Applications of the CF data model

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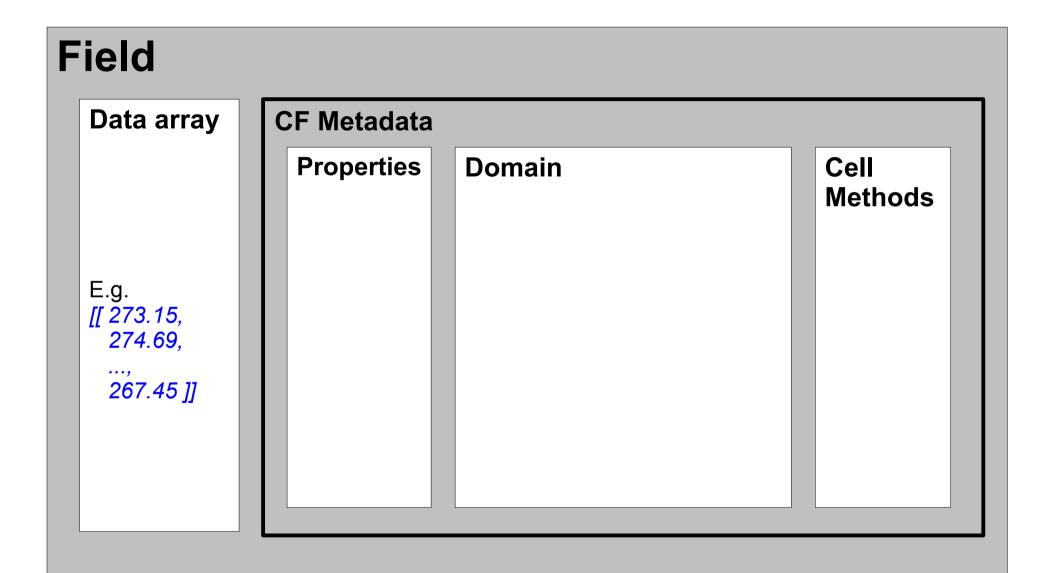Jonathan Gregory + many others in the CF community

The CF data model

- An abstract model which describes the organisation of data and metadata implied by the CF-netCDF conventions

  - It identifies the fundamental relationships between CF-netCDF metadata

  - The model is minimal – each component is as simple as possible

- Independent of netCDF, or any other, file format

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http://kitt.llnl.gov/trac/ticket/68
http://kitt.llnl.gov/trac/ticket/88
http://kitt.llnl.gov/trac/ticket/95
http://kitt.llnl.gov/trac/ticket/107
```
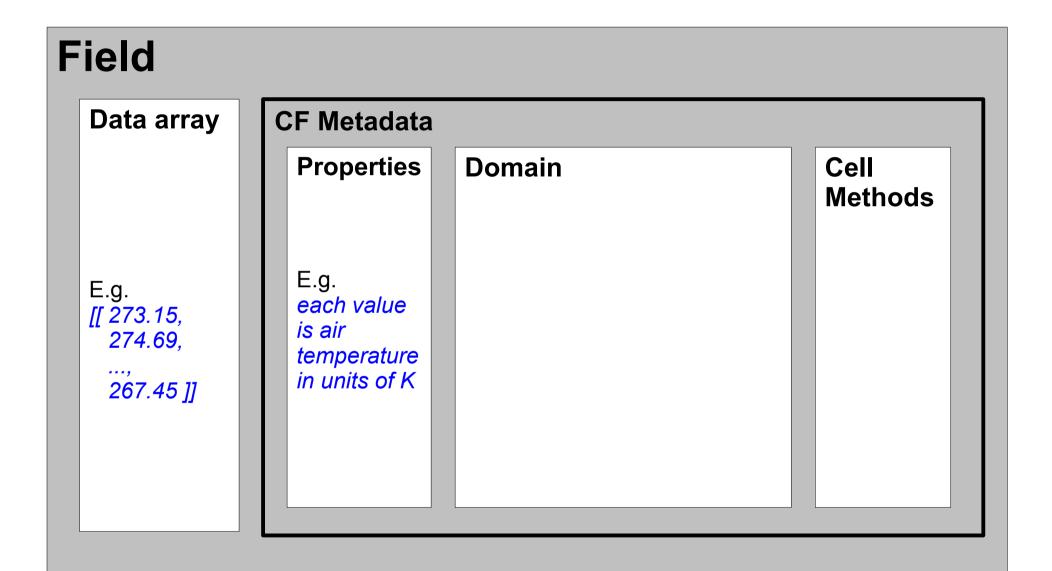
The CF data model

Field

Data array

E.g.
[[273.15,
274.69,

...,
267.45]]

CF Metadata

The CF data model

Field

Data array

E.g.
*[[273.15,
   274.69,
   ...,
   267.45]]*

CF Metadata

Properties

Domain

Cell Methods

The CF data model

Field

Data array

E.g.
[[273.15,
274.69,
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267.45]]

CF Metadata

Properties

E.g.
each value is air temperature in units of K

Domain

Cell Methods

The CF data model

Field

Data array

E.g.
[[273.15,
274.69,
    ...,
267.45]]

CF Metadata

Properties

E.g.
each value
is air
temperature
in units of K

Domain

E.g.
array spans a latitude-longitude
region for a particular height
and for a particular time period

Cell Methods

- Facilitates translating files in other formats to CF-netCDF
  - The other format need "only" be mapped onto the components of the CF data model

Aggregation = combining multiple datasets into a single dataset with a larger domain

- E.g. a timeseries split across several files may logically be viewed as a single dataset

- Having a data model makes it possible to define *all* conditions under which aggregation is possible

- These aggregation rules apply to any dataset format which maps onto the CF data model

`http://kitt.llnl.gov/trac/ticket/78`

Storage of aggregated datasets

A compact netCDF file format (CFA-netCDF) has been created which allows aggregations to be stored on disk

`http://www.met.reading.ac.uk/~david/cfa/0.4/`

Storage of aggregated datasets

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A compact netCDF file format (CFA-netCDF) has been created which allows aggregations to be stored on disk

- A single file comprising a view of multiple datasets
- No duplication of original arrays, so very small file size

`http://www.met.reading.ac.uk/~david/cfa/0.4/`

Storage of aggregated datasets

A compact netCDF file format (CFA-netCDF) has been created which allows aggregations to be stored on disk

- A single file comprising a view of multiple datasets

- No duplication of original arrays, so very small file size

- Stores aggregations along multiple dimensions and copes with arbitrary file encoding choices (such as the order of array axes, different but equivalent units, etc.)

- Metadata is the same as CF-netCDF, so easy to read

- Connects datasets of any format

  - Makes a CF view of non-CF files

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http://www.met.reading.ac.uk/~david/cfa/0.4/
```

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A data model is just another tool

Question: Does GRIB map onto the CF data model?