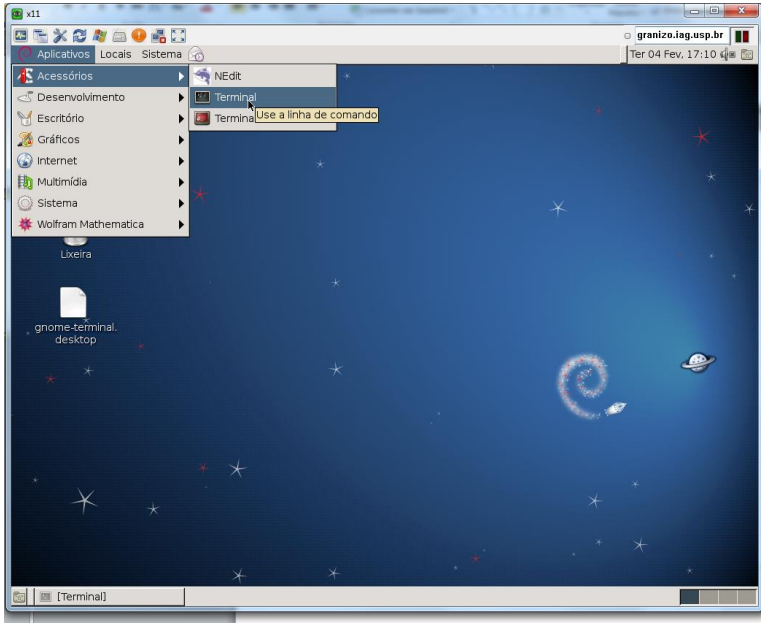
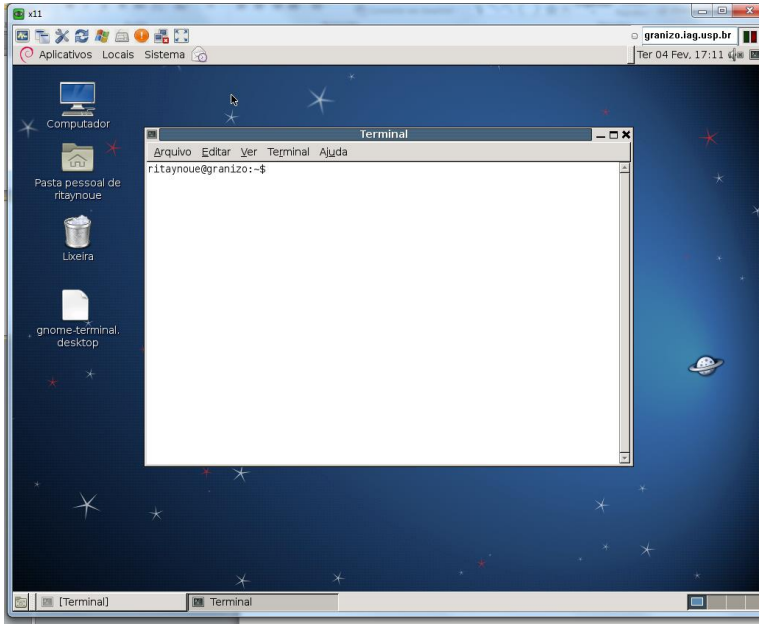
Ambiente Linux

