

Introduction to EdGCM

EdGCM User Interface

- Toolbar
- Setup Simulation window
- Analyze Output window
- Panoply mapping tool

EdGCM Toolbar

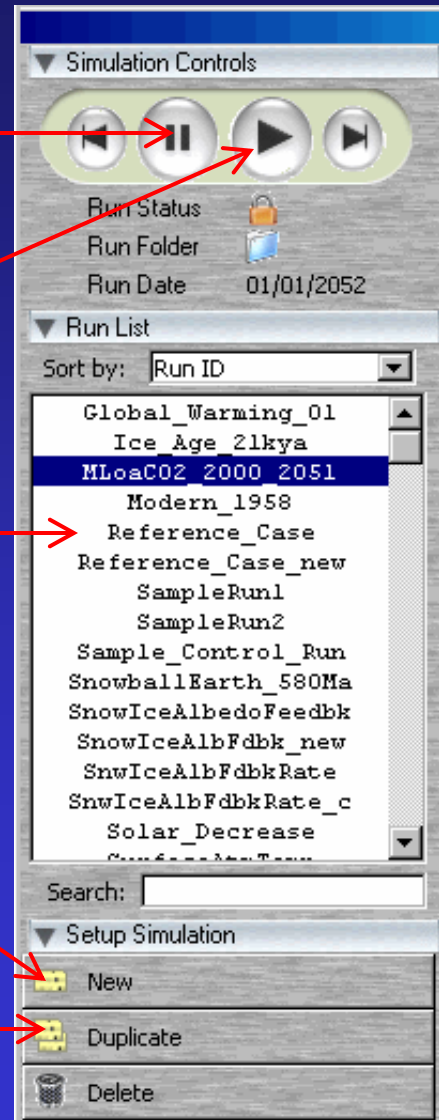
Pause Run

Start/Resume Run

List of all runs

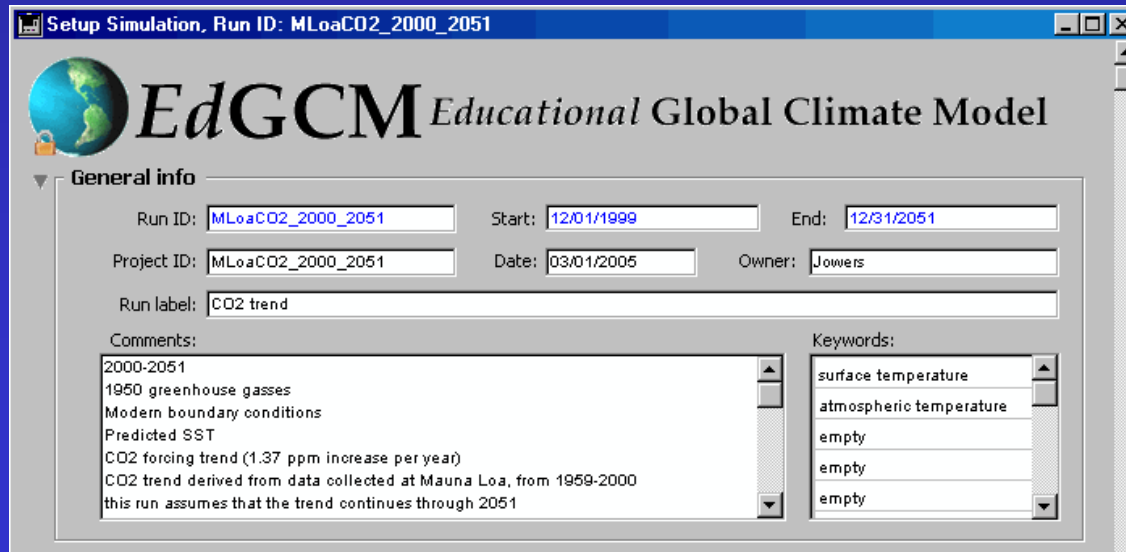
Create new run setup

Duplicate existing setup for
modification



Setup an EdGCM Run

- Highlight any run from list
- Open its Setup Simulation window
(top menu bar → “Window” → “Setup Simulations”)
- In toolbar, click “New” button
- New Setup window opens
- Enter IDs, start & end dates



