WRF Domain Wizard

A GUI for the WRF Preprocessing System

WRF Portal

A GUI for running WRF

Presented by Jeff Smith

Developed by: Mark Govett, Paula McCaslin, Craig Mattocks, Jeff Smith

July 17, 2009

NOAA's Earth System Research Lab in Boulder, CO

What is WRF Domain Wizard?

- The graphical user interface for WPS
- Used to
  - Define the region and projection of a domain on map
  - Define any nests
  - Write information to namelist.wps
  - Write information to namelist.input
  - Run the WPS programs
  - Visualize the netCDF output files
- Version 1.41 released on July 8, 2009

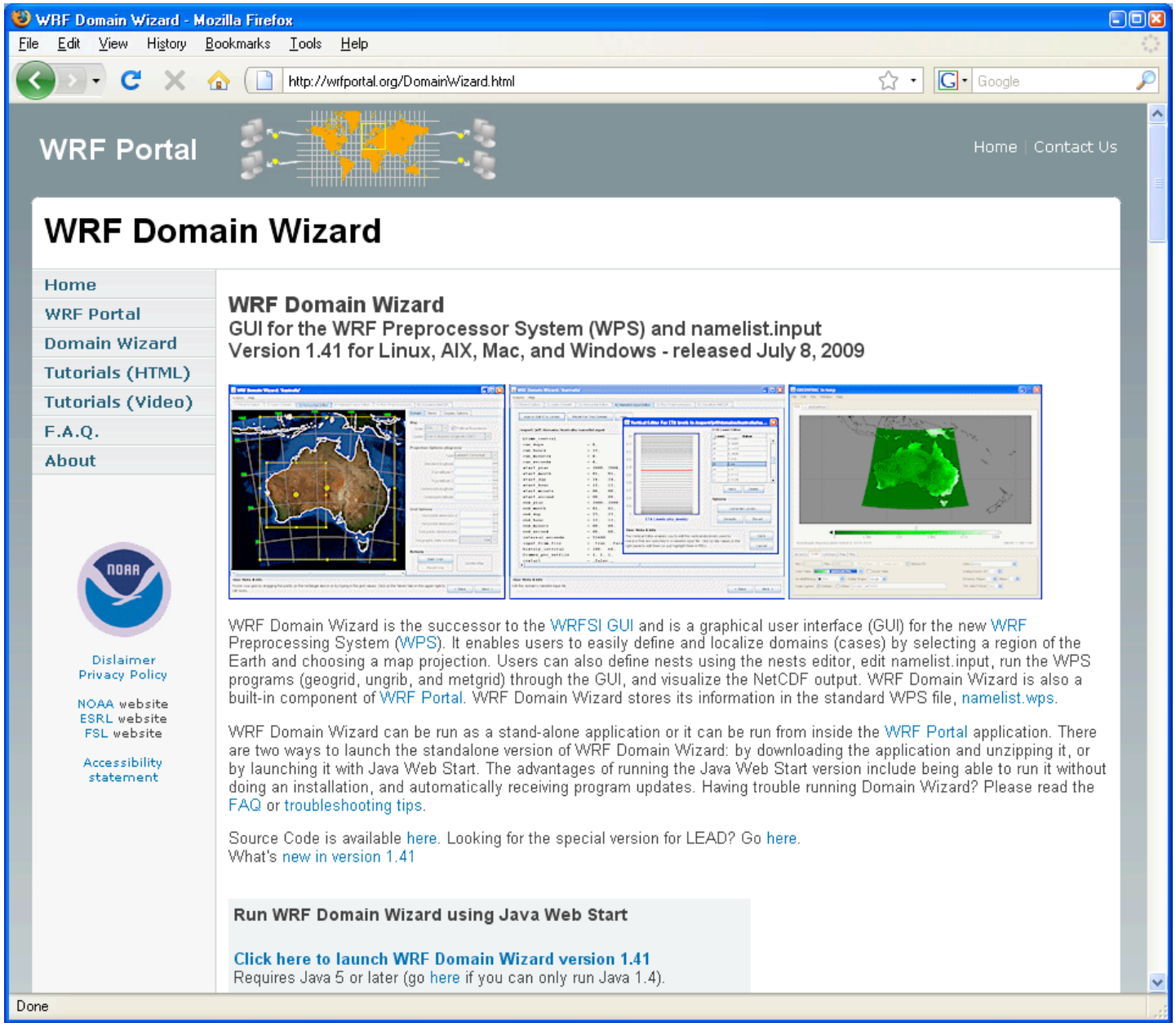
WRF Domain Wizard Technical Info -1

- Software is written in Java
  - Minimum (Java) JRE 1.5
  - JRE 1.6 recommended for best performance
  - Runs on local computer or remote computer
  - Uses SFTP/SSH-2 to connect to remote computers
  - Can be run “locally” on a remote computer with X display forwarding
  - Can be run from web page as a Java Web Start app or download .zip file and run from the command line
  - 390 MB of RAM (memory) available
  - 1024 x 768 (or better) video display
- Does not include WPS (must download/compile that separately)

WRF Domain Wizard Technical Info -2

- WDW supports
  - WPS/WRF 2.x
  - WPS/WRF 3.x
  - ARW
  - NMM
  - HWRF (Hurricane WRF)
  - Nests
  - Projections
    - Lambert Conformal
    - Polar Stereographic
    - Mercator
    - Lat-Lon Regional (WPS 3.x)
    - Lat-Lon Global (WPS 3.x)
    - Rotated Lat-Lon for NMM

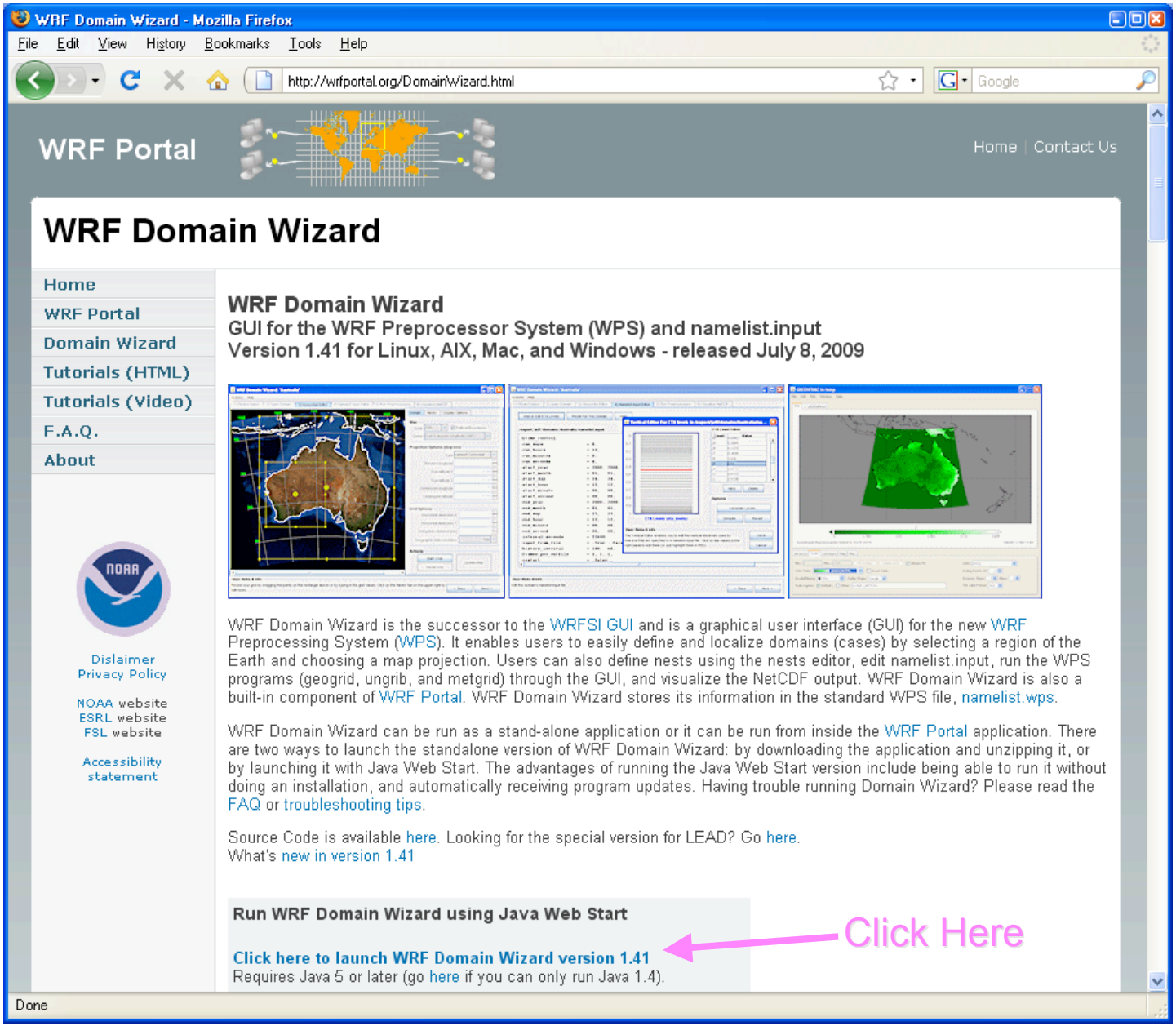
http://www.wrfportal.org/DomainWizard.html



WRF Domain Wizard – How to Run

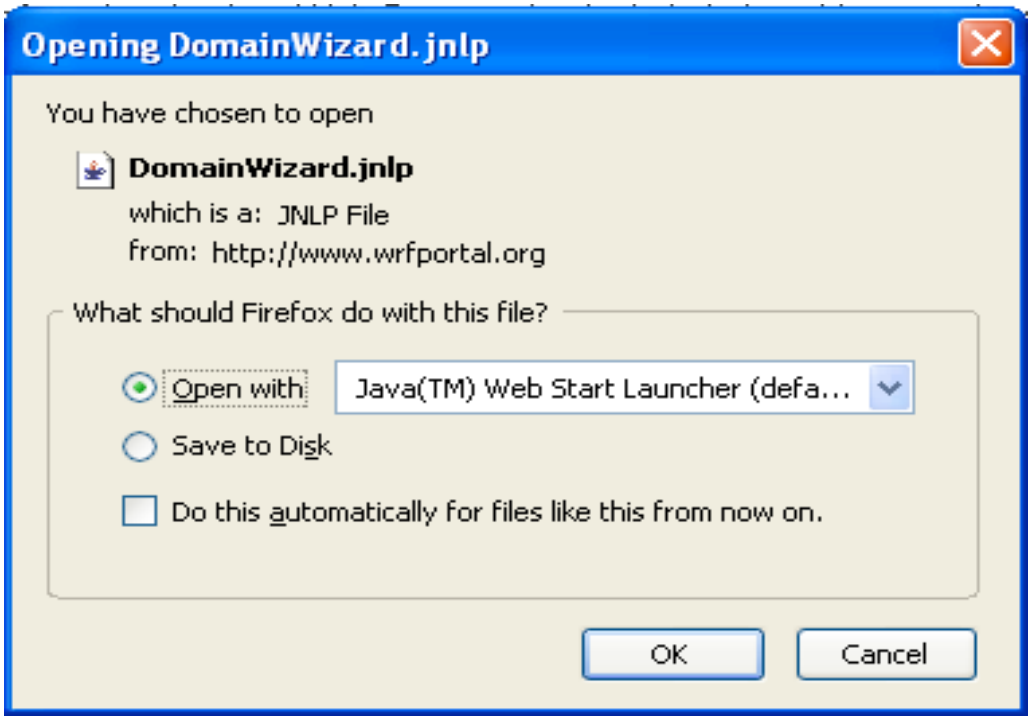
- Run using Java Web Start (JWS)
  - JWS automatically downloads your software then runs it. No need to set up directories, run installation programs, or configure anything. Just click the link and the program runs.
    - The first time you click on the link, there is a delay while the software downloads
    - When you click the link in the future, if the software has been updated, you automatically received the updated portion
  - Java and Java Web Start (javaws) come standard with Linux and Mac. If you don't have Java on your system, download a Java Runtime Edition (JRE) from Sun