Lab. Meteo Sinótica

Entrando nos computadores

- Username: curso1
- Senha: curso
- Abrir um terminal de comando



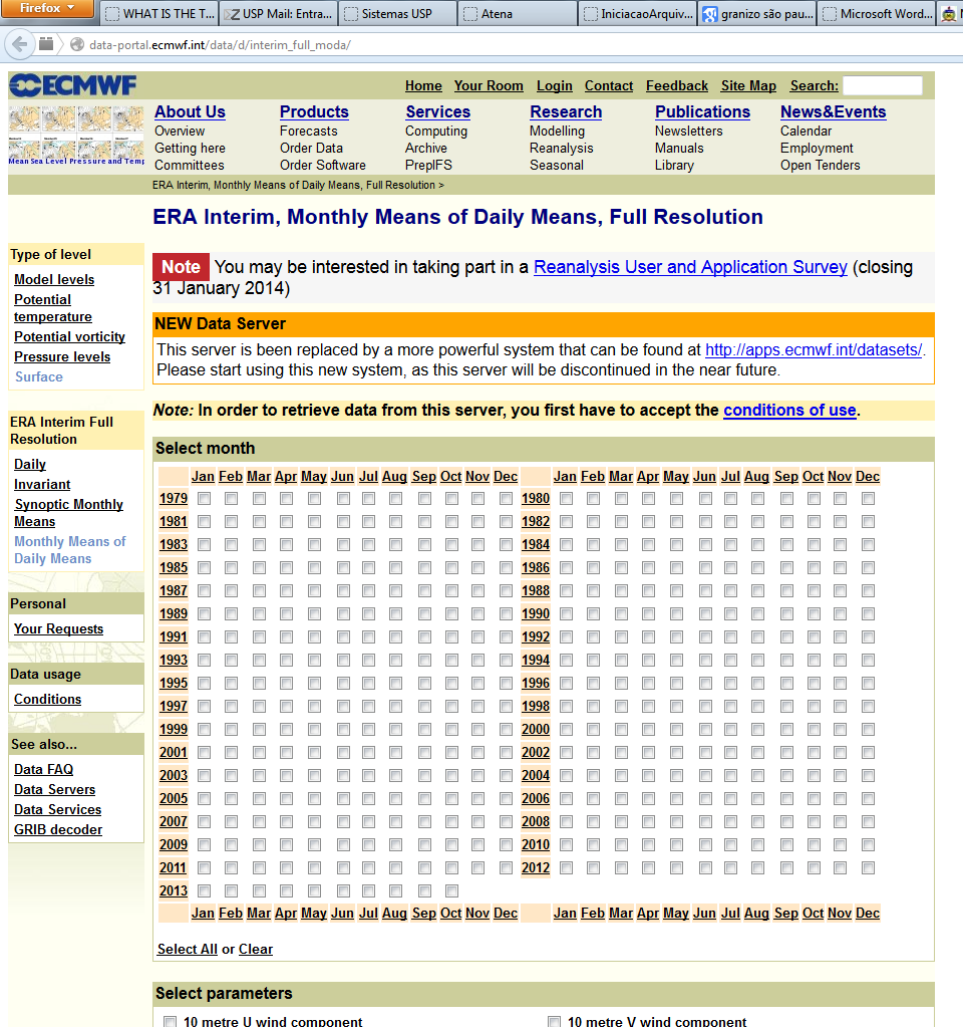


Alguns comandos

- pwd -> identifica o diretório atual
- ls -> lista o conteúdo do diretório
- mkdir SEUNOME -> cria um diretório chamado SEUNOME
- cd SEUNOME -> muda para o diretório SEUNOME

Baixando dados da reanálise do ECMWF (ERA-Interim)

- Abrir um navegador (Iceweasel, Epiphany)
- Ir para:
- http://data-portal.ecmwf.int/data/d/interim_full_moda/



Selecionar:

- meses de janeiro e julho de 2011

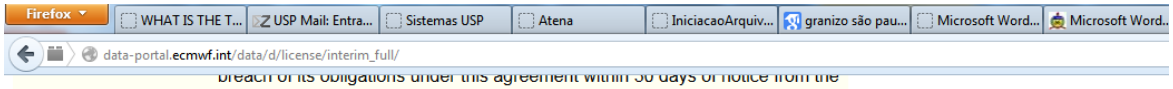
E as variáveis:

- 10 metre U wind component
- 10 metre V wind component
- 2 metre temperature
- Mean sea level pressure
- Sea surface temperature

Select parameters

- [x] 10 metre U wind component
- [x] 10 metre V wind component
- [ ] 10 metre wind speed
- [ ] 2 metre dewpoint temperature
- [x] 2 metre temperature
- [ ] Albedo
- [ ] Boundary layer height
- [ ] Charnock
- [ ] Convective available potential energy
- [ ] Forecast albedo
- [ ] Forecast logarithm of surface roughness for heat
- [ ] Forecast surface roughness
- [ ] High cloud cover
- [ ] Ice temperature layer 1
- [ ] Ice temperature layer 2
- [ ] Ice temperature layer 3
- [ ] Ice temperature layer 4
- [ ] Instantaneous eastward turbulent surface stress
- [ ] Instantaneous moisture flux
- [ ] Instantaneous northward turbulent surface stress
- [ ] Instantaneous surface sensible heat flux
- [ ] Logarithm of surface roughness length for heat
- [ ] Low cloud cover
- [x] Mean sea level pressure
- [ ] Medium cloud cover
- [x] Sea surface temperature
- [ ] Sea-ice cover
- [ ] Skin reservoir content
- [ ] Skin temperature
- [ ] Snow albedo
- [ ] Snow density
- [ ] Snow depth
- [ ] Soil temperature level 1
- [ ] Soil temperature level 2
- [ ] Soil temperature level 3
- [ ] Soil temperature level 4
- [ ] Surface pressure
- [ ] Surface roughness
- [ ] Temperature of snow layer
- [ ] Total cloud cover
- [ ] Total column ice water
- [ ] Total column liquid water
- [ ] Total column ozone
- [ ] Total column water
- [ ] Total column water vapour
- [ ] Vertical integral of cloud frozen water
- [ ] Vertical integral of cloud liquid water
- [ ] Vertical integral of divergence of cloud frozen water flux
- [ ] Vertical integral of divergence of cloud liquid water flux
- [ ] Vertical integral of divergence of geopotential flux
- [ ] Vertical integral of divergence of kinetic energy flux
- [ ] Vertical integral of divergence of mass flux
- [ ] Vertical integral of divergence of moisture flux
- [ ] Vertical integral of divergence of ozone flux
- [ ] Vertical integral of divergence of thermal energy flux
- [ ] Vertical integral of divergence of total energy flux