The screenshot shows the 'Setup Simulation' window for Run ID: MLoaCO2_2000_2051. The window title is 'Setup Simulation, Run ID: MLoaCO2_2000_2051'. The main header features the EdGCM logo (a globe) and the text 'EdGCM Educational Global Climate Model'. Below the header is a 'General info' section with the following fields:

- Run ID: MLoaCO2_2000_2051
- Start: 12/01/1999
- End: 12/31/2051
- Project ID: MLoaCO2_2000_2051
- Date: 03/01/2005
- Owner: Jowers
- Run label: CO2 trend

There are also 'Comments' and 'Keywords' sections. The 'Comments' section contains a text area with the following text:

2000-2051
1950 greenhouse gasses
Modern boundary conditions
Predicted SST
CO2 forcing trend (1.37 ppm increase per year)
CO2 trend derived from data collected at Mauna Loa, from 1959-2000
this run assumes that the trend continues through 2051

The 'Keywords' section contains a list box with the following items:

- surface temperature
- atmospheric temperature
- empty
- empty
- empty

Input File Setup

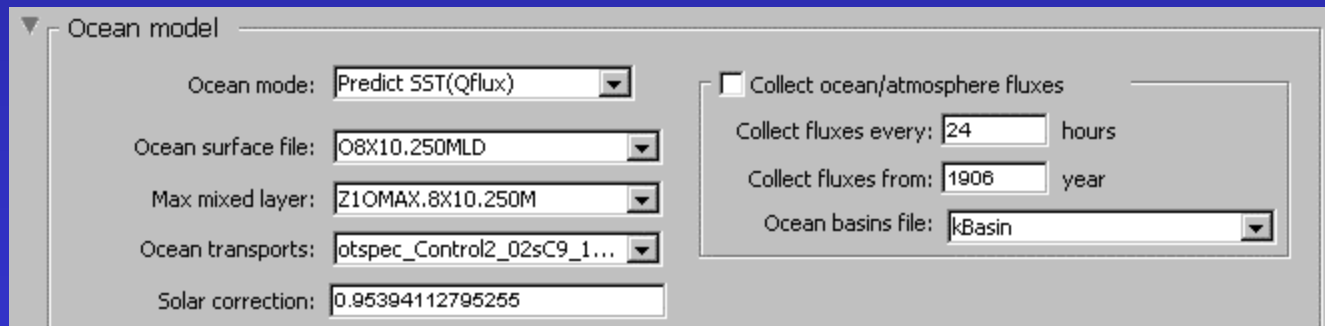
- Choose input folder time period (in setup window)
- For near past, present, & near future runs, use “Modern”
- Choose reference year to match start date
- Leave initial & boundary conditions at default

The screenshot shows a software window titled "Input files" with a tree view on the left. The main area contains several configuration fields:

- Input folder:** A dropdown menu set to "Modern" with a folder icon to its right.
- Reference year:** A text input field containing "1949".
- Random no. seed:** A text input field containing "78".
- Initial Conditions:** A sub-panel containing:
 - Initialization:** A dropdown menu set to "GCM restart file".
 - GCM restart file:** A dropdown menu set to "NOV1911.rsfModern_Qflux".
 - Ground data file:** An empty dropdown menu.
 - Observations file:** An empty dropdown menu.
 - Start date and initial conditions must align
- Boundary conditions:** A sub-panel containing:
 - Topography:** A dropdown menu set to "Z8X101".
 - Vegetation:** A dropdown menu set to "V8X10".
 - Drag coefficient:** A dropdown menu set to "CD8X10".
 - Radiation (RTAU):** A dropdown menu set to "RTAU.G25L15".
 - Radiation (RPLK):** A dropdown menu set to "RPLK25".

