

CERA data server

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Data archiving of CERA-20C reanalysis

Atmospheric data in GRIB format archived on MARS (Meteorological Archive and Retrieval System)

- Data is accessed via a meteorological meta-language interface

retrieve,

class=ep,

date=2004-01-01,

expver=2379,

levtype=sfc,

number=0/ 1/ 2/ 3/ 4/ 5/ 6/ 7/ 8/ 9,

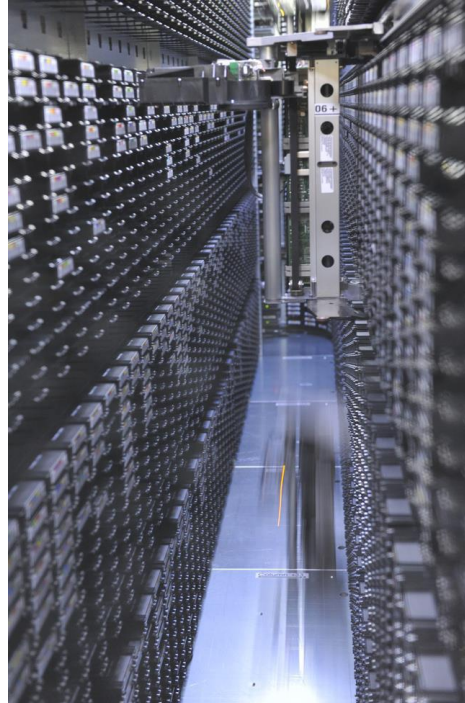
param=34.128,

stream=enda,

time=00/ 03/ 06/ 09/ 12/ 15/ 18/ 21,

type=an,

target="data.grib"

