

ecCodes

GRIB Fortran 90 - Python APIs Practicals 1

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Practical 1: Intro to ecCodes APIs

Get the practical's archive:

```
$ cd $SCRATCH
$ tar xvf ~trx/ecCodes/eccodes_api_practicals.tar.gz
$ cd eccodes_api_practicals/exercise1/
```

```
# select Fortran
$ cd F90
$ ls
Makefile exercise.f90 exercise_eccodes.f90
exercise_grib_api.f90 exercise_mod.f90 u v
$ exercise
```

```
# select Python
$ cd Python
$ ls
Makefile exercise exercise_eccodes.py
exercise_grib_api. u v
$ exercise
```

exercise.f90 built with the old version of EMOSLIB

- The Fortran code `exercise.f90` decodes two GRIB files and to compute wind field and direction. The objective is to make all the necessary changes in `exercise_eccodes.f90` or `exercise_eccodes.py` using ecCodes to obtain the same output.

Practical 1: Main program

```
program exercise_eccodes
```

```
!=====
```

```
use eccodes
```

```
use exercise_mod
```

```
implicit none
```

```
real (KIND=nbytes_dp),dimension(:), allocatable :: u,v, direction, speed
```

```
call read_fields('u', u) } You have to modify the  
call read_fields('v', v) } subroutine read_fields
```

```
call compute_fields()
```

```
call clean_fields()
```

```
$ grib_ls -p parameter,shortName,dataDate,numberOfCodedValues,gridType,packingType u v
```

```
parameter shortName dataDate numberOfCodedValues gridType packingType  
131 u 20080201 4131 regular_ll grid_simple
```

```
...
```

```
132 v 20080201 4131 regular_ll grid_simple
```

```
...
```

```
2 of 2 total grib messages in 2 files
```

Practical 1: The objectives

- You will only have to include the ecCodes I/O statements and make the appropriate calls to `codes_get` in subroutine 'readfields' (F90) or function `gread` (Python).
- You can use the 'codes_' or 'grib_' names for the calls to ecCodes.
- For Fortran, compile/link the examples with:

```
$ gfortran -o exercise_eccodes exercise_eccodes.f90 exercise_mod.f90 \  
$ECCODES_INCLUDE $ECCODES_LIB
```

```
$ gfortran -o exercise_eccodes exercise_grib_api.f90 exercise_mod.f90 \  
$ECCODES_INCLUDE $ECCODES_LIB
```

or use the Makefile ('make eccodes')

- For Python, run with:

```
$ python exercise_eccodes.py
```

Practical 1: The objectives

- Run the resulting code

```
$ exercise_eccodes # for Fortran
```

```
$ python exercise_eccodes.py # for python
```

- Compare with the output produced by ../F90/exercise
- Now change the links for the input files to u.grib2 and v.grib2 (GRIB-2) and run the two executables again, e.g. for Fortran:

```
$ make grib2
```

```
$ exercise_eccodes
```

- You can also compare the usage of ecCodes with the usage of the GRIB API, e.g. for Fortran:

```
$ module swap eccodes grib_api
```

```
$ make clean gribapi
```

```
$ exercise_grib_api
```

```
$ diff exercise_eccodes.f90 exercise_grib_api.f90
```

```
$ module swap grib_api eccodes
```

Tips

- For Fortran, use make ('make [-f <Makefile>] [clean]')
- Documentation for ecCodes can be found at
<https://confluence.ecmwf.int/display/ECC/ecCodes+Home>
- Error codes are listed under:
http://download.ecmwf.int/test-data/eccodes/html/group_errors.html
- See lecture notes, ask one of us or ...
- ... suggested solutions are in the sub-directory '.solution'