Aceitar as condições de uso



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Name:	Rita Ynoue
Organisation:	USP
Country:	Brazil

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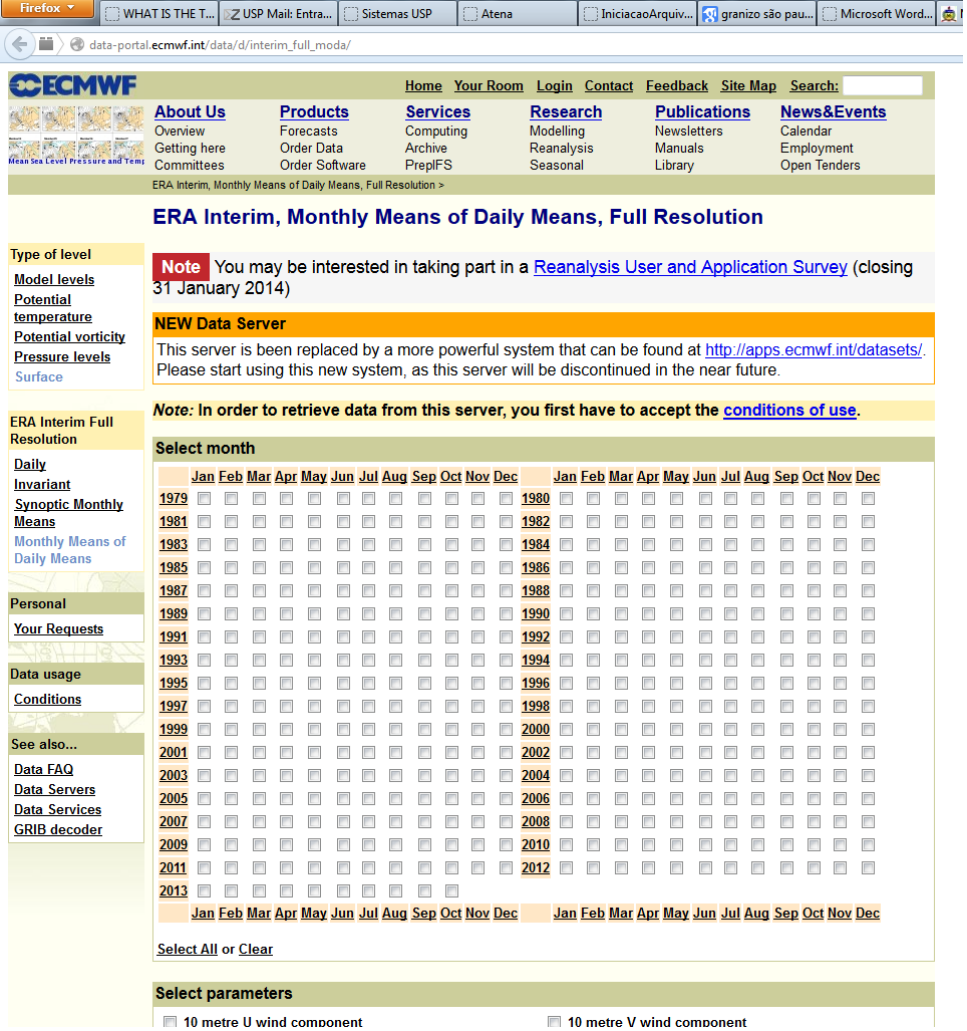