WRF Domain Wizard – How to Run



WRF Domain Wizard – How to Run

- Run using Java Web Start



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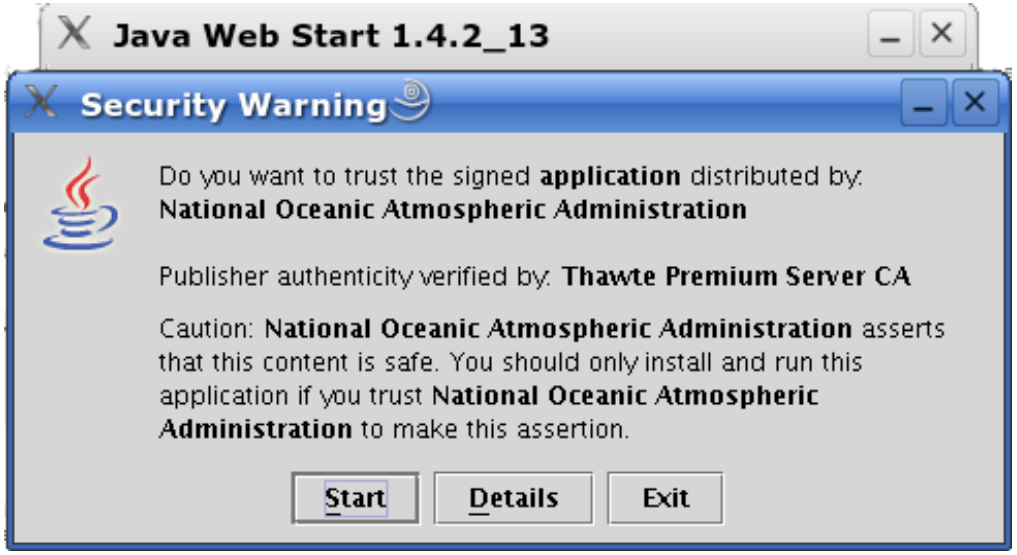
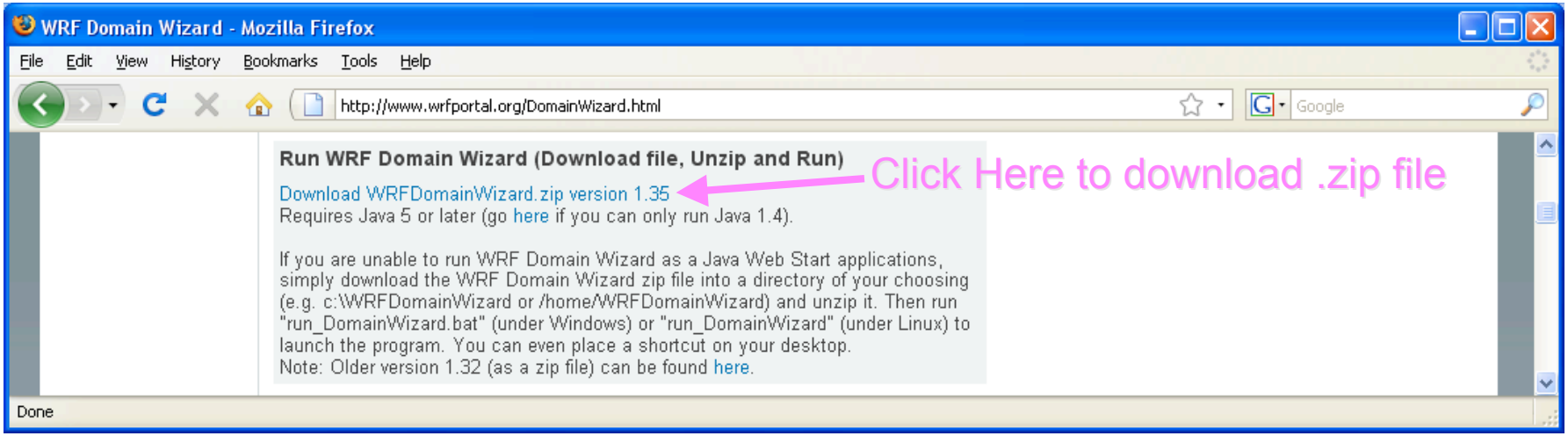


Trust us, we're the United States Government.

WRF Domain Wizard – How to Run (from Zip)



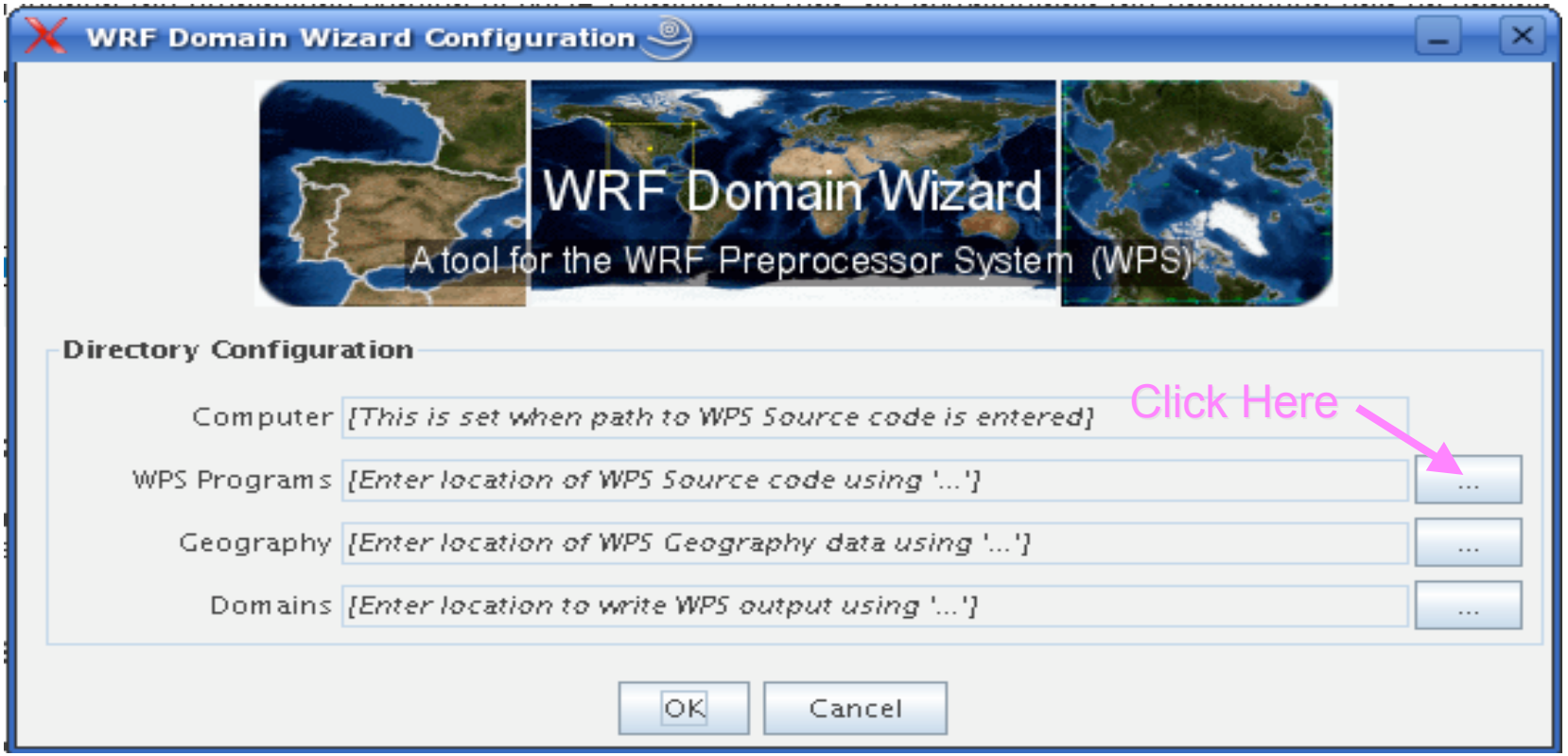
- Download zip file from web link and run
  - Download the **WRFDomainWizard.zip** to e.g. c:\WRFDomainWizard or /home/WRFDomainWizard
  - unzip **WRFDomainWizard.zip**
  - Run "run_DomainWizard.bat" (Windows) or "run_DomainWizard" (Linux)

java -Xmx384m -jar DomainWizard.jar

  - You can place a shortcut icon on your desktop

WRF Domain Wizard Configuration Window

- This window pops up when you start WDW

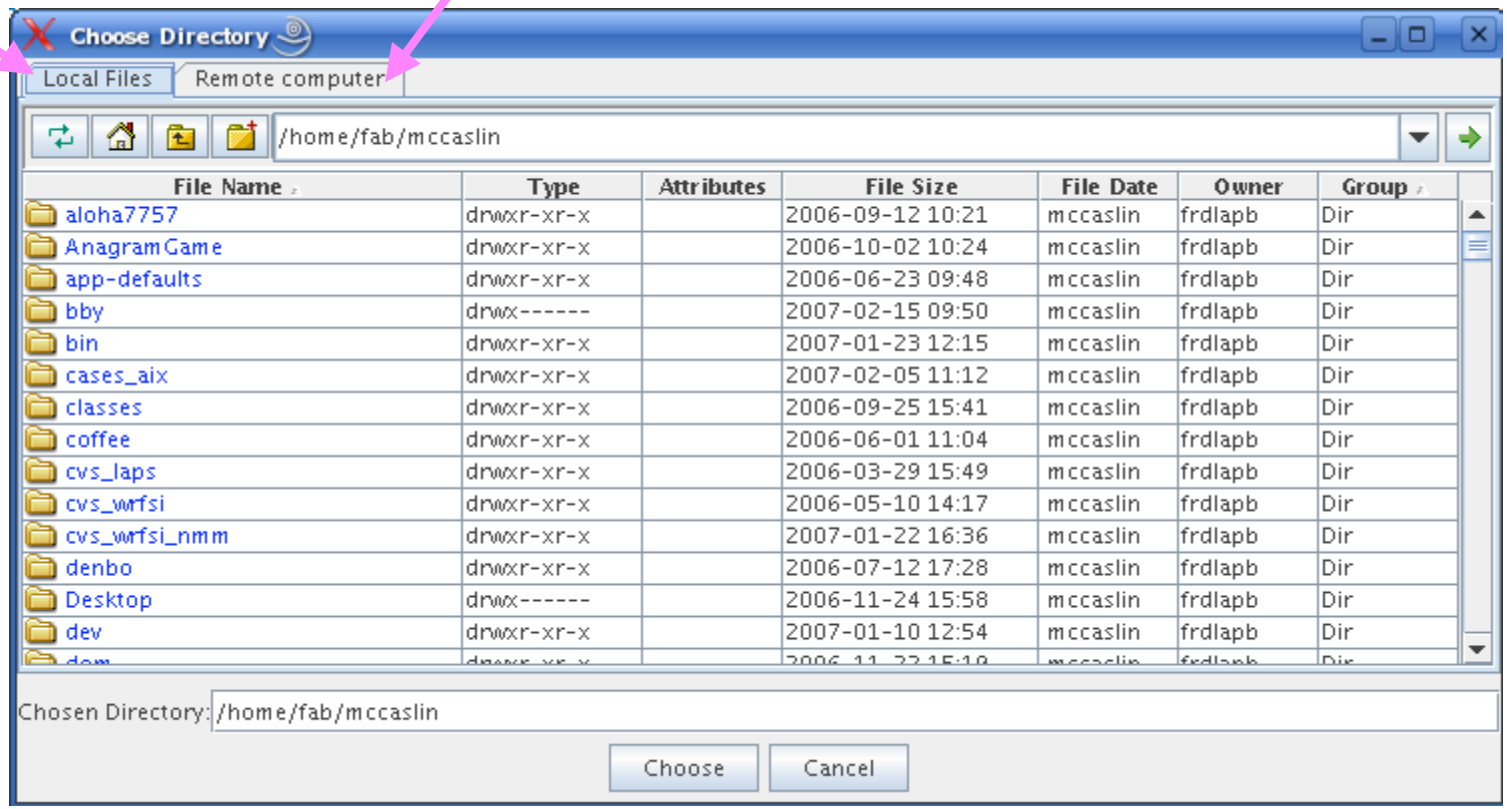


WRF Domain Wizard – How to Run

- Configuration Directory Chooser
  - Choose the computer and dir that WPS is installed on

