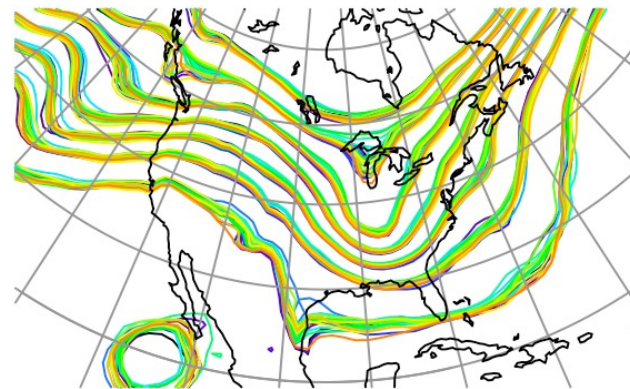


D  
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Data  
Assimilation  
Research  
Testbed



## DART Tutorial Section 3: DART Runtime Control and Documentation



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# DART Philosophy: configurable at run-time

Use F90 namelist facility to do this.

Each F90 module can have its own associated namelist file.

All namelists combined in a single file, *input.nml*, in *work* directory.

Documentation of modules including namelists in html files.

cov\_cutoff\_mod.f90

Code for module ***cov\_cutoff\_mod***

cov\_cutoff\_mod.html

Documentation for module.

cov\_cutoff\_mod.nml

Run-time control for module.

# Example: Changing to a multivariate filter.

models/lorenz\_63/work/

Section 1 Lorenz 63 example:

- Observed x, y, z components.
- Observation of x only impacted ensemble for x, etc.

Let's convert to a multivariate filter:

- Observations of x will impact ensembles for x, y and z.

To do this, will modify a namelist setting:

- Change will be made in file *models/lorenz\_63/work/input.nml*.
- Modification to `&assim_tools_nml`.
- Namelist parameter of interest is *cutoff*.

# Example: Changing to a multivariate filter.

Open a browser and look at file

*assimilation\_code/modules/assimilation/assim\_tools\_mod.html*

Has a variety of sections:

- Overview;
- List of other modules used;
- Public interface (how to use this in another module);
- Details of public interfaces and variables;
- Namelist (what we're interested in for now).

The namelist section lists all runtime control variables for *assim\_tools*.

- Gives description of each;
- *cutoff* controls distance to which observation has impact;

Originally very small: observation of  $x$  only impacts  $x$ .

Make it very big: all observations impact all state variables.

# Example: Changing to a multivariate filter.

Edit *models/lorenz\_63/work/input.nml* – it contains namelists for all modules used with Lorenz 63. The program **filter** uses namelists from many modules, one of which is the *assim\_tools* namelist.

Modify *assim\_tools\_nml* namelist parameter *cutoff*; when program **filter** is run again, it will incorporate this modification.

→  
Start of namelist for  
*assim\_tools* module

End of namelist for  
*assim\_tools* module

```
&assim_tools_nml
  filter_kind           = 1,
  cutoff                = 0.00001,
  sort_obs_inc          = .false.,
  spread_restoration    = .false.,
  sampling_error_correction = .false.,
  adaptive_localization_threshold = -1,
  distribute_mean       = .false.,
  output_localization_diagnostics = .false.,
  localization_diagnostics_file = 'localization_diagnostics',
  print_every_nth_obs   = 0
/
```

Change to 1000000.0

Example *input.nml.xxxxxx\_default* files for each program are automatically constructed by compilation tool (Section 11). It is usually convenient to have **one** *input.nml* containing all the settings for the commonly-used programs.

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