

What is CDAT?

A brief tour

What is CDAT?

- A quick tour of CDAT, showing:
 - VCDAT – the CDAT GUI
 - Running CDAT from Python scripts
 - Running CDAT interactively
 - Applications on top of CDAT
 - Quick look at some code
 - Documentation – PCMDI portal

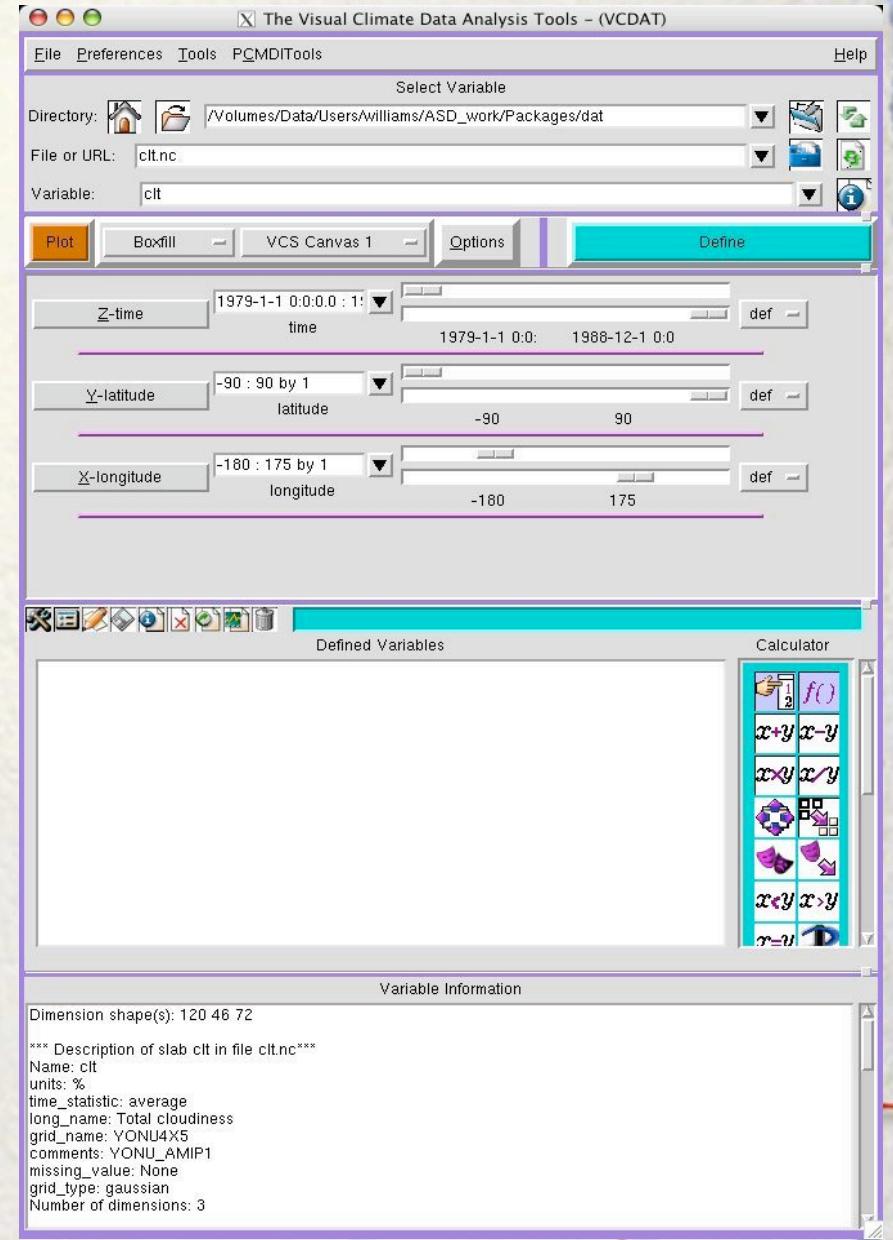
CDAT Propaganda

- Developed at the Program for Climate Model Diagnosis and Intercomparison (PCMDI), USA.
- Designed for climate science data
- Scriptable
- Analysis, conversion, sub-setting and array operations
- Interfaces to Fortran and C/C++
- Visualization system (VCS, Xmgrace, VTK)
- Graphical User Interface (VCDAT)
- XML representation (CDML) for datasets
- Integrated with other packages (such as LAS and OPeNDAP)
- Open-source and free
- URL: <http://www-pcmdi.llnl.gov/software-portal>