Ocean Mode Options

- “Predict SST” lets model predict SSTs throughout the run
- “Specify SST” uses observed SSTs, should not be used for future or paleoclimate runs
- Leave other ocean options at default



The screenshot shows a configuration window titled "Ocean model" with the following settings:

- Ocean mode: Predict SST(Qflux)
- Ocean surface file: O8X10.250MLD
- Max mixed layer: Z10MAX.8X10.250M
- Ocean transports: otspec_Control2_02sC9_1...
- Solar correction: 0.95394112795255
- Collect ocean/atmosphere fluxes
- Collect fluxes every: 24 hours
- Collect fluxes from: 1906 year
- Ocean basins file: kBasin

Setup Forcings

- Use “observed” values - enter year & click “Set”
- Or enter values of your choice
- Solar luminosity values available 1500 – 1998
- GHG values available 1850 – 2050
 - 1850-1957: ice core bubbles
 - 1958-2000: observed
 - 2001-2050: projections

Forcings

Solar

Luminosity: W/m² Use observed values for year:

Greenhouse gases

CO2: ppm N2O: ppm CH4: ppm CFC11: ppt CFC12: ppt

Use observed values from year:


- Entered values remain constant throughout run, unless . . .

Forcings Trend Setup

- Enable trend(s) to change values over time
- For solar luminosity & each GHG
- Choose trend type (i.e. linear, exponential)
- Enter change per year
- Enter start & end years of trend
- Note: start & end years of trend(s) not confined to start & end dates of run
- Click “View” icon to see values trend produces

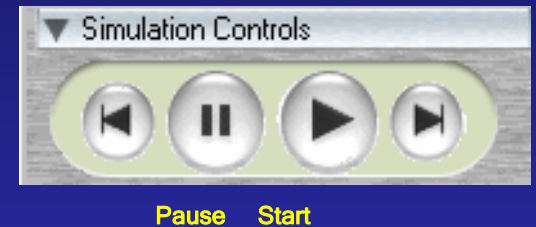
CO2 trend

Enable trend

Linear (ppm)	1.37	change per year	From: 1951	To: 2051	 View
None		change per year	From: 0	To: 0	

Run the Model

- After setup, highlight run ID in run list
- Click start button
- Calculates one cycle, then stops
- Click start button again to finish run
- Can pause run any time & resume later
- When complete, close & restart EdGCM (necessary to analyze output)

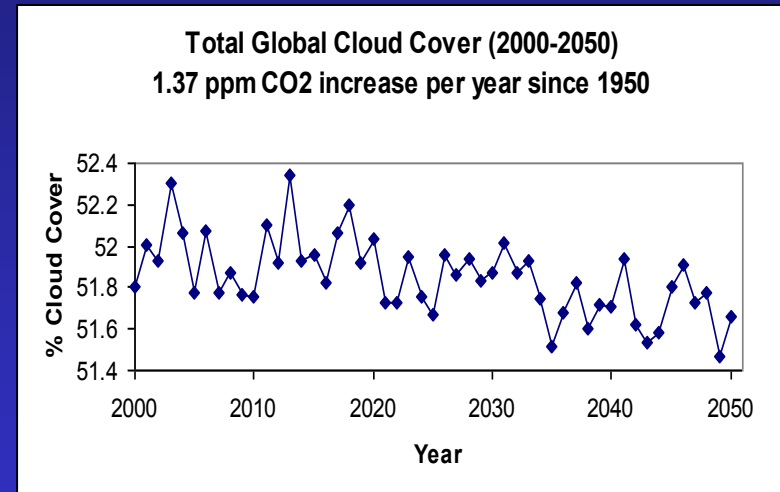


Analyze Output: Tables

- Highlight run in list
- Open its Analyze Output window
(top menu bar → “Window” → “Analyze Output”)
- Select “Tables” tab
- Select start & end years for averaging
- Click “Average” button
- Check boxes of time period averages to view
(months, seasons, annual)
- Click “Get Tables” button
- Highlight table name & click “View”

Analyze Output: Plots

- Analyze Output window → “Plots” tab
- Select start and end years
- Click “Time Series” button
- Select variables to plot
- Click “Get Plots”
- Highlight plot name you wish to view
- Click “View”
- Excel opens & data may be easily plotted

