

# Interfaces for Aircraft Observations

- Check out the JEDI Singularity image ( this is optional, only for those who wants to leverage the utilities contained in the Docker image)

## check out the singularity image

```
[xinzhang@xzhang-qua ufo]$ singularity pull shub://xinzhang8noaa/singularity
Progress |=====| 100.0%
Done. Container is at: /home/xinzhang/jedi/ufo/xinzhang8noaa-singularity-master.simg

[xinzhang@xzhang-qua ufo]$ singularity exec -e xinzhang8noaa-singularity-master.simg git flow # Test the git
flow installation
usage: git flow <subcommand>

Available subcommands are:
  init      Initialize a new git repo with support for the branching model.
  feature   Manage your feature branches.
  bugfix    Manage your bugfix branches.
  release   Manage your release branches.
  hotfix    Manage your hotfix branches.
  support   Manage your support branches.
  version   Shows version information.
  config    Manage your git-flow configuration.
  log       Show log deviating from base branch.

Try 'git flow <subcommand> help' for details.

[xinzhang@xzhang-qua ufo]$ alias sig='singularity exec -e /home/xinzhang/jedi/xinzhang8noaa-singularity-master.
simg' # make an alias to save the typing
```

- Check out the latest UFO code and initialize a feature based on feature/interp

## check out the UFO code

```
[xinzhang@xzhang-qua jedi]$ sig git clone -b feature/interp git@github.com:UCAR/ufo.git
Cloning into 'ufo'...
remote: Counting objects: 1730, done.
remote: Compressing objects: 100% (45/45), done.
remote: Total 1730 (delta 41), reused 47 (delta 27), pack-reused 1658
Receiving objects: 100% (1730/1730), 26.12 MiB | 8.27 MiB/s, done.
Resolving deltas: 100% (1122/1122), done.

[xinzhang@xzhang-qua jedi]$ ls -al ufo
total 40
drwxrwxr-x.  6 xinzhang xinzhang  144 Jan 31 08:58 .
drwxrwxr-x. 18 xinzhang xinzhang 4096 Jan 31 08:58 ..
drwxrwxr-x.  2 xinzhang xinzhang  200 Jan 31 08:58 cmake
-rw-rw-r--.  1 xinzhang xinzhang 3378 Jan 31 08:58 CMakeLists.txt
-rw-rw-r--.  1 xinzhang xinzhang 11357 Jan 31 08:58 COPYING
drwxrwxr-x.  8 xinzhang xinzhang  163 Jan 31 08:58 .git
-rw-rw-r--.  1 xinzhang xinzhang 11357 Jan 31 08:58 LICENSE
-rw-rw-r--.  1 xinzhang xinzhang 1208 Jan 31 08:58 README.md
drwxrwxr-x.  3 xinzhang xinzhang   39 Jan 31 08:58 src
drwxrwxr-x.  4 xinzhang xinzhang   58 Jan 31 08:58 test
-rw-rw-r--.  1 xinzhang xinzhang  225 Jan 31 08:58 VERSION.cmake

[xinzhang@xzhang-qua jedi]$ cd ufo

[xinzhang@localhost ufo]$ sig git branch
* feature/interp

[xinzhang@localhost ufo]$ sig git flow init
```

Which branch should be used for bringing forth production releases?

- feature/interp

Branch name for production releases: [] feature/interp

Branch name for "next release" development: [develop]

How to name your supporting branch prefixes?

