Climate Grid
Software for creating national climate data products and services
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Climate Grid

Aim:

Develop a **portable, modular** and **traceable** code base following **open** software standards to provide a tool kit for the generation, exploration and visualisation of UK climate statistics.
Development process

Test-driven development

Iris 1.8

Python library for analysing and visualising meteorological and oceanographic data sets.

http://scitools.org.uk/iris/

Code refactoring
Climate Grid Components

Gridding → Grid Archive → Product Creation
Gridding Overview

- Many dates
- Many variables
- Iris cube (points) → Interpolation → Iris cube (raster) → NetCDF
Gridding Process

1. Convert to anomalies
2. Regression analysis
3. IDW interpolation
4. Re-combine regression model & residuals
5. Convert to actuals
Gridding Process

1. Convert to anomalies
2. Regression analysis
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4. Re-combine reg\textsuperscript{n} model & residuals
5. Convert to actuals

idw_actuals()
idw_anomalies()
idw_regression_residual()
idw_regression_residuals_anomalies()}
System Configuration

- Paths to system resources
- CF metadata
- Grid definition (extent, projection, resolution etc)
- Gridding method (by variable, month and run type)
- Legends and colours for maps

Indexed via ‘short_name’ = a string combining the temporal resolution and variable name

- e.g. monthly_maxtemp
- e.g. daily_rainfall

System resources:
- Station metadata
- Product templates
- Region definitions (shapefiles and raster masks)
- Grids of the independent regression variables
Climate Grid Components

Gridding → Grid Archive → Product Creation
Grid Archives

Provisional  Final  LTA
Pre-QC  Test  Historic

\grid\variable\year\mm.nc
\station\variable\year\mm.nc

my_archive = GridArchive(path, ...)

combined_archive = GridArchiveHierarchy(
    final_archive, provisional_archive, historic_archive)
Climate Grid Components

Gridding → Grid Archive → Product Creation
Products and Processes

Maps
- Regional values
- Grids
- Point values

monthly, provisional

Daily, final

Services

Ad hoc products
Automation
Automation

```
extract_station_data()

gridding()

product_creation()

product_delivery()
```

cron

Rose: A framework for managing and running meteorological suites.

http://metomi.github.io/rose/doc/rose.html
Quality Control
Current status

• Software has been used for July, August and September summaries

• No major problems but system is still bedding in (various small issues have needed fixing...)

• Work is ongoing in various areas:
  • Memory issues when working with large networks
  • Automation
  • Quality control
  • Batch processing e.g. multi-month runs
  • Additional system tests
  • Refactoring for open source
  • Documentation
Next Steps: Sharing

- Transition plan
- Config tables

Documentation

- Climate Grid
- Climate Grid UK
- Climate Grid Acceptance Tests
- pymidas
Next Steps: End-to-end

- MIDAS
- FORTRAN
- Excel
- ClimateGrid
- Python
- Grid Archive
- Excel
- Fireworks
- Dreamweaver & CMS
- Metnet & external web
Next Steps: Portability

A.N.Other

ClimateGrid

Python

Grid Archive

Prototypes
Next Steps: Methods

- Convert to anomalies
- Regression analysis
- IDW interpolation
- Re-combine reg\textsuperscript{m} model & residuals
- Convert to actuals

Alternate method 1

Alternate method 2
Successful transition
Maintained continuity
Greater flexibility
Improved skills
Work in progress
Future collaboration

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