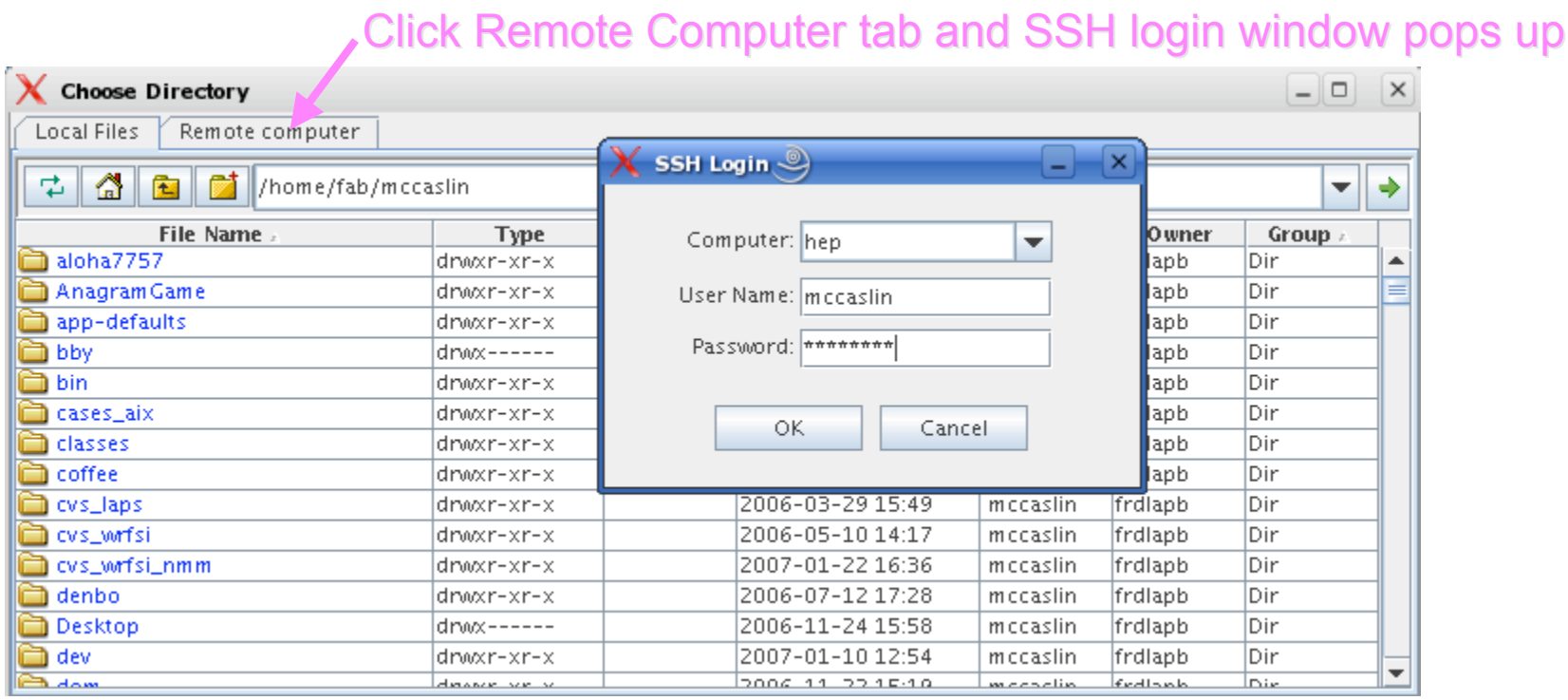
Local Computer

Remote Computer



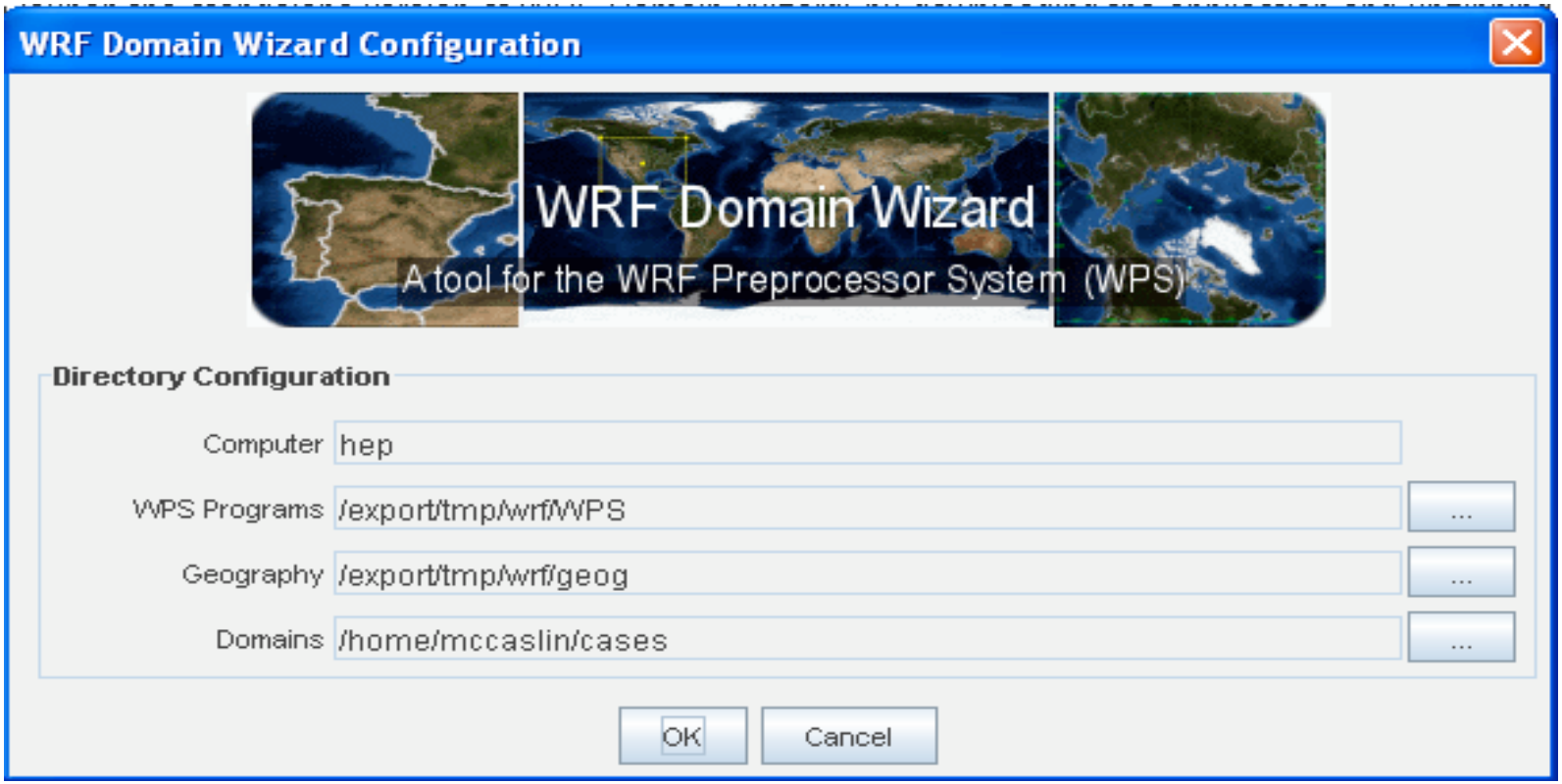
WRF Domain Wizard – How to Run

- Configuration selecting remote system



WRF Domain Wizard – How to Run

- Configuration complete



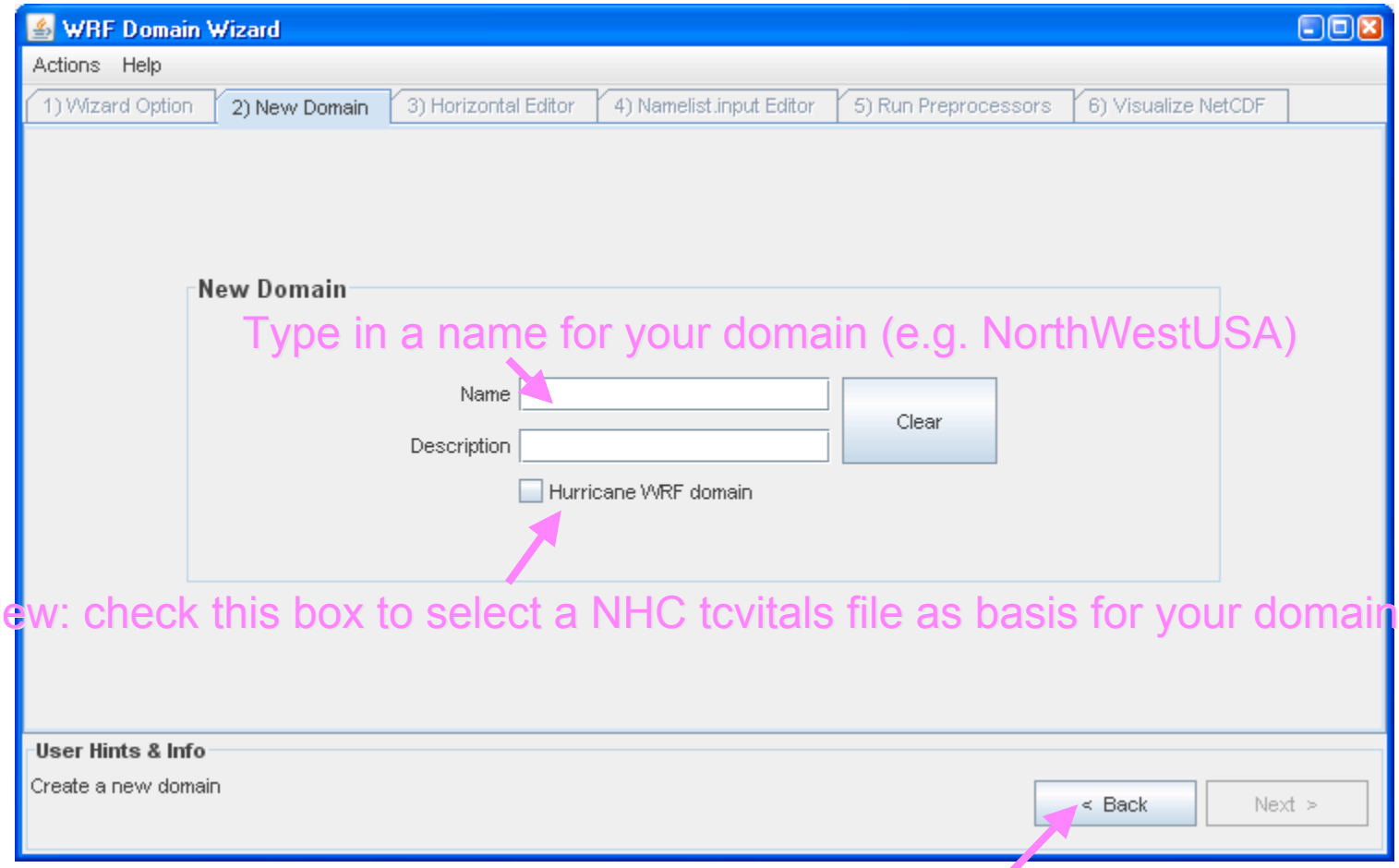
WRF Domain Wizard – How to Run

- WDW writes configuration info to DomainWizard.cfg
  - Located in your home directory
  - Sample file:

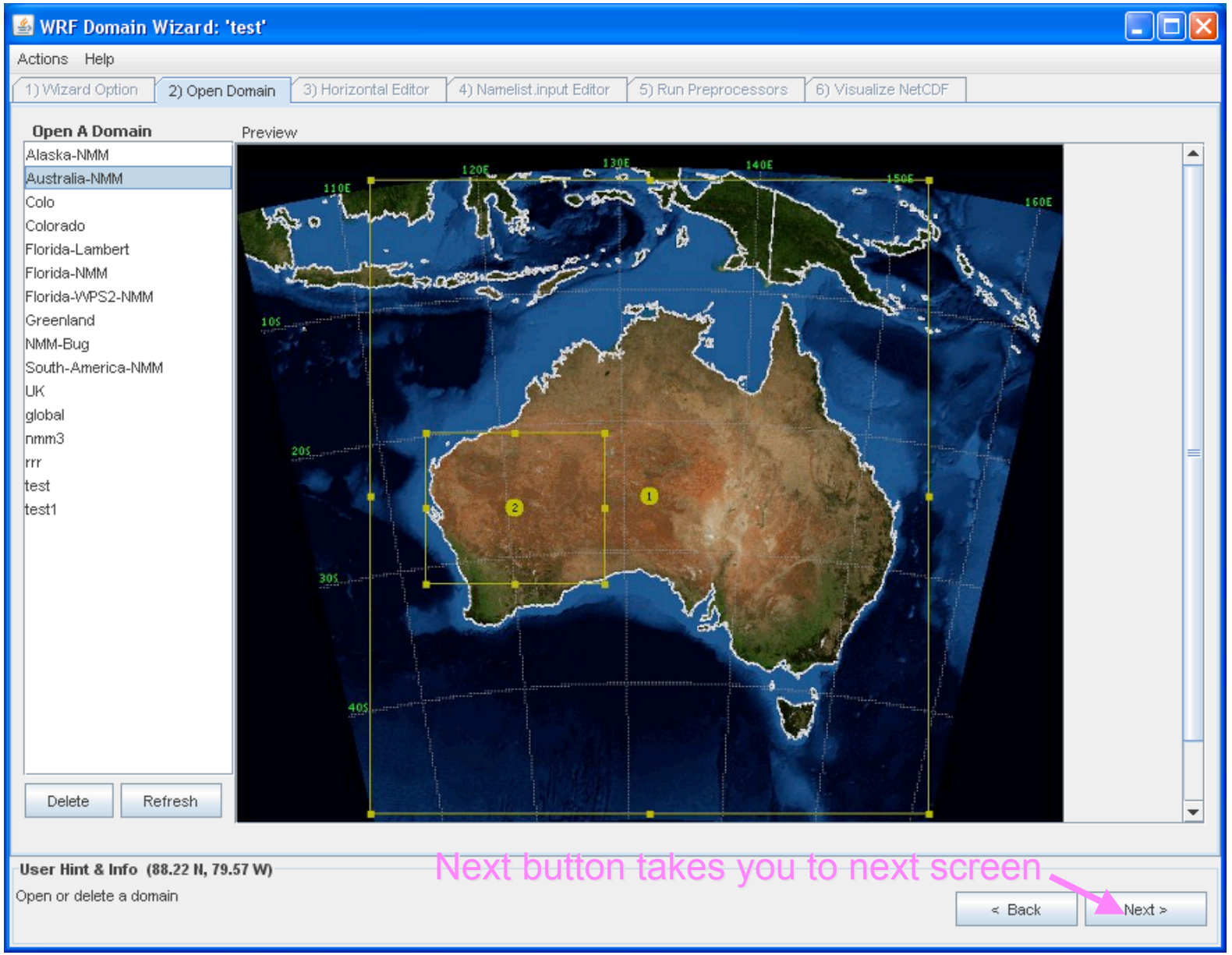
```
hep.fsl.noaa.gov
/export/tmp/wrf/WPS
/export/tmp/wrf/geog
/export/jeff/domains
/data/public/data/grib/ftp/7/0/84/211
```

(last line indicates the last grib files dir you selected)