Feature branches? [feature/]

Bugfix branches? [bugfix/]

Release branches? [release/]

Hotfix branches? [hotfix/]

Support branches? [support/]

Version tag prefix? []

Hooks and filters directory? [/home/xinzhang/jedi/code/ufo/.git/hooks]

```
[xinzhang@localhost ufo]$ sig git branch
```

```
* develop
```

```
feature/interp
```

```
[xinzhang@localhost ufo]$ sig git flow feature start aircraft
```

Switched to a new branch 'feature/aircraft'

Summary of actions:

- A new branch 'feature/aircraft' was created, based on 'develop'

- You are now on branch 'feature/aircraft'

Now, start committing on your feature. When done, use:

```
git flow feature finish aircraft
```

```
[xinzhang@localhost ufo]$ sig git branch
```

```
develop
```

```
* feature/aircraft
```

```
feature/interp
```

```
[xinzhang@localhost ufo]$ git pull origin feature/interp
```

Warning: Permanently added the RSA host key for IP address '192.30.255.112' to the list of known hosts.

From github.com:UCAR/ufo

```
* branch          feature/interp -> FETCH_HEAD
```

Updating b37a3c0..0b3fcc8

Fast-forward

CMakeLists.txt	10 +----
src/CMakeLists.txt	1 +
src/mains/CMakeLists.txt	5 +++
src/mains/RunCRTM.h	89 ++++++
src/mains/ufoRunCRTM.cc	20 ++++++
src/ufo/CMakeLists.txt	19 +++++---
src/ufo/Fortran.h	39 ++++++
src/ufo/GeoVaLs.cc	29 +++++---
src/ufo/GeoVaLs.h	14 +----
src/ufo/GeoVaLs.interface.F90	58 ++++++
src/ufo/Locations.cc	10 +++++
src/ufo/Locations.h	1 +
src/ufo/Locations.interface.F90	26 ++++++
src/ufo/ObsRadiance.cc	68 -----
src/ufo/ObsRadiance.h	53 ++++++
src/ufo/ObsRadiosonde.cc	57 -----
src/ufo/ObsRadiosonde.h	41 ++++++
src/ufo/ObsSeaIceFraction.h	95 ++++++
src/ufo/ObsSeaIceFraction.interface.F90	138
+++++	
src/ufo/ObsSeaIceFractionTLAD.h	105 ++++++
src/ufo/ObsSpace.SeaIceFraction.interface.F90	156
+++++	
src/ufo/ObsSpace.cc	36 ++++++
src/ufo/ObsSpace.h	2 +
src/ufo/ObsVector.cc	3 +-
src/ufo/UfoTrait.h	8 +++-
src/ufo/instantiateLinearObsOpFactory.h	17 ++++++
src/ufo/instantiateObsOperatorFactory.h	21 ++++++
src/ufo/ufo_geovals_mod.F90	33 ++++++
src/ufo/ufo_locs_mod.F90	25 ++++++

```

src/ufo/ufo_obs_seaicefrac_mod.F90          | 165
+++++
src/ufo/ufo_obs_vectors.F90                 | 4 +-
src/ufo/ufo_obscheck_mod.F90                | 5 +--
src/ufo/ufo_radiance_mod.F90                | 2 +-
src/ufo/ufo_radiosonde_mod.F90              | 1 -
src/ufo/ufo_seaicefrac_mod.F90              | 129
+++++
src/ufo/ufo_variables_mod.F90               | 1 +
test/CMakeLists.txt                        | 33 +-----
test/mains/TestGeoVals.cc                  | 3 ++
test/mains/TestObsCheck.cc                 | 3 ++
test/mains/TestObsOperator.cc               | 4 ++
test/mains/TestObsOperatorTLAD.cc           | 21 ++++++++
test/testinput/amsua.json                  | 25 ++++++++
test/testinput/radiosonde.json              | 25 ++++++++
test/testinput/seaice.json                  | 25 ++++++++
test/testinput/seaice_genobs.json           | 28 ++++++++
test/testinput/seaice_obs.nc                | Bin 0 -> 10689901 bytes
test/testinput/ufocrtm.json                 | 24 ++++++++
test/testinput/ufotest.json                 | 36 ++++++++
test/testinput/ufotest.yml                  | 11 -----
49 files changed, 1510 insertions(+), 214 deletions(-)
create mode 100644 src/mains/CMakeLists.txt
create mode 100644 src/mains/RunCRTM.h
create mode 100644 src/mains/ufoRunCRTM.cc
delete mode 100644 src/ufo/ObsRadiance.cc
delete mode 100644 src/ufo/ObsRadiosonde.cc
create mode 100644 src/ufo/ObsSeaIceFraction.h
create mode 100644 src/ufo/ObsSeaIceFraction.interface.F90
create mode 100644 src/ufo/ObsSeaIceFractionTLAD.h
create mode 100644 src/ufo/ObsSpace.SeaIceFraction.interface.F90
create mode 100644 src/ufo/instantiateLinearObsOpFactory.h
create mode 100644 src/ufo/instantiateObsOperatorFactory.h
create mode 100644 src/ufo/ufo_obs_seaicefrac_mod.F90
create mode 100644 src/ufo/ufo_seaicefrac_mod.F90
create mode 100644 test/mains/TestObsOperatorTLAD.cc
create mode 100644 test/testinput/amsua.json
create mode 100644 test/testinput/radiosonde.json
create mode 100644 test/testinput/seaice.json
create mode 100644 test/testinput/seaice_genobs.json
create mode 100644 test/testinput/seaice_obs.nc
create mode 100644 test/testinput/ufocrtm.json
delete mode 100644 test/testinput/ufotest.yml