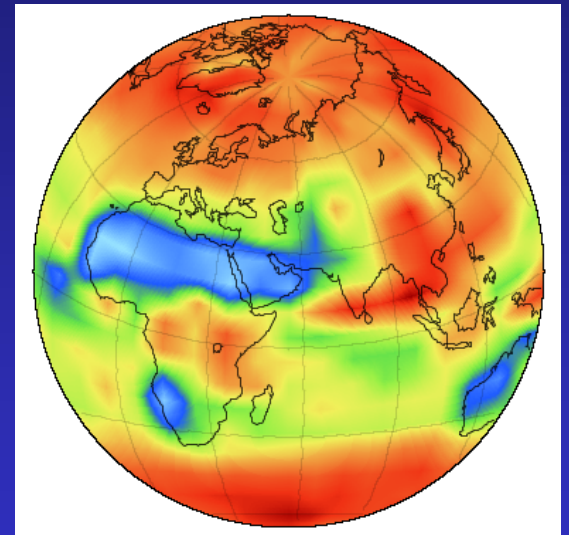


Analyze Output: Maps

- Analyze Output window → “Maps” tab
- Select start & end years for averaging
- Click “Average”
- Select time period(s) to map (i.e. annual)
- Select variables to map
- Click “Get Maps”
- Highlight time period in “Viewable Maps” list
- Click “View”

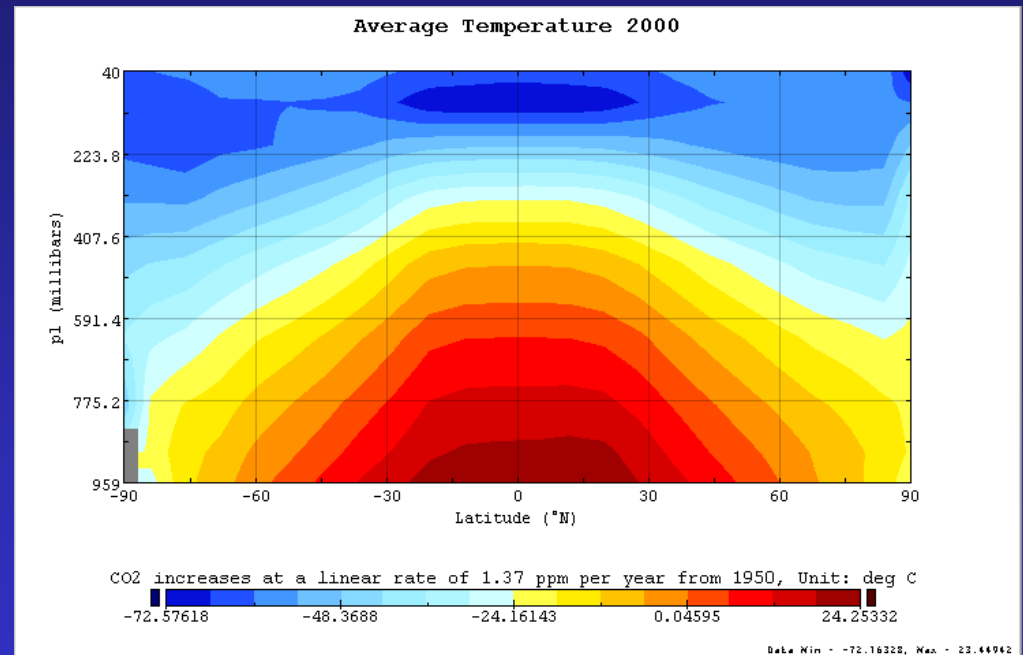
Panoply Mapping Tool

- After clicking “View”, Panoply opens
- Highlight map name
- Click “Create Plot”
- Many map options to choose from
- Drop down box to change time period mapped (i.e. ANN, DJF, JAN)
- Note: map will be lost if you close map window without saving



Analyze Output: Vertical

- In Analyze Output window, “Vertical” tab
- Procedure is similar to “Maps” tab
- Vertical profile also uses Panoply
- Zonal averages depicted in profile



Known Problems

- First calendar year of any run cannot be analyzed
- SST cannot be mapped
- Map images do not save well
- In some cases, data for a certain range of years cannot be averaged for analysis
- Vertical profile variable check boxes are off by one

Sample Run

- Start: 12/01/2005 End: 12/31/2007
- Input folder: Modern
- Reference Year: 2005
- Predict SST
- Choose to generate monthly average data tables
- Solar: 1998 value
- GHGs: 2005 values
- Choose to enable CO2 trend
- Linear (ppm) trend
- 2.75 ppm CO2 change per year (~2x current rate)
- Trend From: 2006 To: 2007