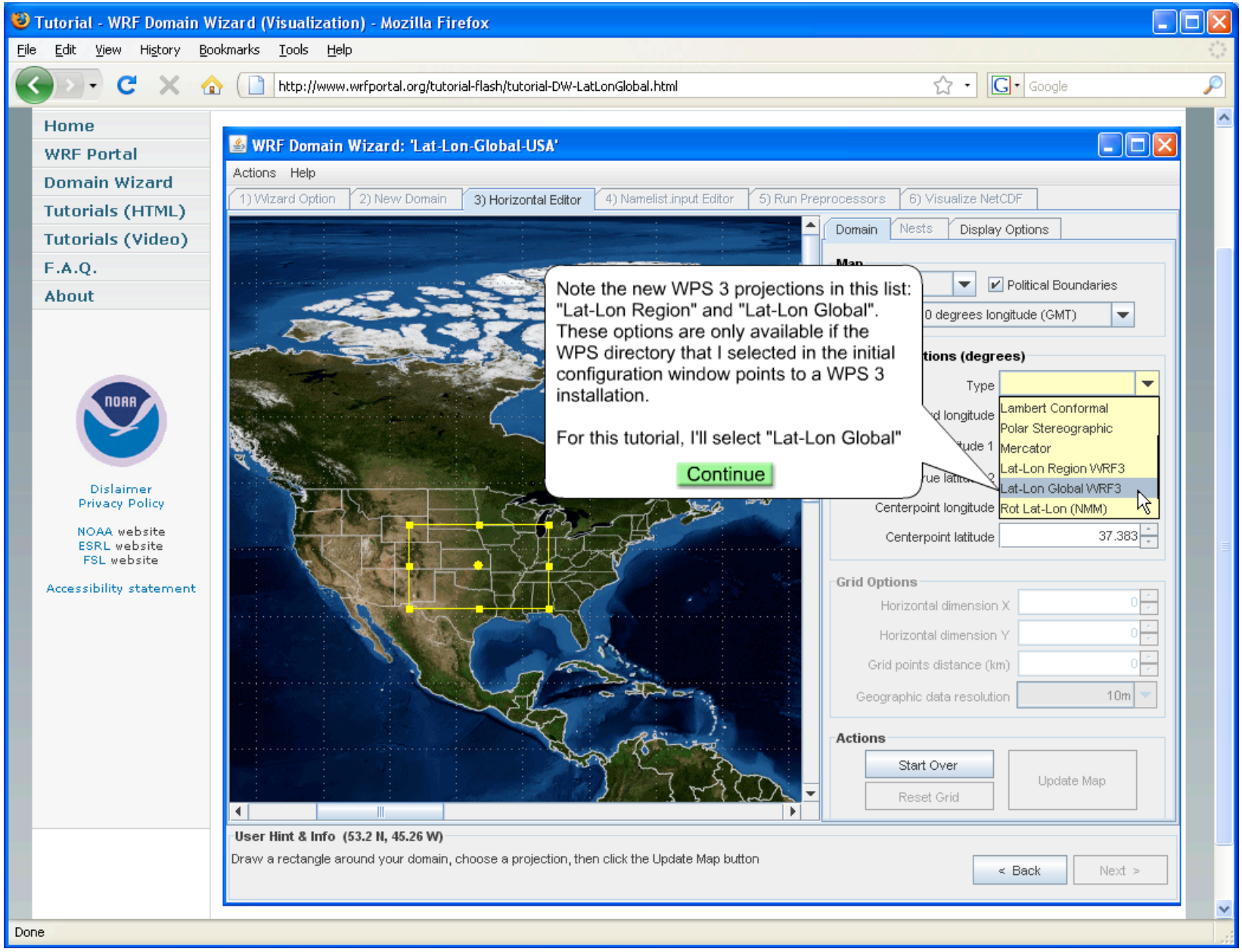
WRF Domain Wizard Tutorial -1



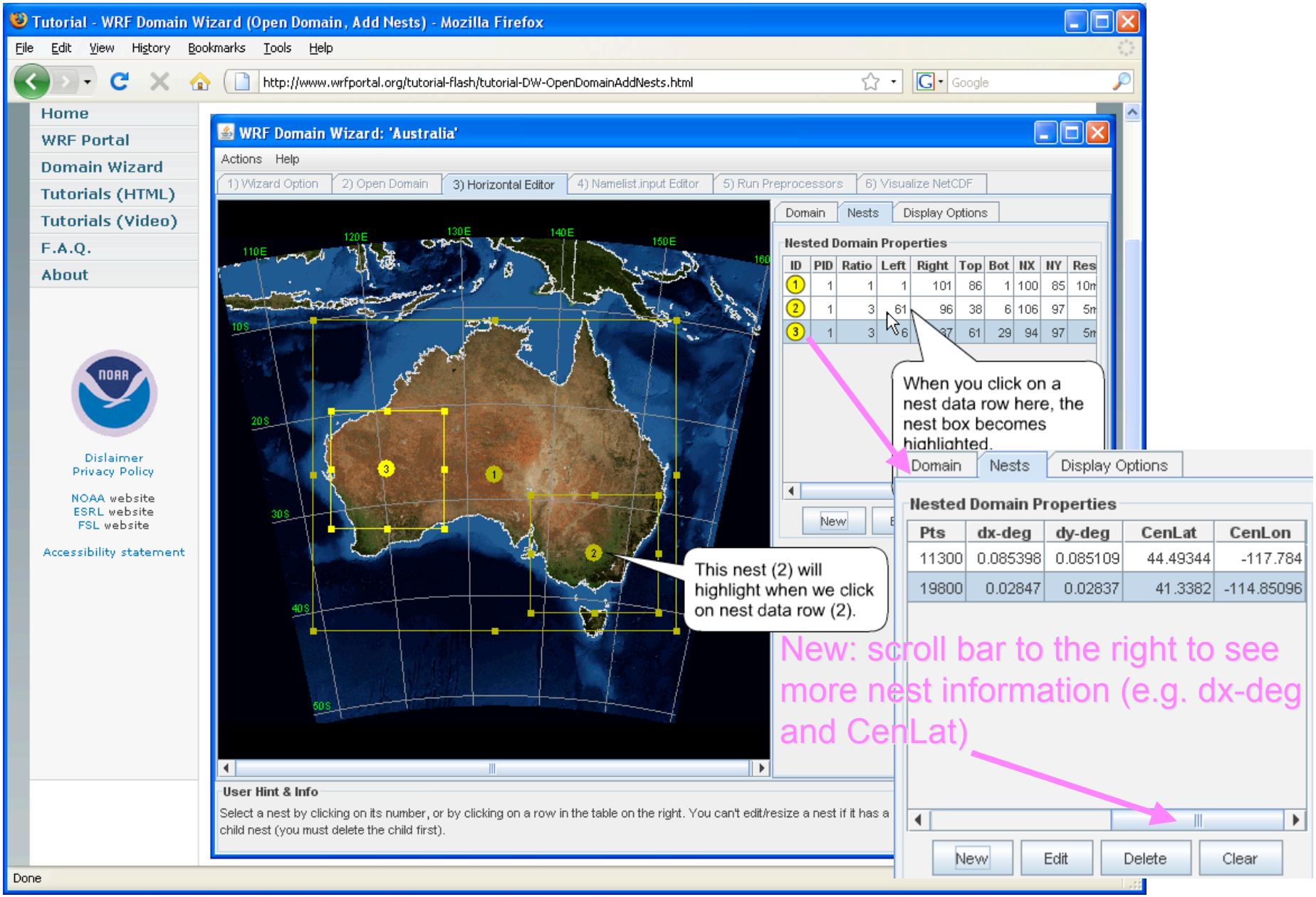
WRF Domain Wizard Tutorial -2



WRF Domain Wizard Tutorial -3



WRF Domain Wizard Tutorial -4

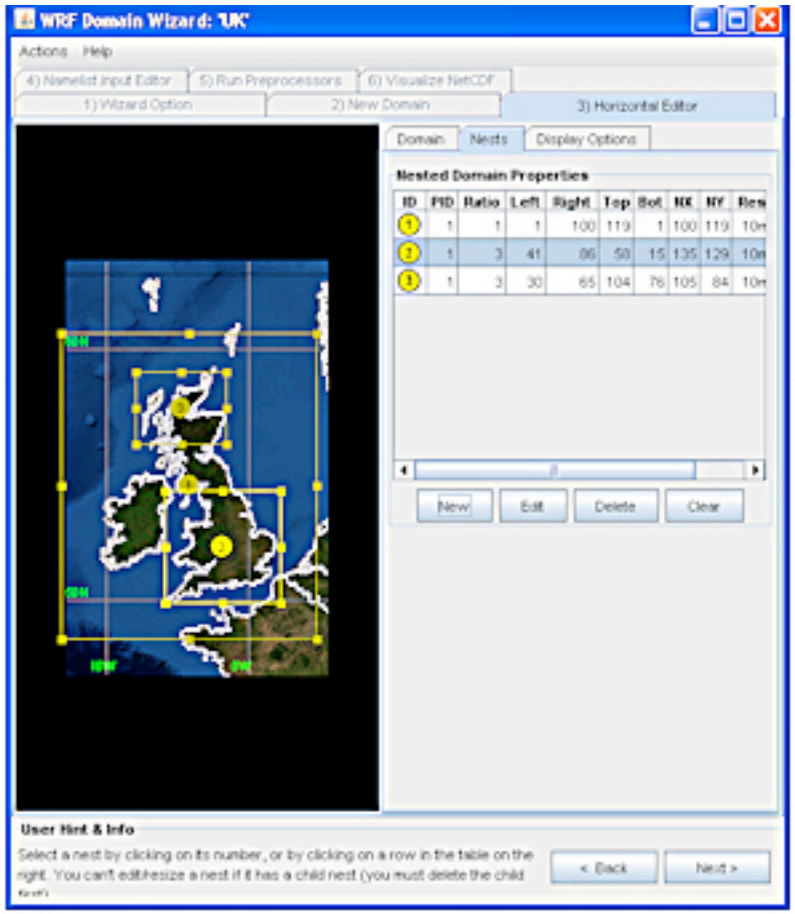


WRF Domain Wizard Tutorial -5

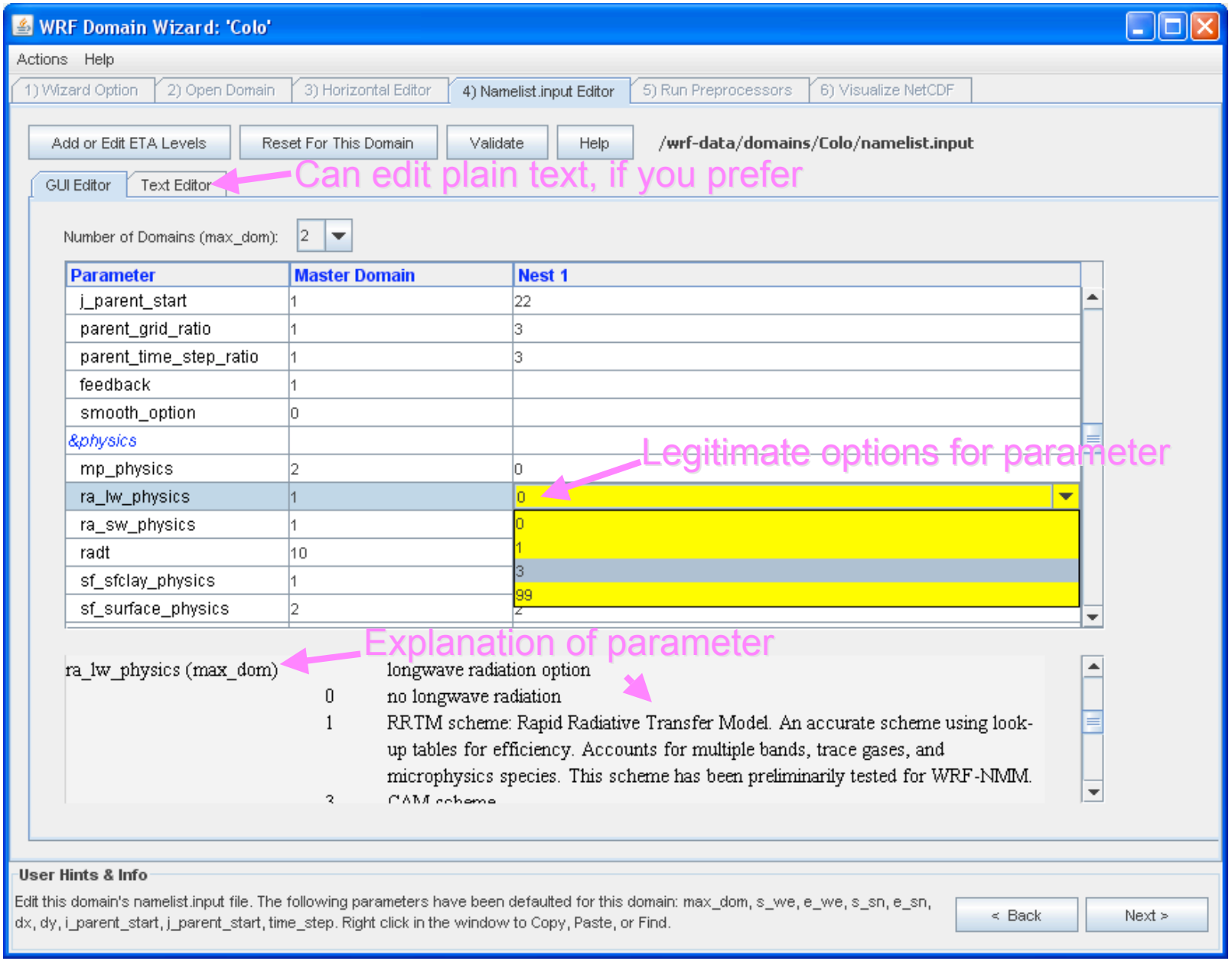
namelist.wps file

```
 interval_seconds = 10800,
 io_form_geogrid = 2,
 opt_output_from_geogrid_path = '/wrf-data/domains/UK/',
 debug_level = 0,
/

&geogrid
 parent_id         = 1,1,1,
 parent_grid_ratio = 1,3,3,
 i_parent_start    = 1,41,30,
 j_parent_start    = 1,15,76,
 e_we              = 100,136,106,
 e_sn              = 119,130,85,
 geog_data_res = '10m','10m','10m',
 dx = 11400,
 dy = 11400,
 map_proj =  'mercator',
 ref_lat   = 54.804,
 ref_lon   = -4.195,
 truelat1  = 54.804,
 truelat2  = 0,
 stand_lon = -4.195,
 geog_data_path = '/wrf-data/geog10m',
 opt_geogrid_tbl_path = '/wrf-data/domains/UK/',
 ref_x = 50.0,
 ref_y = 59.5,
/
```