```

```
[xinzhang@localhost ufo]$ git push --set-upstream origin feature/aircraft
```

- Check out the jedi-bundle and use ufo aircraft feature in the bundle

#### check out the bundle

```

[xinzhang@xzhang-qua code]$ sig git clone git@github.com:UCAR/jedi-bundle.git
Cloning into 'jedi-bundle'...
remote: Counting objects: 57, done.
remote: Compressing objects: 100% (9/9), done.
remote: Total 57 (delta 3), reused 8 (delta 2), pack-reused 46
Receiving objects: 100% (57/57), 14.83 KiB | 0 bytes/s, done.
Resolving deltas: 100% (21/21), done.
Checking connectivity... done.

[xinzhang@xzhang-qua code]$ cd jedi-bundle/

[xinzhang@xzhang-qua jedi-bundle]$ ls -la
total 24
drwxrwxr-x. 3 xinzhang xinzhang 87 Jan 31 16:10 .
drwxrwxr-x. 18 xinzhang xinzhang 271 Jan 31 16:10 ..

```

```
-rw-rw-r--. 1 xinzhang xinzhang 1179 Jan 31 16:10 CMakeLists.txt
drwxrwxr-x. 8 xinzhang xinzhang 163 Jan 31 16:10 .git
-rw-rw-r--. 1 xinzhang xinzhang 196 Jan 31 16:10 .gitignore
-rw-rw-r--. 1 xinzhang xinzhang 11357 Jan 31 16:10 LICENSE
-rw-rw-r--. 1 xinzhang xinzhang 2223 Jan 31 16:10 README
```

```
[xinzhang@xzhang-qua jedi-bundle]$ vi CMakeLists.txt # Change ufo to feature/aircraft and you can remove the
eckit and fckit if use Singularity
```

```
[xinzhang@xzhang-qua jedi-bundle]$ cd ../build
```

```
[xinzhang@xzhang-qua build]$ sig ecbuild ../code/jedi-bundle
Found CMake version 3.5.2
```

```
cmake -DCMAKE_MODULE_PATH=/usr/local/share/ecbuild/cmake ../code/jedi-bundle
```

```
-- The C compiler identification is GNU 7.2.0
-- The CXX compiler identification is GNU 7.2.0
-- The Fortran compiler identification is GNU 7.2.0
-- Check for working C compiler: /usr/bin/gcc
-- Check for working C compiler: /usr/bin/gcc -- works
-- Detecting C compiler ABI info
-- Detecting C compiler ABI info - done
-- Detecting C compile features
-- Detecting C compile features - done
-- Check for working CXX compiler: /usr/bin/g++
-- Check for working CXX compiler: /usr/bin/g++ -- works
-- Detecting CXX compiler ABI info
-- Detecting CXX compiler ABI info - done
-- Detecting CXX compile features
-- Detecting CXX compile features - done
-- Check for working Fortran compiler: /usr/bin/gfortran
-- Check for working Fortran compiler: /usr/bin/gfortran -- works
-- Detecting Fortran compiler ABI info
-- Detecting Fortran compiler ABI info - done
-- Checking whether /usr/bin/gfortran supports Fortran 90
-- Checking whether /usr/bin/gfortran supports Fortran 90 -- yes
-- Found Git: /usr/bin/git (found version "2.7.4")
-- ecbuild 2.7.3 /usr/local/share/ecbuild/cmake
-- cmake 3.5.2 /usr/bin/cmake
-----
-- Performing Test EC_HAVE_C_INLINE
-- Performing Test EC_HAVE_C_INLINE - Success
-- Performing Test EC_HAVE_FUNCTION_DEF
-- Performing Test EC_HAVE_FUNCTION_DEF - Success
-- Performing Test EC_HAVE_CXXABI_H
-- Performing Test EC_HAVE_CXXABI_H - Success
-- Performing Test EC_HAVE_CXX_BOOL
-- Performing Test EC_HAVE_CXX_BOOL - Success
-- Performing Test EC_HAVE_CXX_SSTREAM
-- Performing Test EC_HAVE_CXX_SSTREAM - Success