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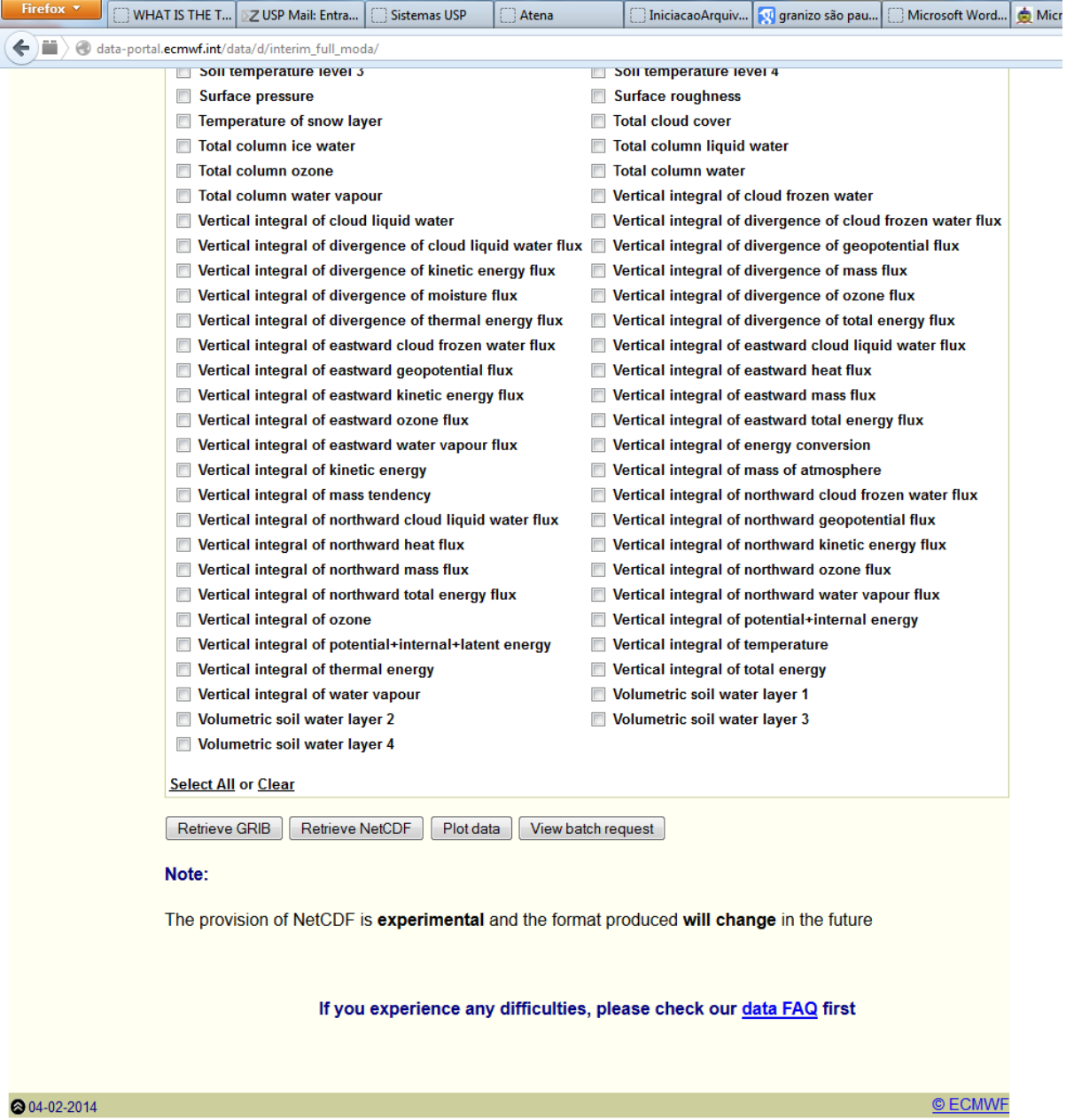

Retrieve NetCDF

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data-portal.ecmwf.int/data/d/edit/personal/temporary/netcdf10/

ECMWF

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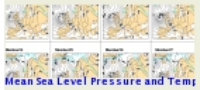

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Personal > Temporary items > netcdf10>

netcdf10

ERA Interim, Monthly means of Daily means

Type: Analysis

Type of level: Surface

Month: 201101, 201107

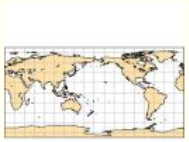
Parameter: 10 metre U wind component, 10 metre V wind component, 2 metre temperature, Mean sea level pressure, Sea surface temperature

Please note:

The default area is global and the default representation is on gaussian grids for surface fields and spherical harmonics or gaussian grids for upper air fields. You can interpolate the data to a lat/lon grid or choose a sub-area by clicking on the icons below. Note that to be able to select a sub-area, you also need to choose a lat/lon grid, otherwise the retrieval will fail.

The netcdf will be done using the following attributes:

Area: Grid:



Default (as archived) *Default (as archived)*

Retrieve and convert to NetCDF:

Now

04-02-2014

Now

Firefox | WHAT IS THE T... | USP Mail: Entra... | Sistemas USP | Atena | IniciacaoArquiv... | granizo são pau... | Microsoft Word... | Microsoft Word... | aula1 [Modo de... | Index of /www/...

data-portal.ecmwf.int/data/d/inspect/personal/results/netcdf10%2C Tue Feb 4 19%3A37%3A19 2014/

ECMWF

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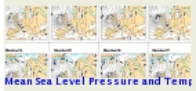

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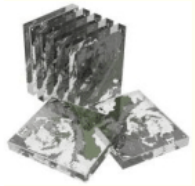
Committees	Order Software	PrepIFS	Seasonal	Library	Open Tenders

Personal > Results of your tasks > netcdf10, Tue Feb 4 19:37:19 2014>

netcdf10, Tue Feb 4 19:37:19 2014



Surface 201101, 201107 interim_full_moda Monthly means of Daily means ERA Interim Analysis ..., 10 metre U wind component, Mean sea level pressure