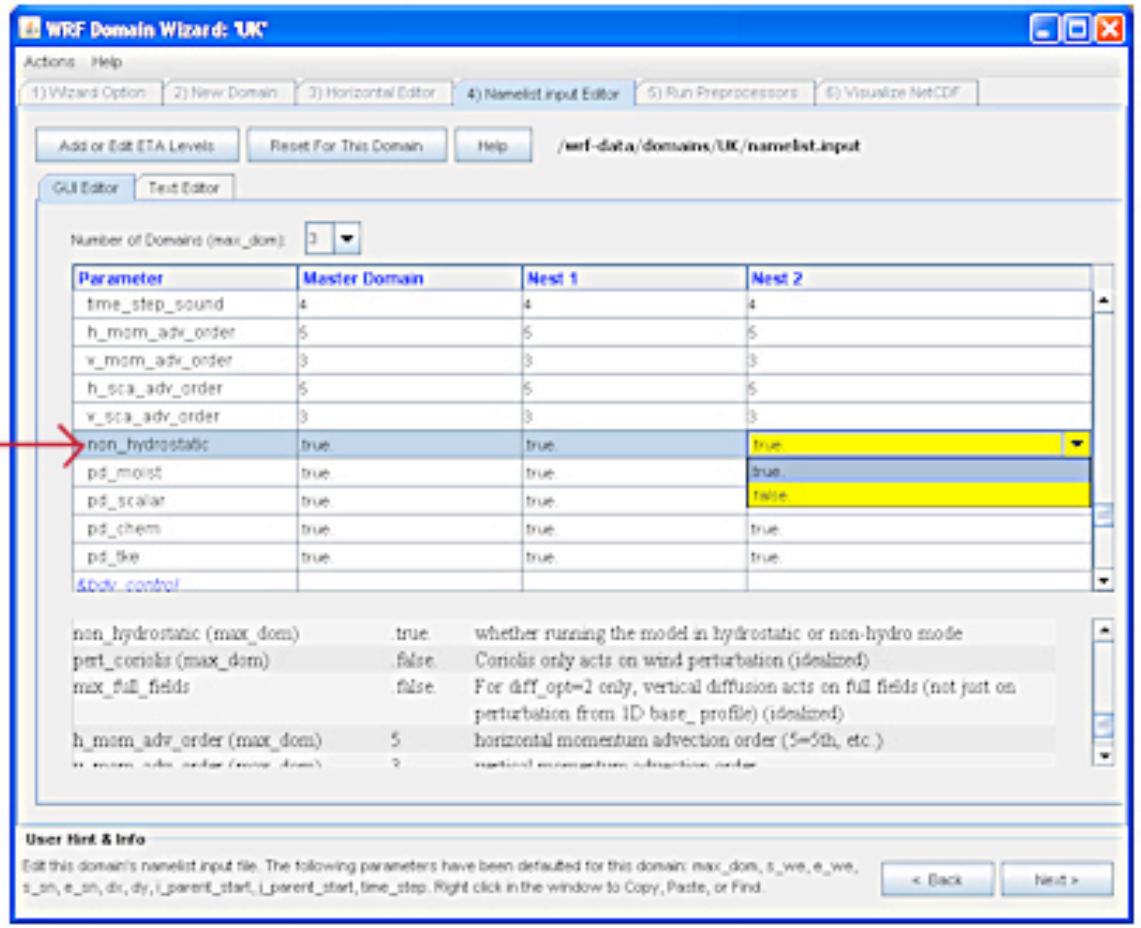
WRF Domain Wizard Tutorial -6



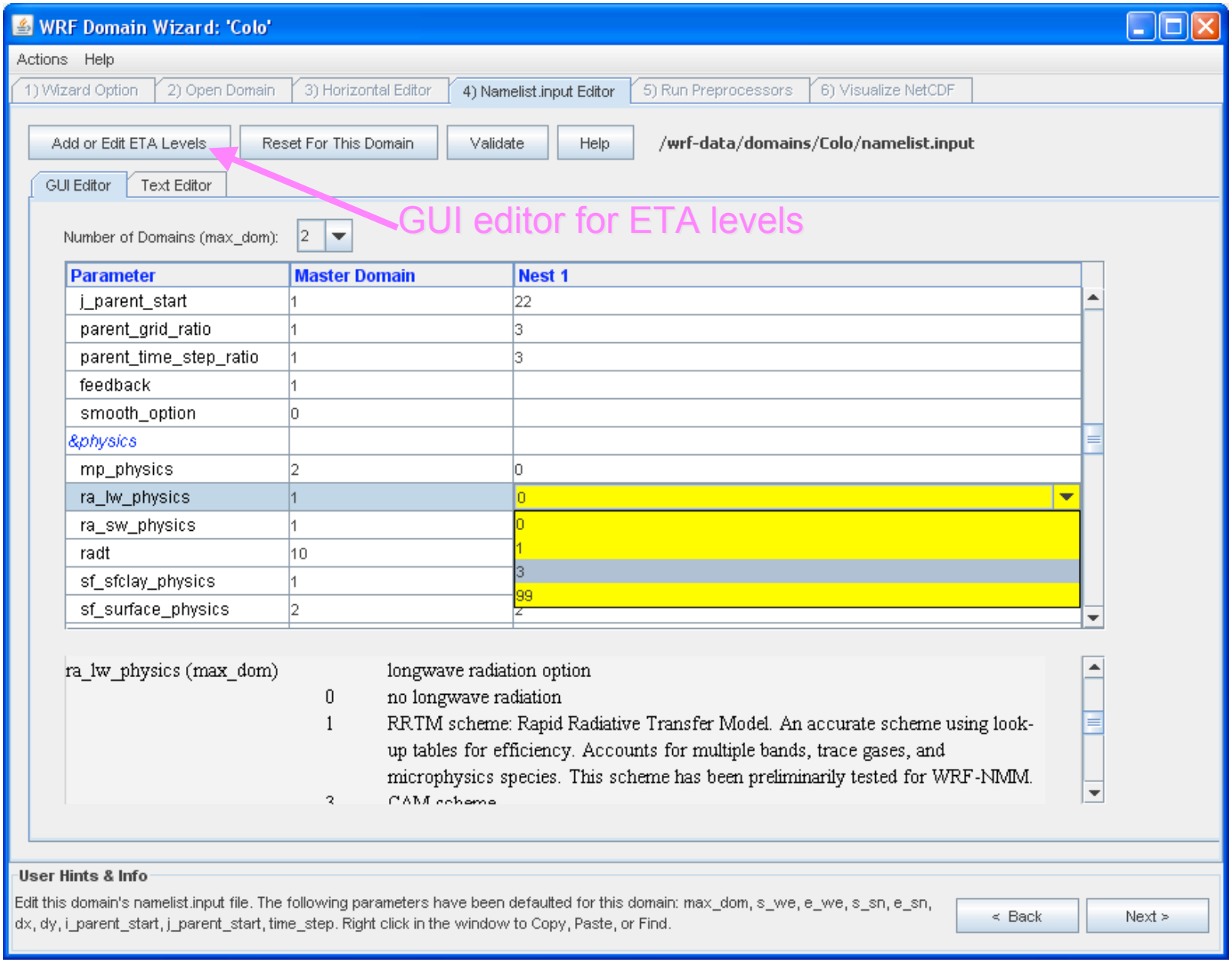
WRF Domain Wizard Tutorial -7

namelist.input file

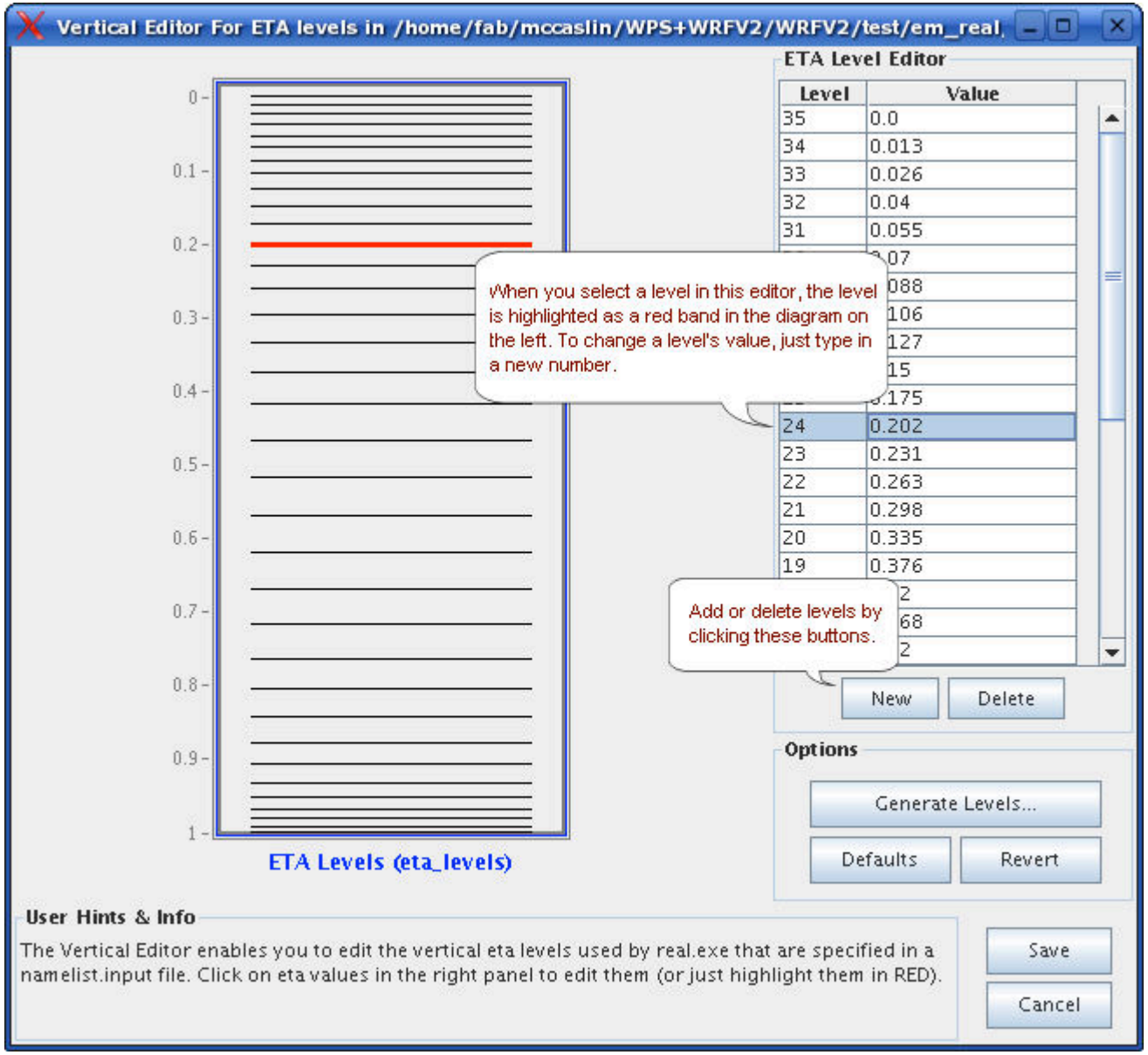
```
&dynamics
w_damping             = 0,
diff_opt              = 1,
km_opt                = 4,
base_temp             = 290.,
damp_opt              = 0,
zdamp                 = 5000.,   5000.,   5000.,
dampcoef              = 0.01,    0.01,    0.01,
khdif                 = 0,       0,       0,
kvdif                 = 0,       0,       0,
smdiv                 = 0.1,     0.1,     0.1,
emdiv                 = 0.01,    0.01,    0.01,
epssm                 = 0.1,     0.1,     0.1,
time_step_sound       = 4,       4,       4,
h_mom_adv_order       = 5,       5,       5,
v_mom_adv_order       = 3,       3,       3,
h_sca_adv_order       = 5,       5,       5,
v_sca_adv_order       = 3,       3,       3,
non_hydrostatic       = .true.,  .true.,  .true.,
pd_moist              = .true.,  .true.,  .true.,
pd_scalar             = .true.,  .true.,  .true.,
pd_chem               = .true.,  .true.,  .true.,
pd_tke                = .true.,  .true.,  .true.,
/
```