-- Performing Test EC_HAVE_CXX_INT_128
-- Performing Test EC_HAVE_CXX_INT_128 - Success
-- Performing Test C_FLAG_TEST_1
-- Performing Test C_FLAG_TEST_1 - Success
-- Performing Test CXX_FLAG_TEST_1
-- Performing Test CXX_FLAG_TEST_1 - Success
-- Looking for sys/types.h
-- Looking for sys/types.h - found
-- Looking for stdint.h
-- Looking for stdint.h - found
-- Looking for stddef.h
-- Looking for stddef.h - found
-- Check size of char
-- Check size of char - done
-- Check size of short
-- Check size of short - done
-- Check size of int
-- Check size of int - done
```

```
-- Check size of long
-- Check size of long - done
-- Check size of long long
-- Check size of long long - done
-- Check size of float
-- Check size of float - done
-- Check size of double
-- Check size of double - done
-- Check size of long double
-- Check size of long double - done
-- Check size of size_t
-- Check size of size_t - done
-- Check size of ssize_t
-- Check size of ssize_t - done
-- Check size of off_t
-- Check size of off_t - done
-- Check if the system is big endian
-- Searching 16 bit integer
-- Check size of unsigned short
-- Check size of unsigned short - done
-- Using unsigned short
-- Check if the system is big endian - little endian
-- Performing Test IEEE_BE
-- Performing Test IEEE_BE - Failed
-- Performing Test IEEE_LE
-- Performing Test IEEE_LE - Success
-- Looking for fseek
-- Looking for fseek - found
-- Looking for fseeko
-- Looking for fseeko - found
-- Looking for ftello
-- Looking for ftello - found
-- Looking for lseek
-- Looking for lseek - not found
-- Looking for open
-- Looking for open - not found
-- Looking for fopen
-- Looking for fopen - found
-- Looking for fmemopen
-- Looking for fmemopen - found
-- Looking for funopen
-- Looking for funopen - not found
-- Looking for flock
-- Looking for flock - found
-- Looking for mmap
-- Looking for mmap - found
-- Looking for posix_memalign
-- Looking for posix_memalign - found
-- Looking for F_GETLK
-- Looking for F_GETLK - found
-- Looking for F_SETLK
-- Looking for F_SETLK - found
-- Looking for F_SETLKW
-- Looking for F_SETLKW - found
-- Looking for F_GETLK64
-- Looking for F_GETLK64 - found
-- Looking for F_SETLK64
-- Looking for F_SETLK64 - found
-- Looking for F_SETLKW64
-- Looking for F_SETLKW64 - found
-- Looking for MAP_ANONYMOUS
-- Looking for MAP_ANONYMOUS - found
-- Looking for MAP_ANON
-- Looking for MAP_ANON - found
-- Looking for include file assert.h
-- Looking for include file assert.h - found
-- Looking for include file stdlib.h
-- Looking for include file stdlib.h - found
-- Looking for include file unistd.h
-- Looking for include file unistd.h - found
-- Looking for include file string.h
```

```
-- Looking for include file string.h - found
-- Looking for include file strings.h
-- Looking for include file strings.h - found
-- Looking for include file sys/stat.h
-- Looking for include file sys/stat.h - found
-- Looking for include file sys/time.h
-- Looking for include file sys/time.h - found