Task complete

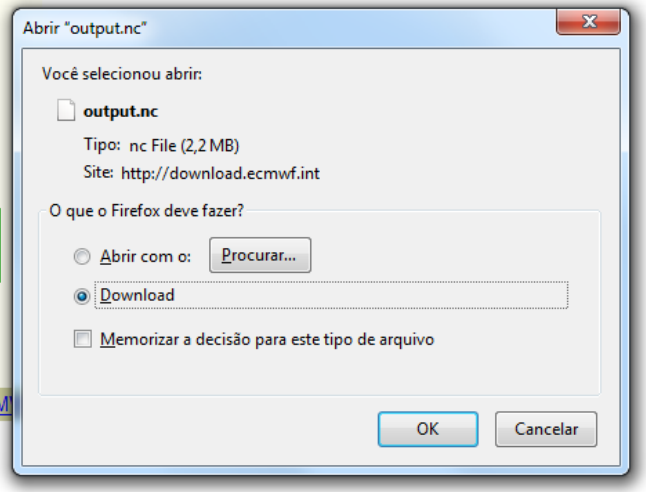
10 fields retrieved

	Name	Size	Created	
	nc	2.2 Mbytes	Tue Feb 4 19:37:24 2014	
	grib	2.1 Mbytes	Tue Feb 4 19:37:24 2014	

Please note:

Thank you for downloading ECMWF data

04-02-2014 © ECM

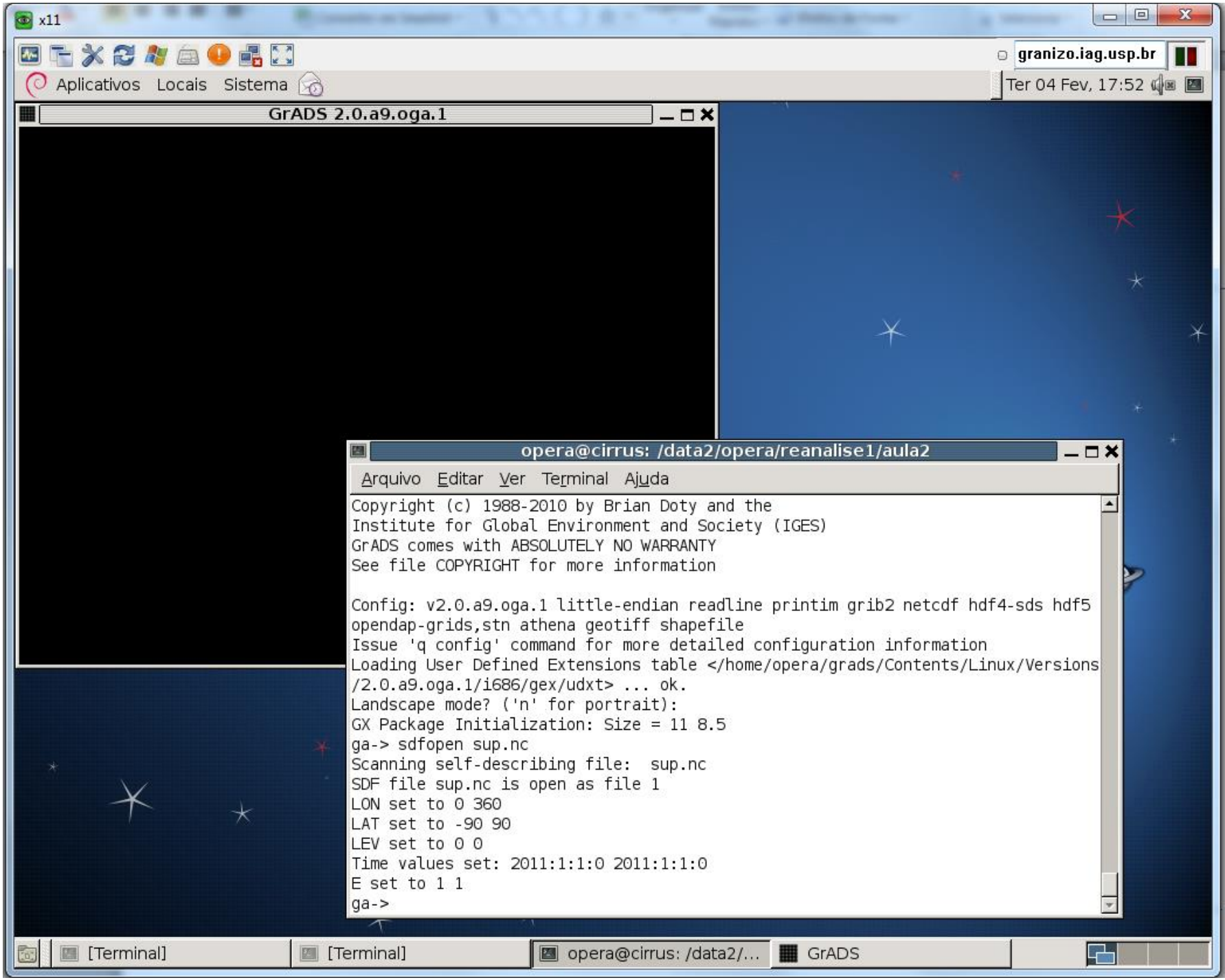


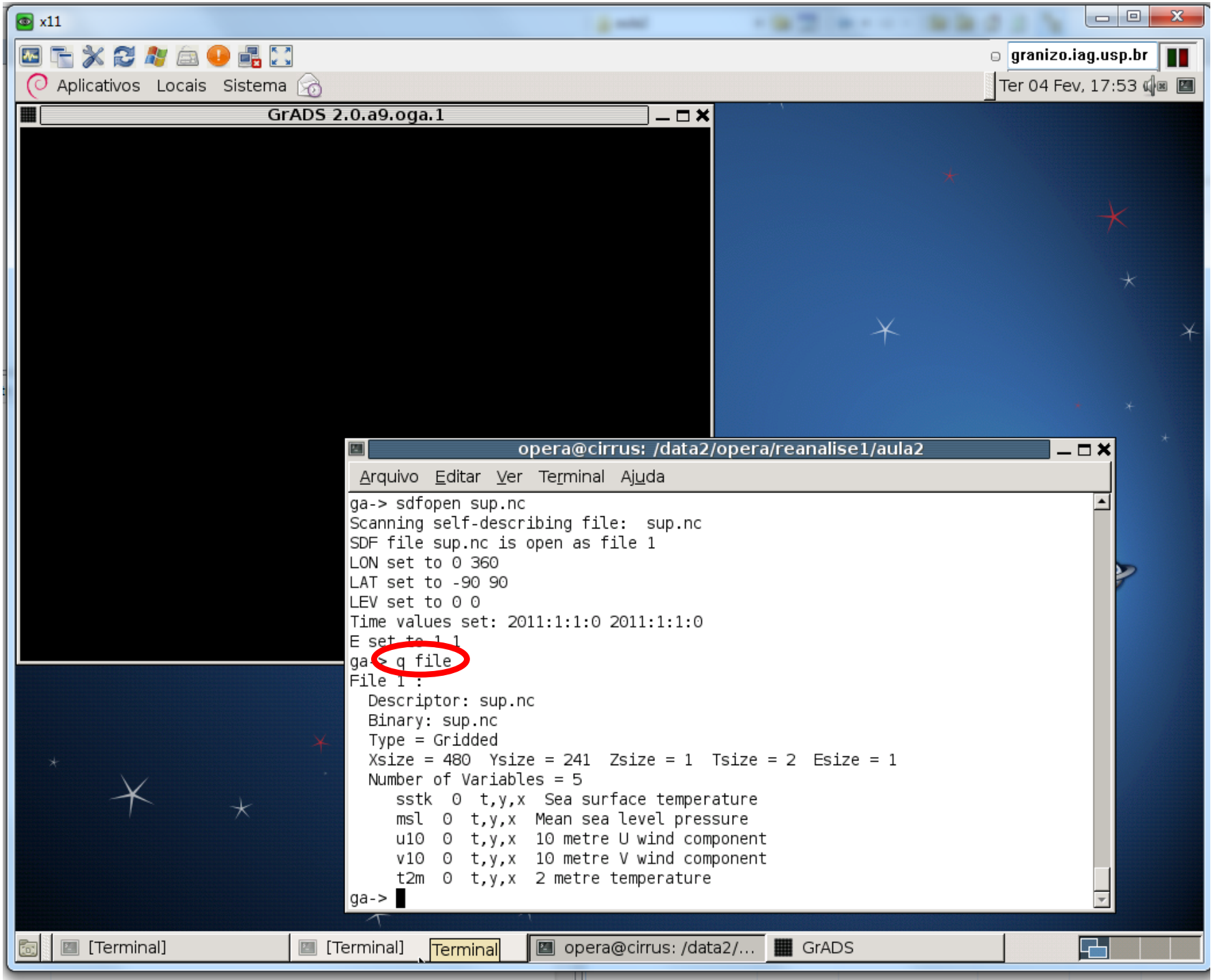
Copiar do diretório Downloads para o seu diretório

- cd Dowloads/
- mv output.nc /home/curso1/seunome
- cd /home/curso1/seunome
- mv output.nc sup.nc

Grads

- grads
- enter
- sdfopen sup.nc


x11
granizo.iag.usp.br
Aplicativos Locais Sistema
Ter 04 Fev, 17:52
GrADS 2.0.a9.oga.1
opera@cirrus: /data2/opera/reanalise1/aula2
Arquivo Editar Ver Terminal Ajuda
Copyright (c) 1988-2010 by Brian Doty and the
Institute for Global Environment and Society (IGES)
GrADS comes with ABSOLUTELY NO WARRANTY
See file COPYRIGHT for more information
Config: v2.0.a9.oga.1 little-endian readline printim grib2 netcdf hdf4-sds hdf5
opendap-grids,stn athena geotiff shapefile
Issue 'q config' command for more detailed configuration information
Loading User Defined Extensions table </home/opera/grads/Contents/Linux/Versions
/2.0.a9.oga.1/i686/gex/udxt> ... ok.
Landscape mode? ('n' for portrait):
GX Package Initialization: Size = 11 8.5
ga-> sdfopen sup.nc
Scanning self-describing file: sup.nc
SDF file sup.nc is open as file 1
LON set to 0 360
LAT set to -90 90
LEV set to 0 0
Time values set: 2011:1:1:0 2011:1:1:0
E set to 1 1
ga->
[Terminal]
[Terminal]
opera@cirrus: /data2/...
GrADS