WRF Domain Wizard Tutorial -8



WRF Domain Wizard Tutorial -9

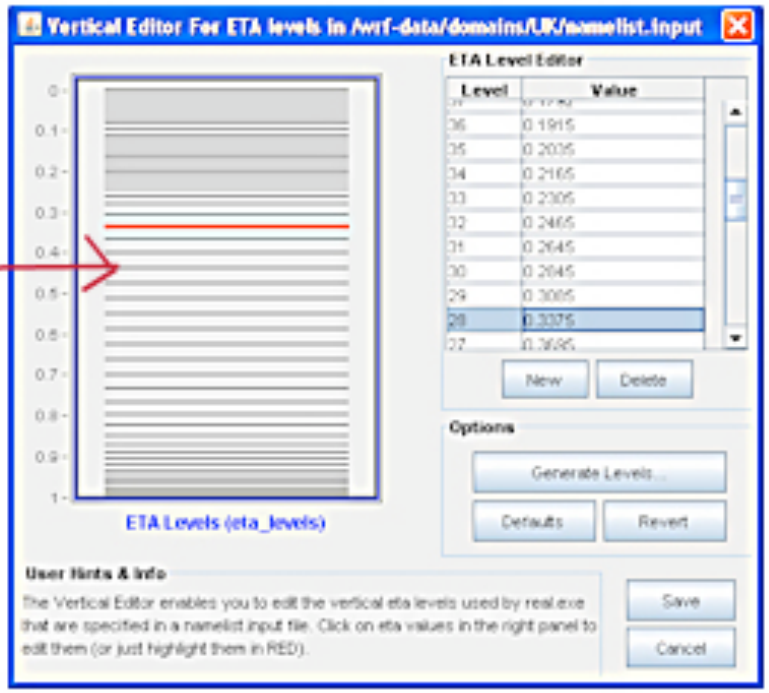


WRF Domain Wizard Tutorial -10

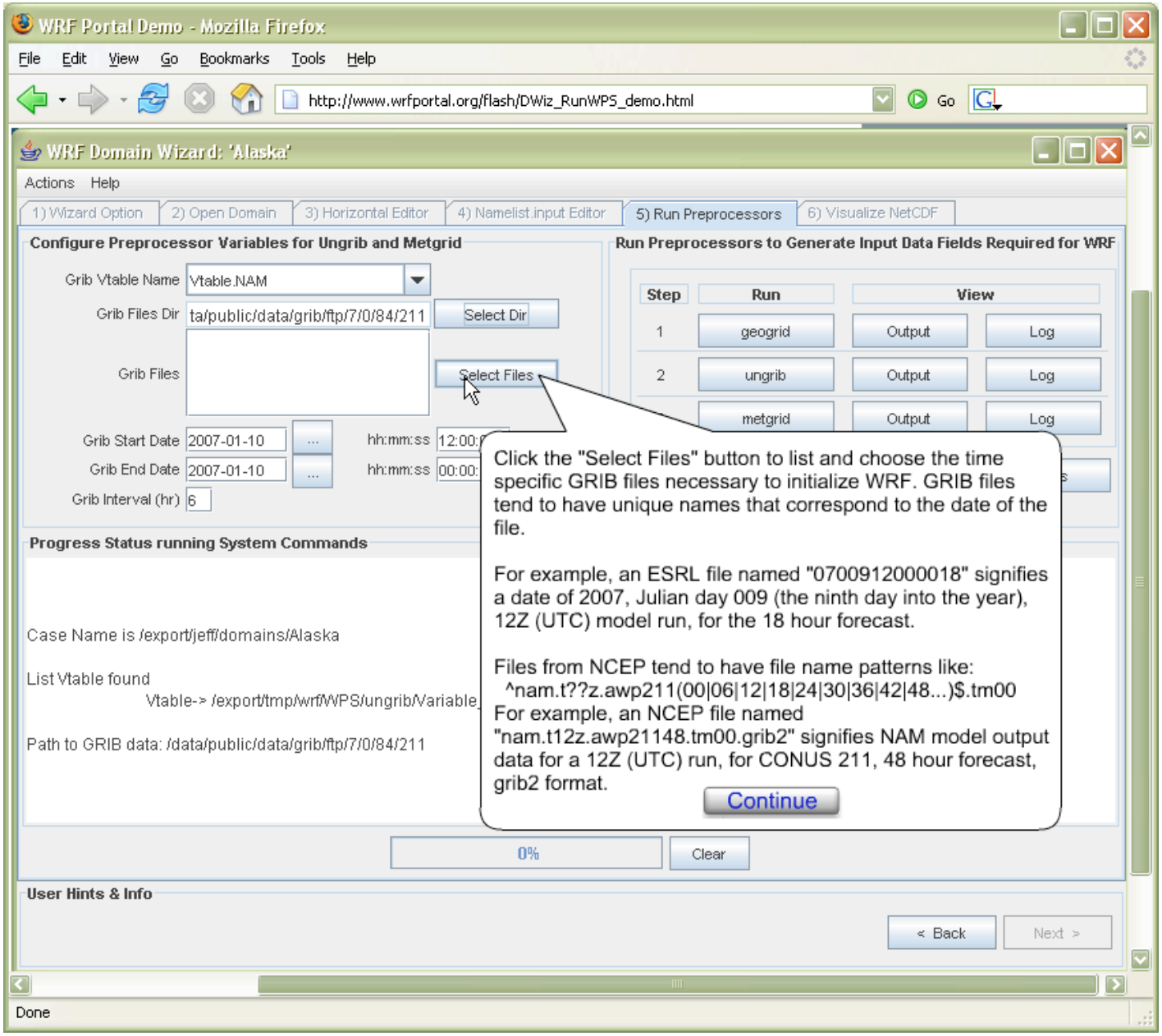
GUI editor for ETA levels

namelist.wps file

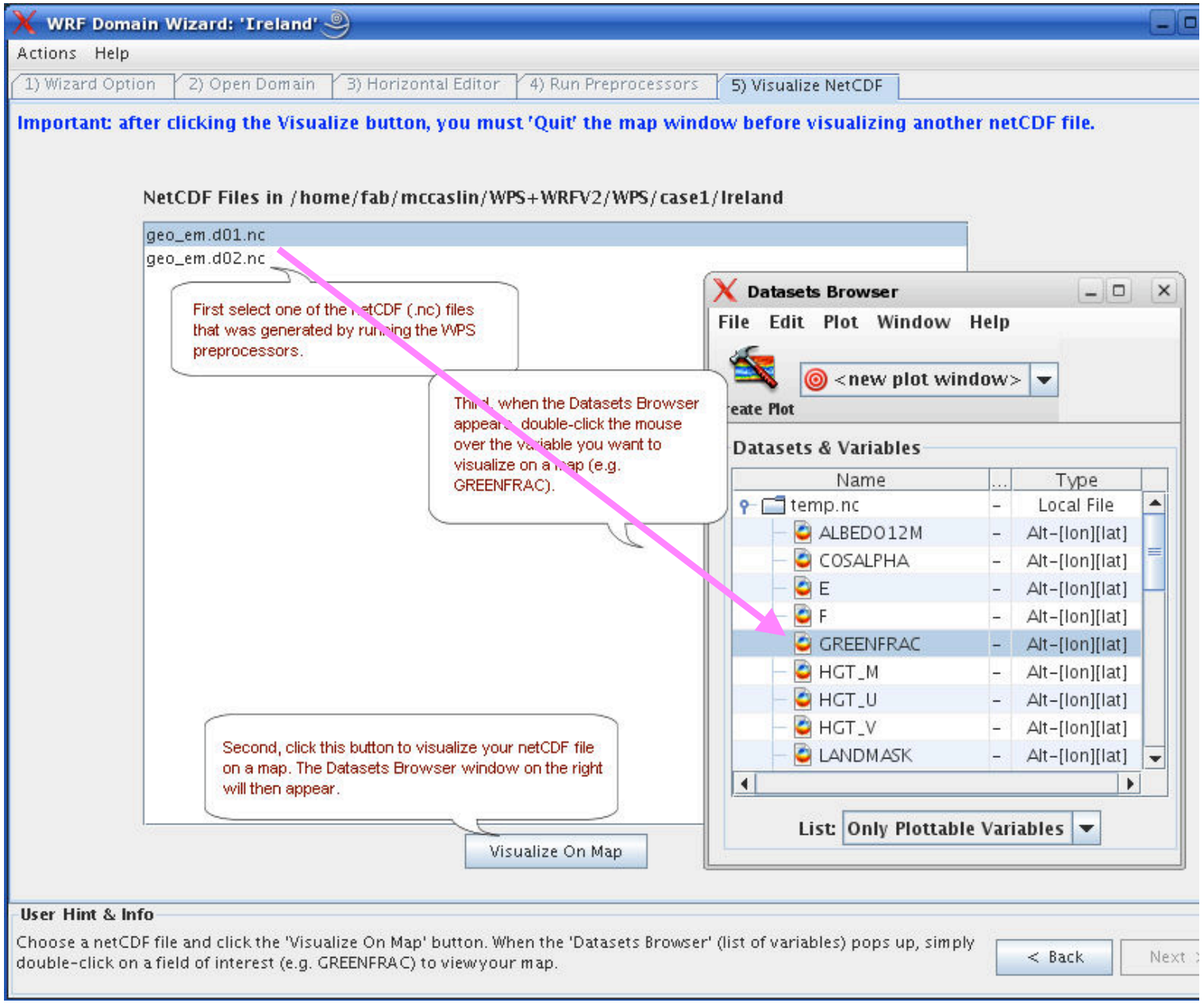
```
&domains
eta_levels   = 1.000, 0.994, 0.987, 0.979, 0.97,
               0.96, 0.949, 0.937, 0.924, 0.909,
               0.892, 0.873, 0.851, 0.826, 0.798,
               0.768, 0.736, 0.702, 0.666, 0.629,
               0.5915, 0.5536, 0.5153, 0.4773, 0.44,
               0.404, 0.3695, 0.3375, 0.3085, 0.2845,
               0.2645, 0.2465, 0.2305, 0.2165, 0.2035,
               0.1915, 0.1792, 0.1667, 0.1539, 0.1407,
               0.1272, 0.1134, 0.0995, 0.0855, 0.0713,
               0.0571, 0.0429, 0.0287, 0.0145, 0.000,
time_step              = 68,
time_step_fract_num    = 0,
time_step_fract_den    = 1,
max_dom                = 3,
s_we                   = 1,     1,     1,
e_we                   = 100,   136,   106,
```