-- Looking for include file sys/types.h
-- Looking for include file sys/types.h - found
-- Looking for include file malloc.h
-- Looking for include file malloc.h - found
-- Looking for include file sys/malloc.h
-- Looking for include file sys/malloc.h - not found
-- Looking for include file sys/param.h
-- Looking for include file sys/param.h - found
-- Looking for include file sys/mount.h
-- Looking for include file sys/mount.h - found
-- Looking for include file sys/vfs.h
-- Looking for include file sys/vfs.h - found
-- Performing Test EC_HAVE_OFFT
-- Performing Test EC_HAVE_OFFT - Success
-- Performing Test EC_HAVE_OFF64T
-- Performing Test EC_HAVE_OFF64T - Success
-- Performing Test EC_HAVE_STRUCT_STAT
-- Performing Test EC_HAVE_STRUCT_STAT - Success
-- Performing Test EC_HAVE_STRUCT_STAT64
-- Performing Test EC_HAVE_STRUCT_STAT64 - Success
-- Performing Test EC_HAVE_STAT
-- Performing Test EC_HAVE_STAT - Success
-- Performing Test EC_HAVE_STAT64
-- Performing Test EC_HAVE_STAT64 - Success
-- Performing Test EC_HAVE_FSTAT
-- Performing Test EC_HAVE_FSTAT - Success
-- Performing Test EC_HAVE_FSTAT64
-- Performing Test EC_HAVE_FSTAT64 - Success
-- Performing Test EC_HAVE_FSEEK064
-- Performing Test EC_HAVE_FSEEK064 - Success
-- Performing Test EC_HAVE_FTELLO64
-- Performing Test EC_HAVE_FTELLO64 - Success
-- Performing Test EC_HAVE_LSEEK64
-- Performing Test EC_HAVE_LSEEK64 - Success
-- Performing Test EC_HAVE_OPEN64
-- Performing Test EC_HAVE_OPEN64 - Success
-- Performing Test EC_HAVE_FOPEN64
-- Performing Test EC_HAVE_FOPEN64 - Success
-- Performing Test EC_HAVE_FTRUNCATE64
-- Performing Test EC_HAVE_FTRUNCATE64 - Success
-- Performing Test EC_HAVE_FLOCK64
-- Performing Test EC_HAVE_FLOCK64 - Success
-- Performing Test EC_HAVE_MMAP64
-- Performing Test EC_HAVE_MMAP64 - Success
-- Performing Test EC_HAVE_STRUCT_STATVFS
-- Performing Test EC_HAVE_STRUCT_STATVFS - Success
-- Performing Test EC_HAVE_STRUCT_STATVFS64
-- Performing Test EC_HAVE_STRUCT_STATVFS64 - Success
-- Performing Test EC_HAVE_FOPENCOOKIE
-- Performing Test EC_HAVE_FOPENCOOKIE - Success
-- Looking for fsync
-- Looking for fsync - found
-- Looking for fdatsync
-- Looking for fdatsync - found
-- Performing Test EC_HAVE_DIRFD
-- Performing Test EC_HAVE_DIRFD - Success
-- Performing Test EC_HAVE_SYSPROC
-- Performing Test EC_HAVE_SYSPROC - Failed
-- Performing Test EC_HAVE_SYSPROCFS
-- Performing Test EC_HAVE_SYSPROCFS - Success
-- Performing Test EC_HAVE_EXECINFO_BACKTRACE
-- Performing Test EC_HAVE_EXECINFO_BACKTRACE - Success
-- Performing Test EC_HAVE_GMTIME_R
-- Performing Test EC_HAVE_GMTIME_R - Success
```

```

-- Performing Test EC_HAVE_GETPWUID_R
-- Performing Test EC_HAVE_GETPWUID_R - Success
-- Performing Test EC_HAVE_GETPWNAM_R
-- Performing Test EC_HAVE_GETPWNAM_R - Success
-- Performing Test EC_HAVE_READDIR_R
-- Performing Test EC_HAVE_READDIR_R - Success
-- Performing Test EC_HAVE_DIRENT_D_TYPE
-- Performing Test EC_HAVE_DIRENT_D_TYPE - Success