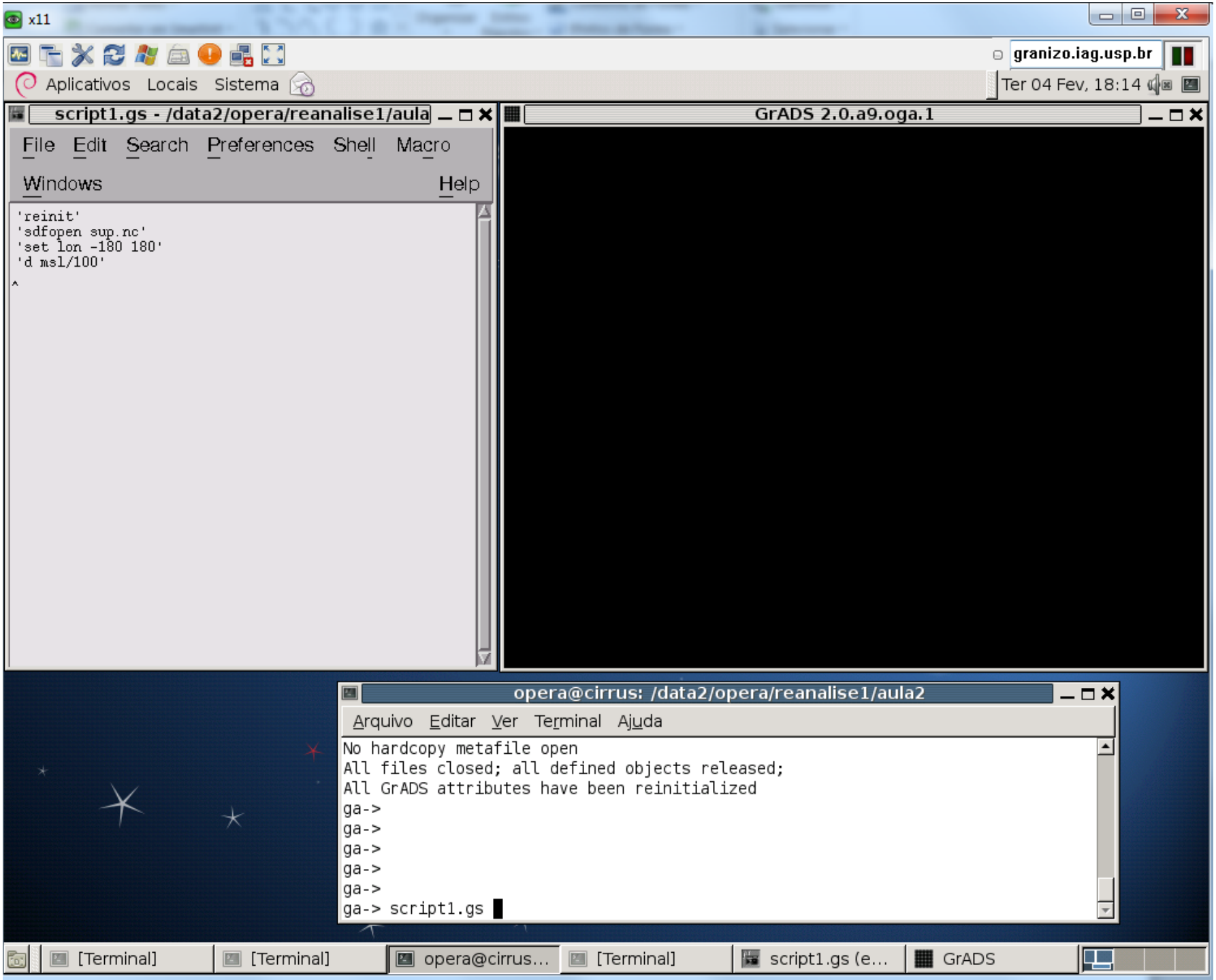

x11
granizo.iag.usp.br
Aplicativos Locais Sistema
Ter 04 Fev, 17:53
GrADS 2.0.a9.oga.1
opera@cirrus: /data2/opera/reanalise1/aula2
Arquivo Editar Ver Terminal Ajuda
ga-> sdfopen sup.nc
Scanning self-describing file: sup.nc
SDF file sup.nc is open as file 1
LON set to 0 360
LAT set to -90 90
LEV set to 0 0
Time values set: 2011:1:1:0 2011:1:1:0
E set to 1 1
ga-> q file
File 1 :
Descriptor: sup.nc
Binary: sup.nc
Type = Gridded
Xsize = 480 Ysize = 241 Zsize = 1 Tsize = 2 Esize = 1
Number of Variables = 5
sstk 0 t,y,x Sea surface temperature
msl 0 t,y,x Mean sea level pressure
u10 0 t,y,x 10 metre U wind component
v10 0 t,y,x 10 metre V wind component
t2m 0 t,y,x 2 metre temperature
ga->
[Terminal]
[Terminal]
Terminal
opera@cirrus: /data2/...
GrADS

