History	1
2.1. Future Work	2
2.2. New in fremake01	2
3. frerun Version History	2
3.1. Future Work	2
3.2. New in frerun01	2
3.3. New in rtsrun14	3
3.4. New in rtsrun13	3
3.5. New in rtsrun11, rtsrun12	3
3.6. New in rtsrun10	3
3.7. New in rtsrun9	4
3.8. New in rtsrun8	4
4. frepp Version History	4
4.1. Future Work	4
4.2. New in frepp01	4
4.3. New in rtspp14	5
4.4. New in rtspp13	5
4.5. New in rtspp12	6
4.6. New in rtspp11	6
4.7. New in rtspp10	6
4.8. New in rtspp9	7
4.9. New in rtspp8	7
5. Other Future Work	7

1. Introduction

The following programs all reside in `/home/fms/bin`. You can tell which version is currently default by executing

```
ls -l /home/fms/bin/frerun
```

The command **frerun** is a unix link that changes over time, but the file that the link points to is a frozen version which will not change over time. When a new version of FRE is available for use, an email will be sent to oar.gfdl.forrestal@noaa.gov.

2. fremake Version History

2.1. Future Work

- change behavior of frerun with respect to compiling. Add option (-c?) which always submits a compile script. If the make is successful, the compile shell script should submit the run scripts requested in the frerun command. The 'make' should not be done in the run shell script. (If it is, errors can occur when two runscripts try to 'make' at once.) This would make Balaji happy (he would always use '-c') and satisfy those who never want compiling to be done in the runscript.
- if someone types control-c during cvs checkout, how to know to warn user that checkout didn't get completed?
- currently script decides whether to run cvs commands based on existence of \$expt/src directory. should also test for empty \$expt/src directory.

2.2. New in fremake01

1. new version of mkmf allows for calling mkmf from exec dir instead of src dir. fremake uses this to allow you to compile the optimized and debug versions at the same time.
2. new option -p to call list_paths only once, after all the cvs stuff is complete. This is much faster. This works for all experiments except mom4 ones that treat the mom4 paths differently than the shared code paths.

3. frerun Version History

3.1. Future Work

- add totalview support
- frerun should read and edit queue_commands to ensure that jobs do not run out of queue allocations inappropriately, which is a common complaint.
- handle hourly runs (several)
- ability to run no-calendar models (which only use days) in production mode (which only accepts months and years now) (rjw)
- error checking that diagTable corresponds to pp requested
- handle experiments starting with a number (add a letter to the batch job name or something) (several)
- long regression type runs / being able to specify runsPerScript and runsPerExpt (ens)
- for development, if an interactive run, write the ascii output files to a directory in /home/ and do not cpio them. Also, skip or always overwrite the reload_commands file. (rsh, slm)
- handle multiple <fmsDataSets> tags (pcm)
- create rhosts file automatically

3.2. New in frerun01

1. namelists in runscript will be sorted alphabetically

2. new attribute `zetaac_layout` is processed
3. modified subroutine `getexecutable` to always check whether an inherited experiment should have its own executable or not
4. bugfix to production runs of less than 1 year; will now set an appropriate `combineFreq` for these runs
5. new option for reading all the namelists for an experiment and outputting all namelists alphabetically as text in xml tags.
6. bugfix to procedure of finding the debug executable for inherited experiments
7. changed so that project tag gets placed in regression runs as well as production runs

3.3. New in `rtsrun14`

1. ability to run on altix platform

3.4. New in `rtsrun13`

1. prints a warning if `make_exchange_reproduce` is false for regression tests, and prints a warning if `make_exchange_reproduce` is true for production runs.
2. added code to combine multithreaded write restart files
3. added code to change priority projects to dev projects when submitting a windf job

3.5. New in `rtsrun11`, `rtsrun12`

1. just call the corresponding version of the postprocessing program

3.6. New in `rtsrun10`

1. better wording on namelist warnings
2. supports platform `csh` for changing version of compiler. To use the new version of the compiler, use xml as follows:

```
<setup>
  <target platform="sgi">
    <csh>
      source /opt/modules/modules/init/csh
      module switch mpt mpt_1900
      module switch mipspro mipspro_741m
    </csh>
  </target>
</setup>
```

and remove the old `<targetPlatform>sgi</targetPlatform>`.

3. multiple types of input `csh` supported

```
<input>
  <csH> this is executed in the section which copies input files at the beginning
        of each JOB, same as previously
  </csH>
  <csH type="init"> this is executed in the section which copies input files ONLY ONCE
                    PER EXPERIMENT, only at the initial run time t=0
  </csH>
  <csH type="always"> this is executed in the mpirun loop so that it is executed
                     BEFORE EVERY MPIRUN command
  </csH>
```

3.7. New in rtsrun9

1. developmental changes, calls rtsp9

3.8. New in rtsrun8

1. Doesn't attempt to compile an executable if you specified an existing one in your xml
2. can now set project for jobs with rtspriority

4. frepp Version History

4.1. Future Work

- perform pp on runs less than 1 year (gamdt)
- perform pp on data not starting jan 1. (gamdt)
- perform pp when segment length (therefore history files) > 1 year (mom, lm3)
- interpolation for ocean data analogous to plevel conversion in atmosphere (bls)
- analysis issues, ie -A incompatible with -p
- do 280 yr timeseries = 100 + 100 + 4x80yrs (cm2)
- option to combine after each segment on production runs (smg)
- automate secondary pp (200yrs plus) (cm2)
- error checking that diagTable corresponds to pp requested
- reduce frepp's metadata load on system