-- Performing Test EC_HAVE_GETHOSTBYNAME_R
-- Performing Test EC_HAVE_GETHOSTBYNAME_R - Success
-- Performing Test EC_HAVE_ATTRIBUTE_CONSTRUCTOR
-- Performing Test EC_HAVE_ATTRIBUTE_CONSTRUCTOR - Success
-- Looking for include file dlfcn.h
-- Looking for include file dlfcn.h - found
-- Performing Test EC_HAVE_DLADDR
-- Performing Test EC_HAVE_DLADDR - Success
-- Feature TESTS enabled
CMake Warning at /usr/share/cmake-3.5/Modules/FindBoost.cmake:725 (message):
  Imported targets not available for Boost version 106501
Call Stack (most recent call first):
  /usr/share/cmake-3.5/Modules/FindBoost.cmake:763 (_Boost_COMPONENT_DEPENDENCIES)
  /usr/share/cmake-3.5/Modules/FindBoost.cmake:1332 (_Boost_MISSING_DEPENDENCIES)
  /usr/local/share/ecbuild/cmake/ecbuild_setup_test_framework.cmake:17 (find_package)
  /usr/local/share/ecbuild/cmake/ecbuild_system.cmake:241 (include)
  /usr/local/share/ecbuild/cmake/ecbuild_bundle.cmake:37 (include)
  CMakeLists.txt:19 (ecbuild_bundle_initialize)

-- Boost version: 1.65.1
-- Found the following Boost libraries:
--   unit_test_framework
-- Using Boost for unit tests:
--   INC [/usr/local/include]
--   LIB [/usr/local/lib/libboost_unit_test_framework.so]
-- -----
-- [jedi-bundle] (0.0.0) [8fel762]
-- -----
-- Adding bundle project crtm
-- Cloning crtm from https://github.com/UCAR/crtm.git into /home/xinzhang/jedi/code/jedi-bundle/crtm...
Username for 'https://github.com': xinzhang8noaa
Password for 'https://xinzhang8noaa@github.com':
-- /home/xinzhang/jedi/code/jedi-bundle/crtm retrieved.
-- Updating crtm to head of BRANCH master...
-- git fetch --all @ /home/xinzhang/jedi/code/jedi-bundle/crtm
-- git fetch --all --tags @ /home/xinzhang/jedi/code/jedi-bundle/crtm
-- git checkout master @ /home/xinzhang/jedi/code/jedi-bundle/crtm
-- -----
-- [crtm] (2.2.3.1) [994e23c]
-- Found HDF5: /usr/local/lib/libhdf5.so;/usr/local/lib/libsz.so;/usr/lib/x86_64-linux-gnu/libz.so;/usr/lib/x86_64-linux-gnu/libdl.so;/usr/lib/x86_64-linux-gnu/libm.so (found version "1.8.17")
-- Found NetCDF4: 1
-- CRTM_TPLS: NetCDF
-- -----
-- Adding bundle project oops
-- Cloning oops from https://github.com/UCAR/oops.git into /home/xinzhang/jedi/code/jedi-bundle/oops...
-- /home/xinzhang/jedi/code/jedi-bundle/oops retrieved.
-- Updating oops to head of BRANCH feature/ufo...
-- git fetch --all @ /home/xinzhang/jedi/code/jedi-bundle/oops
-- git fetch --all --tags @ /home/xinzhang/jedi/code/jedi-bundle/oops
-- git checkout feature/ufo @ /home/xinzhang/jedi/code/jedi-bundle/oops
-- -----
-- [oops] (0.2.1) [c611b86]
-- Performing Test has_cxx11_flag_1
-- Performing Test has_cxx11_flag_1 - Success
CMake Warning at /usr/share/cmake-3.5/Modules/FindBoost.cmake:725 (message):
  Imported targets not available for Boost version 106501
Call Stack (most recent call first):
  /usr/share/cmake-3.5/Modules/FindBoost.cmake:763 (_Boost_COMPONENT_DEPENDENCIES)
  /usr/share/cmake-3.5/Modules/FindBoost.cmake:1332 (_Boost_MISSING_DEPENDENCIES)
  oops/CMakeLists.txt:49 (find_package)