Grads

- d msl (d = display = mostrar)
- c (clear = limpar)
- set lon -180 180 (deixar long 0 no meio)
- d msl
- d u10;v10
- d t2m
- set t 2 (t 1 = janeiro/2011; t 2 = julho/2011)

Script do grads

- Abrir um outro terminal de comandos
- nedit nomedoarquivo.gs -> abre o arquivo “nome do arquivo.gs” em um editor de texto
- & -> no final do comando, deixa disponível o prompt de comando
- Dentro do editor de texto: colocar os mesmos comandos do grads, mas entre apóstrofes, por exemplo:
- ‘sdfopen sup.nc’
- ‘set lon -180 180’
- ‘d msl/100’


x11
granizo.iag.usp.br
Aplicativos Locais Sistema
Ter 04 Fev, 18:14
script1.gs - /data2/opera/reanalise1/aula
File Edit Search Preferences Shell Macro
Windows Help
'reinit'
'sdfopen sup.nc'
'set lon -180 180'
'd msl/100'
^
GrADS 2.0.a9.oga.1
opera@cirrus: /data2/opera/reanalise1/aula2
Arquivo Editar Ver Terminal Ajuda
No hardcopy metafile open
All files closed; all defined objects released;
All GrADS attributes have been reinitialized
ga->
ga->
ga->
ga->
ga->
ga-> script1.gs
[Terminal]
[Terminal]
opera@cirrus...
[Terminal]
script1.gs (e...
GrADS

Manipulando as dimensões: comando set

- O comando **set** especifica "quando" "onde" e "como" as variáveis serão plotadas:

- Quando → **ga> set t 1**
- Onde → **ga> set lat -100 20**
- Como → **ga> set gxout shaded**

Tipos de **set**:

ga> set lat valorLAT1 valorLAT2
ga> set lon valorLON1 valorLON2
ga> set lev valorLEV1 valorLEV2
ga> set time valorT1 valorT2

Lembrando:
-90°<LAT<90°
-180°<LON<180°

Aula preparada por Thiago Degola, disponível em http://www.dca.iag.usp.br/www/material/ritaynoue/aca-0422/2013/grads/aula1.pdf

Tipos de gráficos

- Existem diversas opções de gráficos. Se o usuário não especificar, o default será line (2D) e contour (3D). O comando de opções é:

ga> set gxout tipo_de_gráfico

Exercício para casa: plote os tipos_de_gráficos a baixo:

ga> set gxout contour
ga> set gxout grfill
ga> set gxout shaded
ga> set gxout vector
ga> set gxout stream
ga> set gxout barb
ga> set gxout line

- **ga> set ylopts <cor> <espessura> <tamanho>**

Comando: define

- O comando **define** permite a criação de novas variáveis, conforme a sintaxe:

ga> define nome-da-variavel = expressão

Exemplo:

```
ga> define temp=t-273.15
ga> d temp
```

Não é necessário escrever toda hora t-273.15

Exercício 1

- Mostre a pressão reduzida ao nível médio do mar (em hPa) com intervalos de 4hPa e o vento horizontal em janeiro de 2011 para a região compreendida entre
  - Latitudes: 90oS e 0o
  - Longitudes: 90oW e 20oE

Exercício 2

- Mostre a temperatura (em oC) com intervalos de 5oC e as linhas de corrente (na cor branca se o fundo for preto ou na cor preta se o fundo for branco) em julho de 2011 para a região compreendida entre
  - Latitudes: 40oN e 40oS
  - Longitudes: 20oE e 150oE

Exercício 3

- Calcule a diferença da temperatura (em oC) entre janeiro e julho de 2011 para todo o domínio

Coordenadas esféricas

- Leia o texto:
- http://www.met.wau.nl/education/atd/Practical../unit%202/Coord.html

- E a explicação do comando cdiff do Grads:
- http://www.met.wau.nl/education/atd/Practical../gadoc/gradfunccdiff.html

Exercício 4

- Calcular o gradiente de temperatura
- Calcular a advecção de temperatura
- Plotar:
  - Advecção de temperatura (shaded)
  - Temperatura (contour)
  - Vento (vetor)

Exercício 5

- Calcular o gradiente de pressão horizontal
- Calcular o vento geostrófico utilizando a definição:

$$f \cdot v = \frac{1}{\rho}\frac{\partial P}{\partial x}$$

$$f \cdot u = -\frac{1}{\rho}\frac{\partial P}{\partial y}$$

- Suponha densidade = 1 kg.m-3
- Plote o vento geostrófico, o vento e a pressão reduzida ao nível médio do mar.