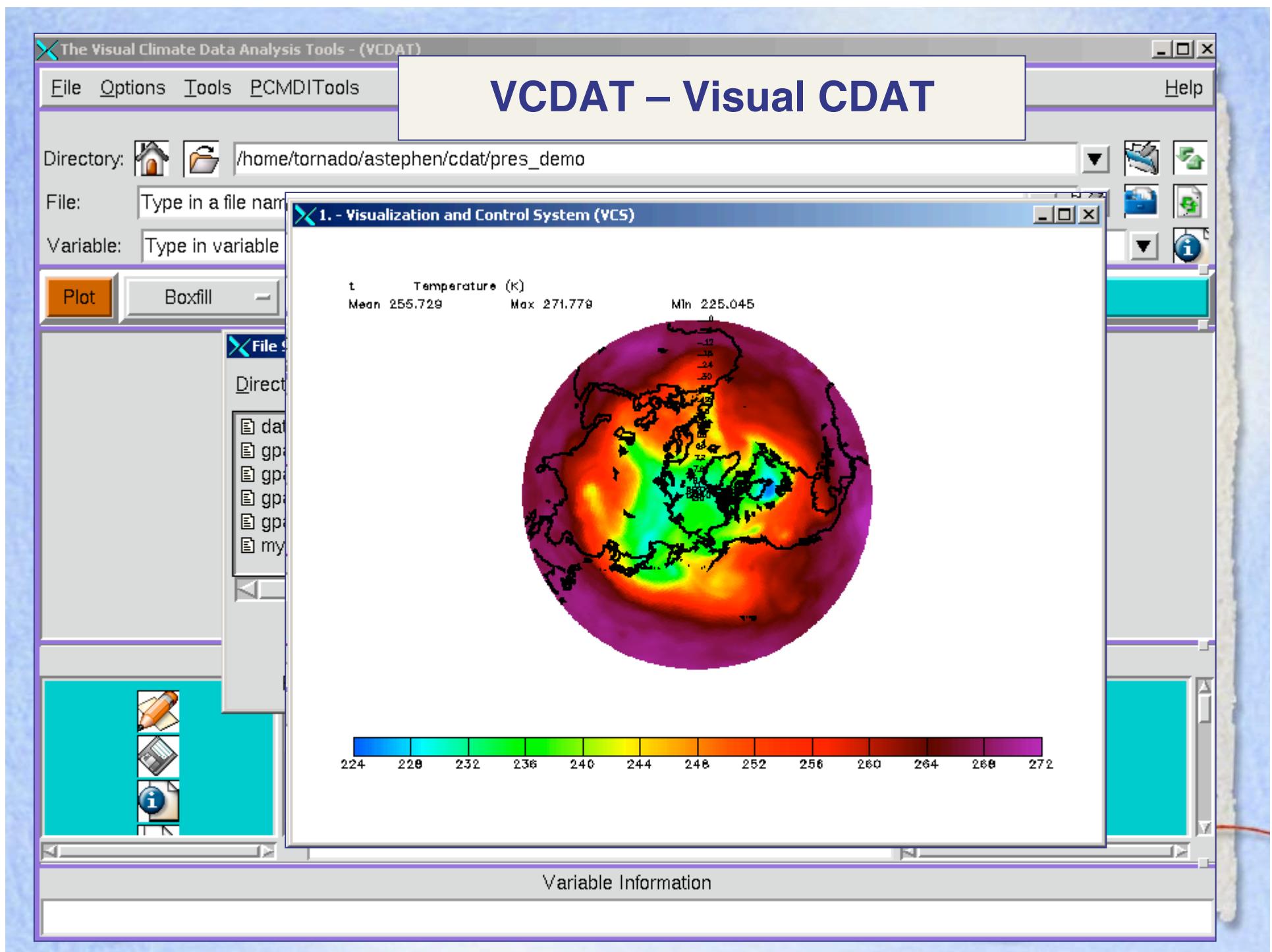
VCDAT – Visual CDAT

- VCDAT lets you get familiar with many parts of CDAT
- Start by typing “**vcdat**” at the command line.



VCDAT – Visual CDAT

- VCDAT is usually the first tool that newcomers to CDAT experience.
- It provides a Graphical User Interface (GUI) to CDAT's functionality.
- Advantages:
 - no need to learn scripting
 - incorporates different CDAT sub-packages seamlessly
 - provides tips on how to script CDAT.
 - allows interaction between GUI and command line



Running CDAT from Python scripts

- CDAT IS Python!
- You can combine with any python code.
- Python interfaces to Fortran/C/C++ allow you to bind to lower level languages.
- Python is really useful for other applications.
- Flexible control of data objects (*wave goodbye to loops*).
- You can build applications directly on top of CDAT since it is python.

