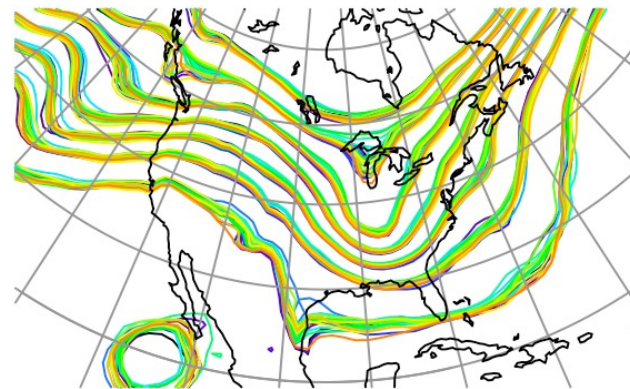


Data
Assimilation
Research
Testbed



DART Tutorial Section 23: Location Module Design



©UCAR



The National Center for Atmospheric Research is sponsored by the National Science Foundation. Any opinions, findings and conclusions or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

NCAR | National Center for
UCAR | Atmospheric Research

DART Location Modules

Location type of Model State and Observations are specified by selecting one of the available location modules.

Module Name	Location Specification
threed_sphere (*)	lat, lon, vertical (vert: surface, height, pressure, scale height, level, none)
oned (*)	x (periodic)
annulus	azimuth, radius, vertical (vert: surface, level, height)
channel	x (periodic), y (limited domain), z (infinite)
column	vertical (none, surface, level, pressure, height)
twod	x, y (both periodic)
twod_annulus	azimuth, radius (azimuth boundary options available)
twod_sphere	lat, lon
threed	x,y,z (all periodic)
threed_cartesian	x,y,z

* most commonly used

Location Module Design

Location Derived Type hides differences between different modules for code that passes locations through but doesn't manipulate the internal values.

All Location Modules have a standard set of routine interfaces, so they can be compiled interchangeably with main DART routines.

Location Module Required Interfaces

```
public :: location_type, get_location, set_location, &
      set_location_missing, is_location_in_region, &
      query_location, write_location, read_location, &
      interactive_location, operator(==), operator(/=), &
      LocationDims, LocationName, LocationLName, &
      LocationStorageOrder, LocationUnits, &
      get_close_type, get_close_init, get_close_obs, &
      get_close_state, get_close_destroy, get_dist, &
      has_vertical_choice, vertical_localization_on, &
      set_vertical, is_vertical, convert_vertical_obs, &
      convert_vertical_state, &
      get_vertical_localization_coord, &
      set_vertical_localization_coord
```

Some of these may be dummy routines.

Obviously, the low-order models do not have vertical coordinates, yet even the *oned/location_mod.f90* must have these entry points.

DART Tutorial Index to Sections

1. Filtering For a One Variable System
2. The DART Directory Tree
3. DART Runtime Control and Documentation
4. How should observations of a state variable impact an unobserved state variable?
Multivariate assimilation.
5. Comprehensive Filtering Theory: Non-Identity Observations and the Joint Phase Space
6. Other Updates for An Observed Variable
7. Some Additional Low-Order Models
8. Dealing with Sampling Error
9. More on Dealing with Error; Inflation
10. Regression and Nonlinear Effects
11. Creating DART Executables
12. Adaptive Inflation
13. Hierarchical Group Filters and Localization
14. Quality Control
15. DART Experiments: Control and Design
16. Diagnostic Output
17. Creating Observation Sequences
18. Lost in Phase Space: The Challenge of Not Knowing the Truth
19. DART-Compliant Models and Making Models Compliant
20. Model Parameter Estimation
21. Observation Types and Observing System Design
22. Parallel Algorithm Implementation
23. Location module design
24. Fixed lag smoother (not available)
25. **A simple 1D advection model: Tracer Data Assimilation**