```

```

-- Boost version: 1.65.1
-- Found the following Boost libraries:
--   unit_test_framework
-- [LAPACK] (3.7.0)
-- Found package LAPACK required for feature LAPACK
-- Feature LAPACK enabled
-- [eckit] (0.18.0)
--   ECKIT_INCLUDE_DIRS : [/usr/local/include /usr/local/include/eigen3 /usr/include]
--   ECKIT_LIBRARIES : [eckit eckit_geometry eckit_linalg eckit_math eckit_web eckit_cmd /usr/local/lib
/libmpi_cxx.so /usr/local/lib/libmpi.so lapack /usr/lib/x86_64-linux-gnu/libssl.so /usr/lib/x86_64-linux-gnu
/libcrypto.so /usr/lib/x86_64-linux-gnu/libcurl.so]
-- [fckit] (0.4.1)
--   FCKIT_INCLUDE_DIRS : [/usr/local/include /usr/local/include /usr/local/include/eigen3 /usr/include]
--   FCKIT_LIBRARIES : [fckit eckit eckit_mpi]
-- Found package fckit required for feature FCTEST
-- Feature FCTEST enabled
-- Found Eigen3: /usr/local/include/eigen3 (Required is at least version "2.91.0")
-- OOPS_TPLS: LAPACK eckit fckit LAPACK eckit
-----
-- Adding bundle project ioda
-- Cloning ioda from https://github.com/UCAR/ioda.git into /home/xinzhang/jedi/code/jedi-bundle/ioda...
-- /home/xinzhang/jedi/code/jedi-bundle/ioda retrieved.
-- Updating ioda to head of BRANCH feature/intel...
-- git fetch --all @ /home/xinzhang/jedi/code/jedi-bundle/ioda
-- git fetch --all --tags @ /home/xinzhang/jedi/code/jedi-bundle/ioda
-- git checkout feature/intel @ /home/xinzhang/jedi/code/jedi-bundle/ioda
-----
-- [ioda] (0.1.0) [0d874d6]
-- IODA_TPLS: NetCDF
-----
-- Adding bundle project ufo
-- Cloning ufo from https://github.com/UCAR/ufo.git into /home/xinzhang/jedi/code/jedi-bundle/ufo...
-- /home/xinzhang/jedi/code/jedi-bundle/ufo retrieved.
-- Updating ufo to head of BRANCH feature/aircraft...
-- git fetch --all @ /home/xinzhang/jedi/code/jedi-bundle/ufo
-- git fetch --all --tags @ /home/xinzhang/jedi/code/jedi-bundle/ufo
-- git checkout feature/aircraft @ /home/xinzhang/jedi/code/jedi-bundle/ufo
-----
-- [ufo] (0.1.0) [ac0b019]
CMake Warning at /usr/share/cmake-3.5/Modules/FindBoost.cmake:725 (message):
  Imported targets not available for Boost version 106501
Call Stack (most recent call first):
  /usr/share/cmake-3.5/Modules/FindBoost.cmake:763 (_Boost_COMPONENT_DEPENDENCIES)
  /usr/share/cmake-3.5/Modules/FindBoost.cmake:1332 (_Boost_MISSING_DEPENDENCIES)
  ufo/CMakeLists.txt:42 (find_package)

-- Boost version: 1.65.1
-- Found the following Boost libraries:
--   unit_test_framework
-- ufo requires ioda >= 0.1.0 -- detected as already existing sub-project ioda (sources) 0.1.0
-- ufo requires oops >= 0.2.1 -- detected as already existing sub-project oops (sources) 0.2.1
-- ufo requires crtm >= 2.2.3 -- detected as already existing sub-project crtm (sources) 2.2.3
-- UFO_TPLS: ioda oops crtm ioda crtm oops
-----
-- Bundle jedi-bundle
-----
-- JEDI-BUNDLE_TPLS: crtm oops ioda ufo
-----
-- Build summary
-----
-- system : [xzhang-quaa.psd.esrl.noaa.gov] [Linux-3.10.0-693.11.6.el7.x86_64] [linux.64]
-- processor : [x86_64]
-- endianness : Little Endian -- IEEE [1]
-- build type : [RelWithDebInfo]
-- timestamp : [20180131231530]
-- install prefix : [/usr/local]
--   bin dir : [/usr/local/bin]
--   lib dir : [/usr/local/lib]