Running CDAT from Python scripts

```
#!/usr/bin/env python

print "I am a python script."

print "Let's import some CDAT modules..."

import cdms, vcs

print "Open a data file, grab some data..."

f=cdms.open("myfile.nc")

var=f('temperature', latitude=(0,90),
      time="2004-12-17")

print "Plot the data..."

canvas=vcs.init()

canvas.plot(var)

print "So long!"
```

Running CDAT interactively

- You can work interactively with CDAT because python has an interactive prompt.
- Run ‘**python**’, ‘**cdat**’, or ‘**idle**’:

```
>>> print "hello"  
"hello"  
>>> import Numeric  
>>> arr1=Numeric.array([1,3,4,6], 'f')  
>>> arr2=Numeric.array([3,1,0,-2], 'f')  
>>> print arr1+arr2  
[ 4.,  4.,  4.,  4., ]
```

Applications on top of CDAT

- Building on top of CDAT is simple, some example applications are:
 - BADC Data Extractor:
<http://cdat.badc.nerc.ac.uk/cgi-bin/dxui.py>
 - NetCDF CF-convention checker:
<http://titania.badc.rl.ac.uk/cgi-bin/cf-checker.pl>
 - ClimatePrediction.net:
<http://www.climateprediction.net>

BADC Data Extractor

0.0 W 357.5 E
Select from map Note that the map Java applet may take a few moments to appear.
[Note about interpolation methods.]

Vertical Domain

Levels
Single level

Time

Dataset 1: Start time
1979 01 01 00 00 00
year month day hour min sec
1979 01 01 00 00 00
End time

Format
NetCDF Note that you should choose NetCDF format if
Proceed

http://cdat.badc.nerc.ac.uk/dx_extra/LiveMap_30/extractorMap.html - Microsoft Internet Explorer

Choose this selection

VIEW: Longitude-Latitude

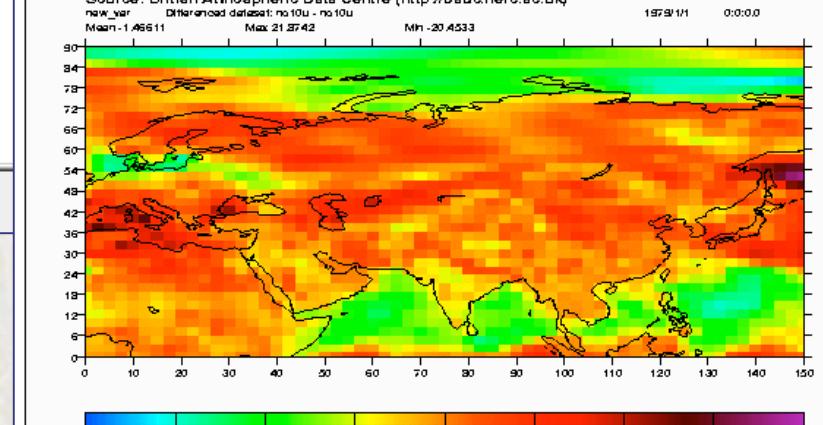
Projection: Standard
Dimensions: 600x400

Plotting your data...

Request processed...

NERC Centres for Atmospheric Science
NATIONAL ENVIRONMENT RESEARCH COUNCIL

Source: British Atmospheric Data Centre (<http://badc.nerc.ac.uk>)
new_var Dimension dataset: no10u - no10u
Mean:-1.46511 Max:21.8742 Min:-20.4533 1979/1/1 0:0:0.0