4.2. New in frepp01

1. now using Fanrong's Analysis.pm package for figures
2. modified not to cpio files when there is only one file
3. prevent trying to run platform csh intended for the altix on the sgi platform
4. added the ability to average daily data to a monthly timeseries. To take advantage of this capability, you need to add three lines to your xml:

```

<component type="atmos" zInterp="ncep" start="0001" source="atmos_month">
  <timeSeries freq="daily" source="atmos_daily" chunkLength="5yr"/>
  <timeSeries freq="monthly" chunkLength="5yr"/>
  ...
  <timeSeries freq="monthly" averageOf="daily" chunkLength="5yr">
    <variables> t_ref_min t_ref_max </variables>
  </timeSeries>
</component>

```

The new feature is 'timeSeries freq="monthly" averageOf="daily"'. There are several things to note:

- a. You can either calculate this in the same pp job with the 'timeSeries freq="daily"' or do it anytime after the daily timeSeries has been created. (ie, you can run just this piece of postprocessing offline.)
 - b. The chunkLength requested for the averaged file must be the same as the chunkLength of the daily timeSeries file, ie, 5yrs. Longer chunks of pp should pick up the new variables and create 20yr timeSeries from the 5yr ones.
 - c. This is specifically designed with the noleap calendar in mind and currently does not check the model calendar.
 - d. The variables tag is required for this type of timeSeries calculation.
5. gory bugfixy details surrounding making cpio files, calculating one or two variables offline after other variables have been processed, and performing frescrub at any point along the way.
 6. the variables tag is now available for all timeSeries options.
 7. checks that timeSeries contain the right number of time levels as it calculates them. If the timeSeries file contains the wrong number of levels, you'll get email about it.

4.3. New in rtsp14

1. ability to run on altix platform
2. analysis figure improvements

4.4. New in rtsp13

1. analysis figure bugfix when using <variables> tag inside of <timeSeries>; previously rtsp could mistakenly assume that pp files were missing and not create figures for that data
2. new timeSeries and timeAverage attribute 'from' can override what chunklength or interval pp you want to calculate a timeSeries or timeAverage from, ie

```

<timeSeries freq="monthly" chunkLength="200yr" from="100yr"/>

```

3. annual multi-year averages will only try to calculate the interval they're supposed to calculate. Previously, they looked for the last existing output file and calculated all the intervals after that through the -t year. This change is only useful when you are trying to run offline pp out of order.
4. seasonal averages that need the previous december now know how to get it from the history file as well as from the previously existing monthly timeAverage file. This change is only useful when you are trying to run offline pp out of order.
5. better error message when you try to run seasonal timeSeries without any available monthly timeSeries data
6. -m option: If you give the -m option, you will get an email when your job is complete. Only useful for off-line pp. Doesn't send email if option -p is used; this way you only get email when it's done with the stream
7. can put <variables> inside seasonal ts and it will use only those variables. Previously you could only use <variables> in the monthly ts, and those variables would then get used for seasonal and annual ts also. Note that you still need to have the monthly ts for all variables you request a seasonal ts of.
8. minor cleanup: seasonal ts tests whether cpio has already been extracted

4.5. New in rtsp12

1. BUGFIX: timavg.csh was using the wrong weighting interval in some cases
2. truncation of long filenames on timavg'ed files and plevel data avoided
3. bugfix for postprocessing jobs run after an experiment has been frescrubbed
4. dmget improvements to avoid the 'line too long' error

4.6. New in rtsp11

1. doesn't call nc_to_midtime, should improve speed of postprocessing by 10-25%
2. consolidates error notification into fewer actual emails
3. doublechecks that output directories exist so that there are no missing directories
4. additional dmgets implemented
5. static files created with splitncvars, should retain all appropriate attributes
6. time_bounds bugfix to seasonal averages when the first december of the run needs to be recalculated from the end of the first year
7. new analysis figure options:

```

-Y year      = specify a four digit year as your analysis's start year, ex
              This year overrides the startYear specified in the <analysis>
-Z year      = specify a four digit year as your analysis's end year, ex -Z
              This year overrides the endYear specified in the <analysis> t
    
```

4.7. New in rtsp10

1. analysis figures fixes
2. time_bounds fixes
3. bugfixes and improvements to external utilities: list_ncvars, timavg, plevel

4.8. New in rtsp9

1. developmental changes for time_bounds fixes

4.9. New in rtsp8

1. added option to split postprocessing into different jobs: -c component
 - without -c, behavior is same as rtsp6
 - keyword '-c split' means each component will be managed in a separate postprocessing stream; ie, one job will be submitted for each component.
 - using a component name, ie '-c ocean', means that only the postprocessing for that component will be done.
2. nrcat now uses -O option to overwrite files if they already exist. Previously if you were regenerating pp after a system error, you would get emails about nrcat errors. nrcat complained because the output file already existed. This change will prevent those error messages.
3. includes seasonal average functionality.
4. uses ncatted to put the calendar attribute back after plevel.sh called
5. filename attribute corrected in some annual average files
6. writes some version information to ppRootDir/.frepp_history

5. Other Future Work

- alter design enough to allow various pieces to be taken from various places: postprocess someone else's history files, freanalyze two different experiments in two different xml files
- handle variables in rts.xml
- site specific stuff, porting
- fredb: integrate with model development database
- managing multiple executables in FRE
- frecheck
 - enhance performance information printed to frecheck's report
 - talk with Koushik about what can be done about incorporating vtune/speedshop
 - automate checking of diagnostic history output (currently only restarts are checked)
- update FRE xml schema