```



```

-- include dir      : [/usr/local/include]
-- data dir         : [/usr/local/share/jedi-bundle]
-- cmake dir        : [/usr/local/share/jedi-bundle/cmake]
-----
-- C -- GNU 7.2.0
--   compiler      : /usr/bin/gcc
--   flags         : -pipe -O2 -g
--   link flags    :
-- CXX -- GNU 7.2.0
--   compiler      : /usr/bin/g++
--   flags         : -pipe -O2 -g
--   link flags    :
-- Fortran -- GNU 7.2.0
--   compiler      : /usr/bin/gfortran
--   flags         : -O2 -g
--   link flags    :
-- linker          : /usr/bin/ld
-- ar               : /usr/bin/ar
-- ranlib           : /usr/bin/ranlib
-- link flags
--   executable [   -Wl,--disable-new-dtags ]
--   shared lib [ -Wl,--disable-new-dtags ]
--   static lib [ -Wl,--disable-new-dtags ]
-- install rpath   : $ORIGIN/../lib
-- common definitions:
-----
-- Feature summary
-----
--
-- The following features have been enabled:

* TESTS , jedi-bundle: Enable the unit tests
* LAPACK , oops: Linear Algebra PACKage
* FCTEST , oops: Fortran Unit Testing Framework

-- The following OPTIONAL packages have been found:

* Git
* HDF5

-- The following RECOMMENDED packages have been found:

* NetCDF4
  support for NetCDF4 file format
  support for NetCDF4 file format

-- The following REQUIRED packages have been found:

* LAPACK , oops: Linear Algebra PACKage
* eckit (required version >= 0.18.0)
* fckit (required version >= 0.4.1)
* Eigen3
* NetCDF
* Boost (required version >= 1.47)

-- Configuring done
-- Generating done
-- Build files have been written to: /home/xinzhang/jedi/build

[xinzhang@xzhang-qua build]$ sig make -j3

[xinzhang@xzhang-qua build]$ sig ctest

```

- Quality control

Variational Correction of Aircraft Temperature Bias in the NCEP's GSI Analysis System, click [here](#)