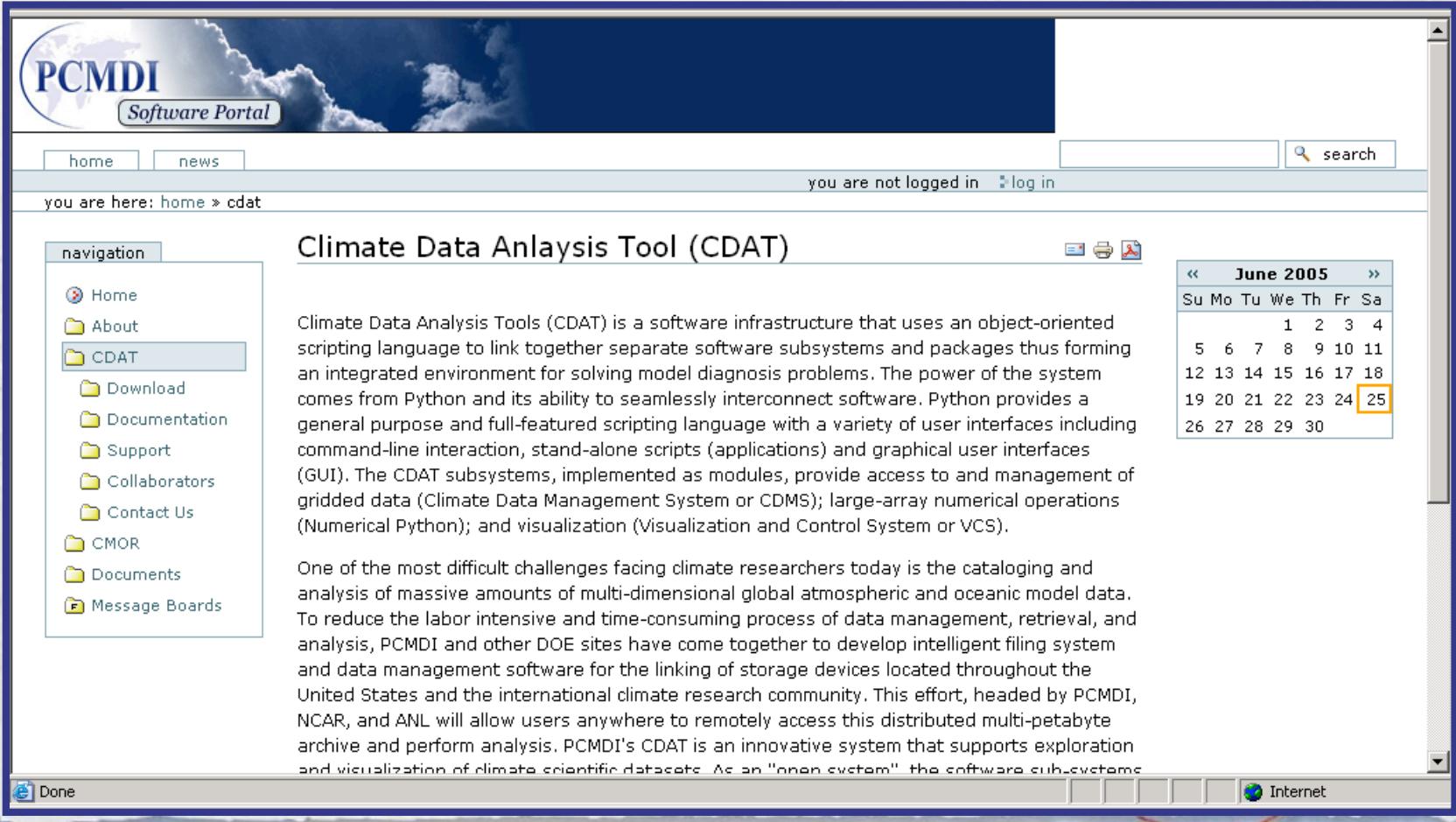


Typical usage examples of CDAT

- calculate a long-term average
- define wind-speed from u- and v-components
- subset a dataset, selecting a spatiotemporal region
- aggregate 1000s of files into a small XML file.

CDAT Documentation

- See searchable online documentation at:
<http://www-pcmdi.llnl.gov/software-portal/cdat>



The screenshot shows a web browser window for the PCMDI Software Portal. The title bar reads "PCMDI Software Portal". The main content area displays the "Climate Data Anlaysis Tool (CDAT)" page. The left sidebar has a "navigation" section with links to Home, About, CDAT (which is selected and highlighted), Download, Documentation, Support, Collaborators, Contact Us, CMOR, Documents, and Message Boards. The right sidebar features a calendar for June 2005, with the 25th highlighted. The central text area describes CDAT as a software infrastructure using Python for linking various subsystems like CDMS, Numerical Python, and VCS. It also mentions the challenges of managing large climate datasets.

you are here: home > cdat

Climate Data Anlaysis Tool (CDAT)

Climate Data Analysis Tools (CDAT) is a software infrastructure that uses an object-oriented scripting language to link together separate software subsystems and packages thus forming an integrated environment for solving model diagnosis problems. The power of the system comes from Python and its ability to seamlessly interconnect software. Python provides a general purpose and full-featured scripting language with a variety of user interfaces including command-line interaction, stand-alone scripts (applications) and graphical user interfaces (GUI). The CDAT subsystems, implemented as modules, provide access to and management of gridded data (Climate Data Management System or CDMS); large-array numerical operations (Numerical Python); and visualization (Visualization and Control System or VCS).

One of the most difficult challenges facing climate researchers today is the cataloging and analysis of massive amounts of multi-dimensional global atmospheric and oceanic model data. To reduce the labor intensive and time-consuming process of data management, retrieval, and analysis, PCMDI and other DOE sites have come together to develop intelligent filing system and data management software for the linking of storage devices located throughout the United States and the international climate research community. This effort, headed by PCMDI, NCAR, and ANL will allow users anywhere to remotely access this distributed multi-petabyte archive and perform analysis. PCMDI's CDAT is an innovative system that supports exploration and visualization of climate scientific datasets. As an "open system" the software subsystems