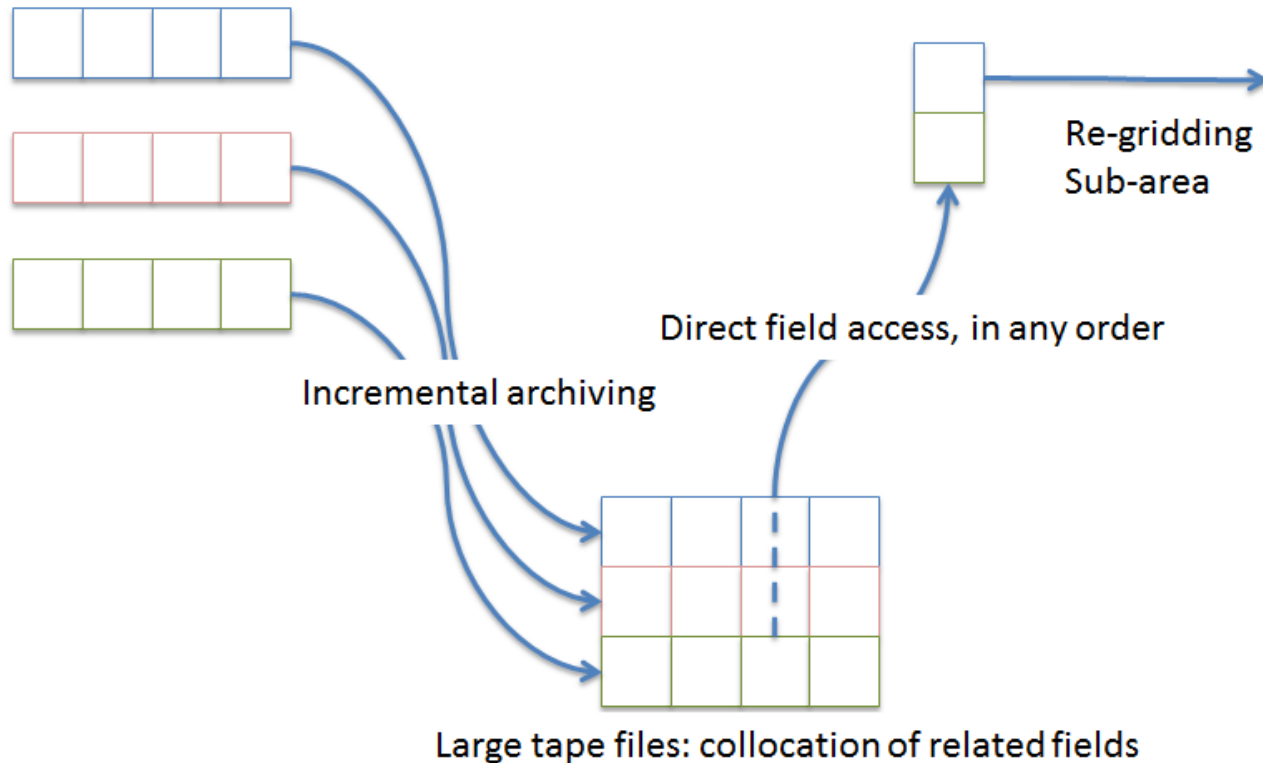


Ocean data in NetCDF format archived on ECFS (ECMWF File System)

- large file system for files that are not suitable for storing in MARS
- UNIX-like commands enable users to copy data

```
ecp ec:/ERAS/cera20c/${EXPID}/an/output/${YYYY} * $SCRATCH
```

Services offered by MARS



- MARS archives atmospheric field of CERA-20C (handles 2D fields in GRIB)
- MARS scans archived files, extracts metadata from GRIB headers and keeps an index that tracks where each GRIB field is
- GRIBs are reorganised into larger files, to minimise the total number of files and collocate related fields to speed up retrievals
- On retrievals, MARS find the required fields, reads them from tape, and re-assembles them according to the user's request

NetCDF archived in MARS

The same services for NetCDF should be provided by MARS:



- incremental archive
- data collocation
- user can select 2D fields from the archive and have them delivered in a single file

Challenges:

- NetCDF is a file format, not a record format
- original files contain multi-dimensional variables (often > 2 dimensions)
- one cannot extract a 2D field from a NetCDF file directly from tape

Workshop on "Closing the GRIB/NetCDF gap" organized at ECMWF :

- bring together experts from various domains, including experts in GRIB and NetCDF

Support for NetCDF in MARS

Solution chosen:

- NetCDF files are split into individual NetCDF files containing a single 2D field
- Resulting NetCDF files are annotated with MARS specific information, using NetCDF file 'Variable' attributes
- These attributes are used by MARS to index the NetCDF files, and treat them as simple binary records

For the users:

- On retrieval, those records will be assembled in a single NetCDF file to be delivered to the user
- The delivered NetCDF files will be CF (Climate and Forecast) compliant with valid CF attributes attached to the variables

Dissemination of reanalysis through a data server

- Web application developed to disseminate reanalysis data
- On-Demand Web Services

Type of level

- Model levels
- Potential temperature
- Potential vorticity
- Pressure levels
- ▶ Surface

Type

- ▶ Analysis
- Forecast

ERA-20C sets

- Daily
- Synoptic Monthly Means
- Monthly Means of Daily Means
- Invariant
- Ocean Wave Daily
- Ocean Wave Invariant
- Ocean Wave Synoptic Monthly Means
- Ocean Wave Monthly Means of Daily Means
- Observations

Select date

Select a date in the interval 1900-01-01 to 2010-12-31

Start date: End date:

[Reset](#)

Select time

00:00:00 03:00:00 06:00:00 09:00:00 12:00:00 15:00:00 18:00:00 21:00:00

[Select All](#) or [Clear](#)

Select parameter

<input type="checkbox"/> 2 metre dewpoint temperature	<input type="checkbox"/> 2 metre temperature
<input type="checkbox"/> 10 metre U wind component	<input type="checkbox"/> 10 metre V wind component
<input type="checkbox"/> 100 metre U wind component	<input type="checkbox"/> 100 metre V wind component

- Retrieve in GRIB format
- Retrieve in NetCDF format
- View the MARS request (for latter use in scripts)

Example with a Python interface

- Install a simple library
- Download data via scripts

```
usr/bin/env python
```

```
from ecmwfapi import ECMWFDataServer
```

```
server = ECMWFDataServer()
```

```
server.retrieve({  
    'dataset' : "era20c",  
    'levtype' : "sfc",  
    'date'    : "20100101/to/20101231",  
    'time'    : "00",  
    'param'   : "2t",  
    'grid'    : "1/1",  
    'format'  : "netcdf",  
    'target'  : "data.nc"  
})
```


Any questions?