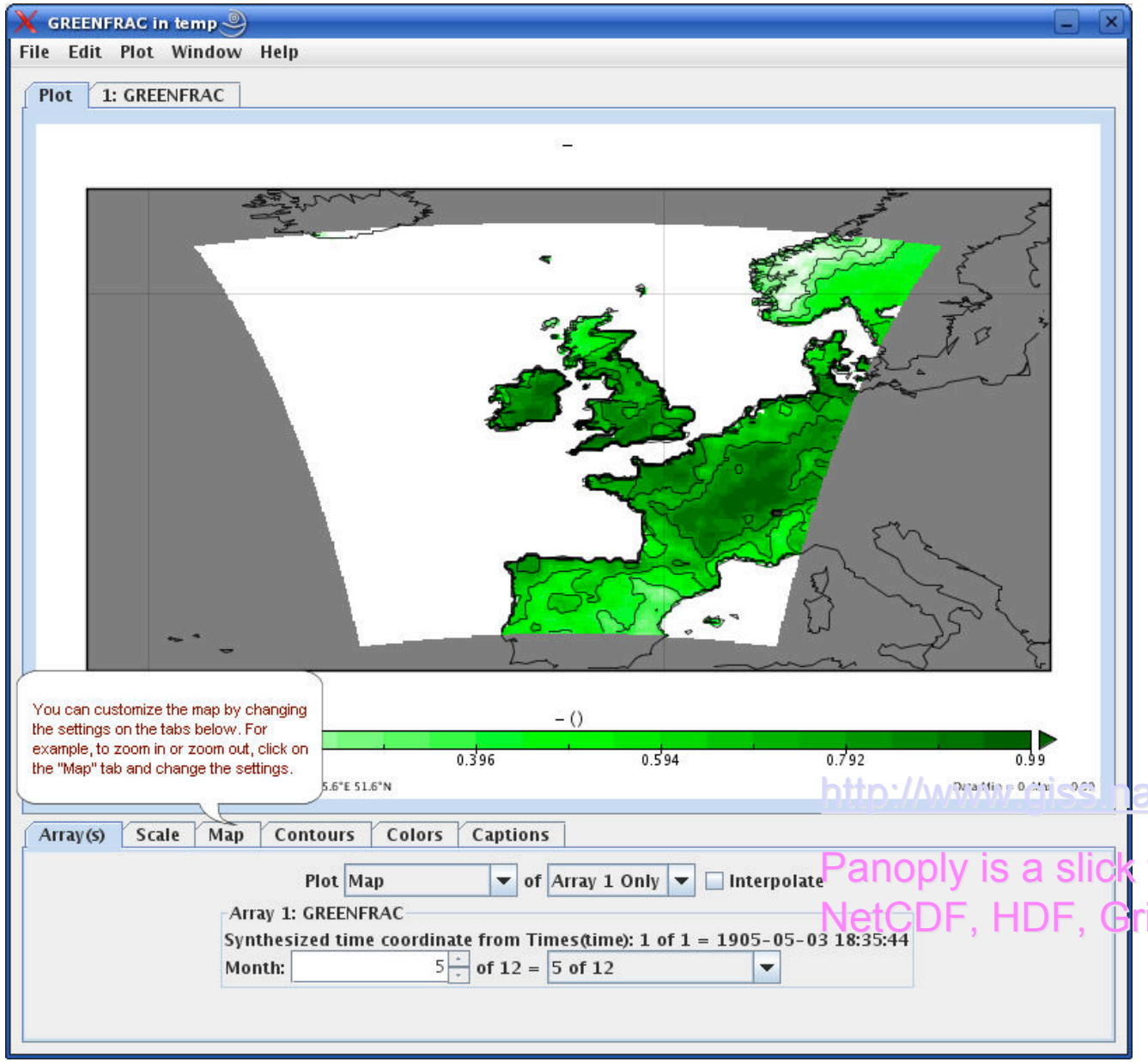
WRF Domain Wizard Tutorial -11



WRF Domain Wizard Tutorial -12



WRF Domain Wizard Tutorial -13



http://www.giss.nasa.gov/tools/panoply

Panoply is a slick tool/library for viewing NetCDF, HDF, Grib1, Grib2 files

WRF Domain Wizard

A GUI for the WRF Preprocessing System

WRF Portal

A GUI for running WRF

Presented by Jeff Smith

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NOAA's Earth System Research Lab in Boulder, CO

What is WRF Portal? -1

- A graphical user interface for running WRF
  - Also being used to run FIM (as FIM Portal)
- This application runs on all platforms and can be launched from a standard web browser as a Java Web Start program
- It simplifies and automates:
  - configuring and running of model workflows
  - launching and monitoring runs
  - Halting or canceling runs/jobs
  - visualization of your model's output
  - Includes WDW (you can just download WRF Portal and you'll also have the domain wizard)
- Version 1.41 released on July 8, 2009

What is WRF Portal? -1

- Does not include WRF (you must download and compile that separately)
- Includes an internal workflow manager that works “out of the box” and supports SGE, LSF, and PBS
- Optional external workflow manager (written by Chris Harrop at ESRL) must be installed separately and is more powerful and robust. It supports SGE and LSF
- More info here: http://www.wrfportal.org

Why Use WRF Portal?

- Saves user's time by automating tedious and repetitive tasks and providing time saving features
- Portal Wizard that walks the user through the steps of configuring computers, user preferences, and tasks

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- "Diff" tool for comparing different workflows and runs
- Graphical file browsers to quickly locate files
- Robust job managers for running and managing tasks
- Progress monitor for tracking the progress of runs

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- Graphical file browsers to quickly locate files
- Robust job managers for running and managing tasks
- Progress monitor for tracking the progress of runs
- Graphical netcdf/grib viewers to visualize model input/output
- Stores its information in a database so you can easily search and retrieve your information without the tedium of hunting through a myriad of files in directories directories

Two Main Categories of WRF Portal Users

- **“Black box” users** who want an quick and easy way to run their model without having to master long and complex instruction manuals or tutorials.

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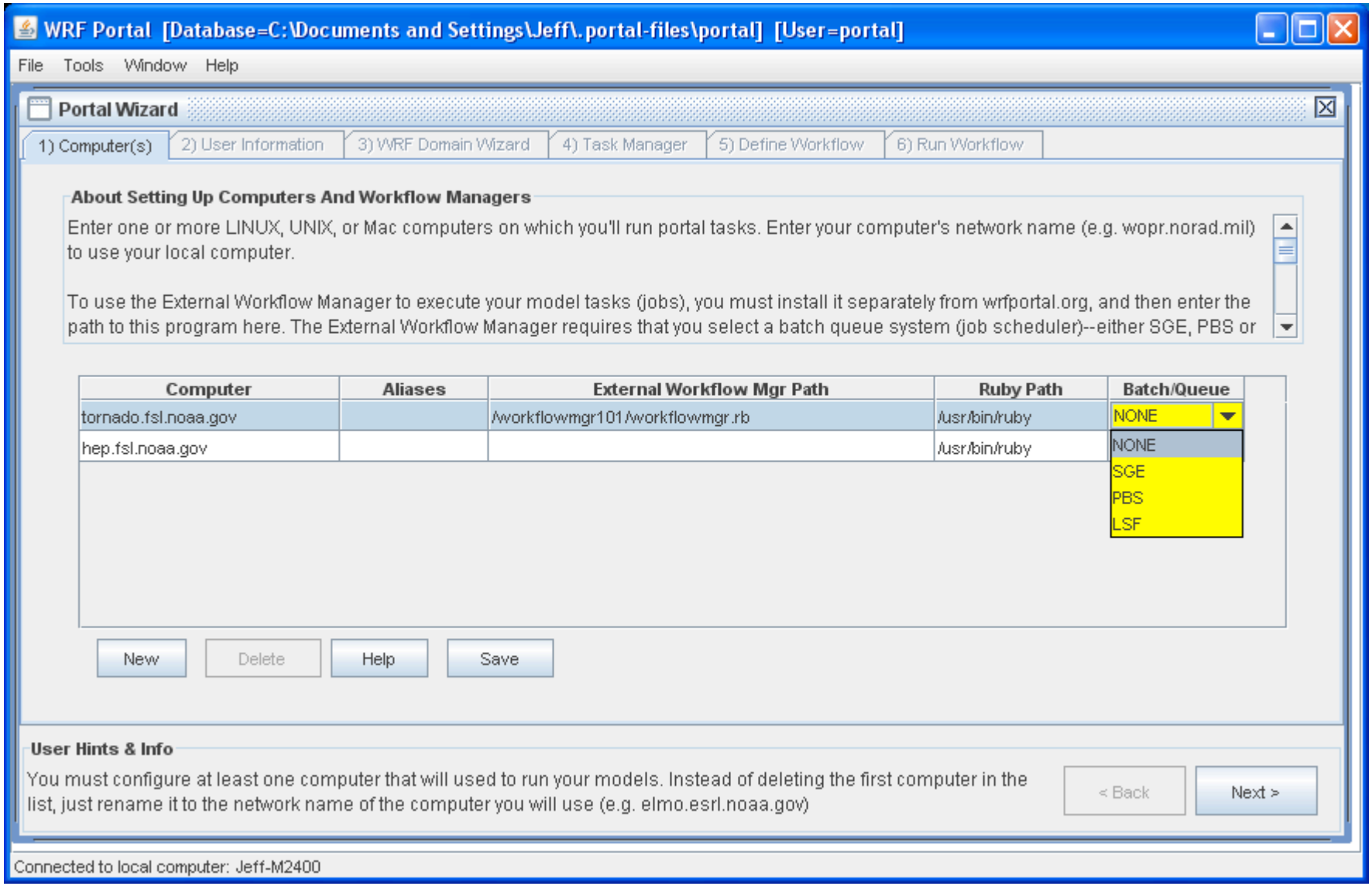
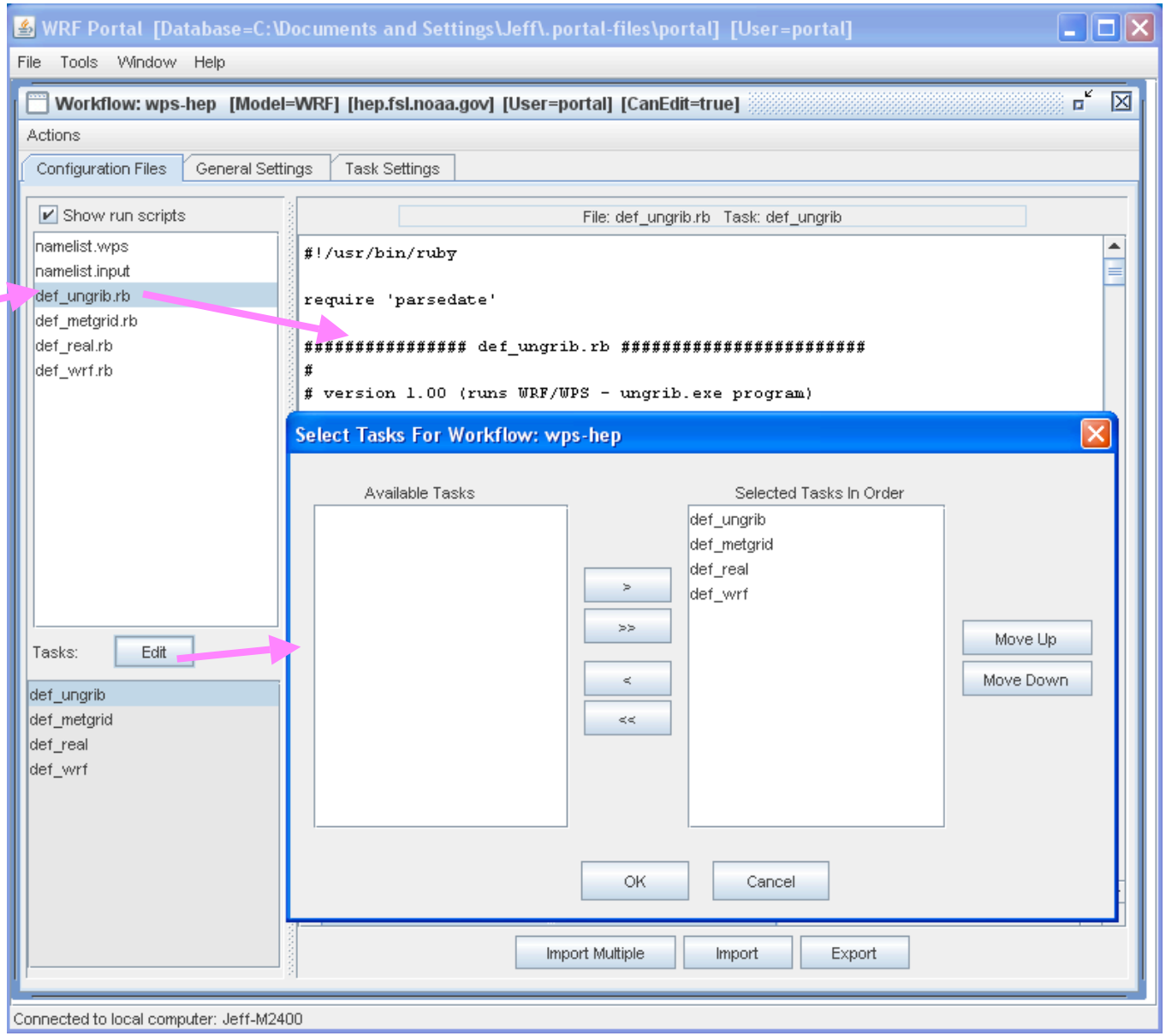
- **“Black box” users** who want an quick and easy way to run their model without having to master long and complex instruction manuals or tutorials.
- **Model developers and testers** who, while familiar with WRF, want a tool to simplify the process. Managing and making dozens or hundreds of model runs can be tedious, time-consuming, and prone to error. The portal automates many tedious tasks, freeing the developer or tester to focus on the science of their model runs

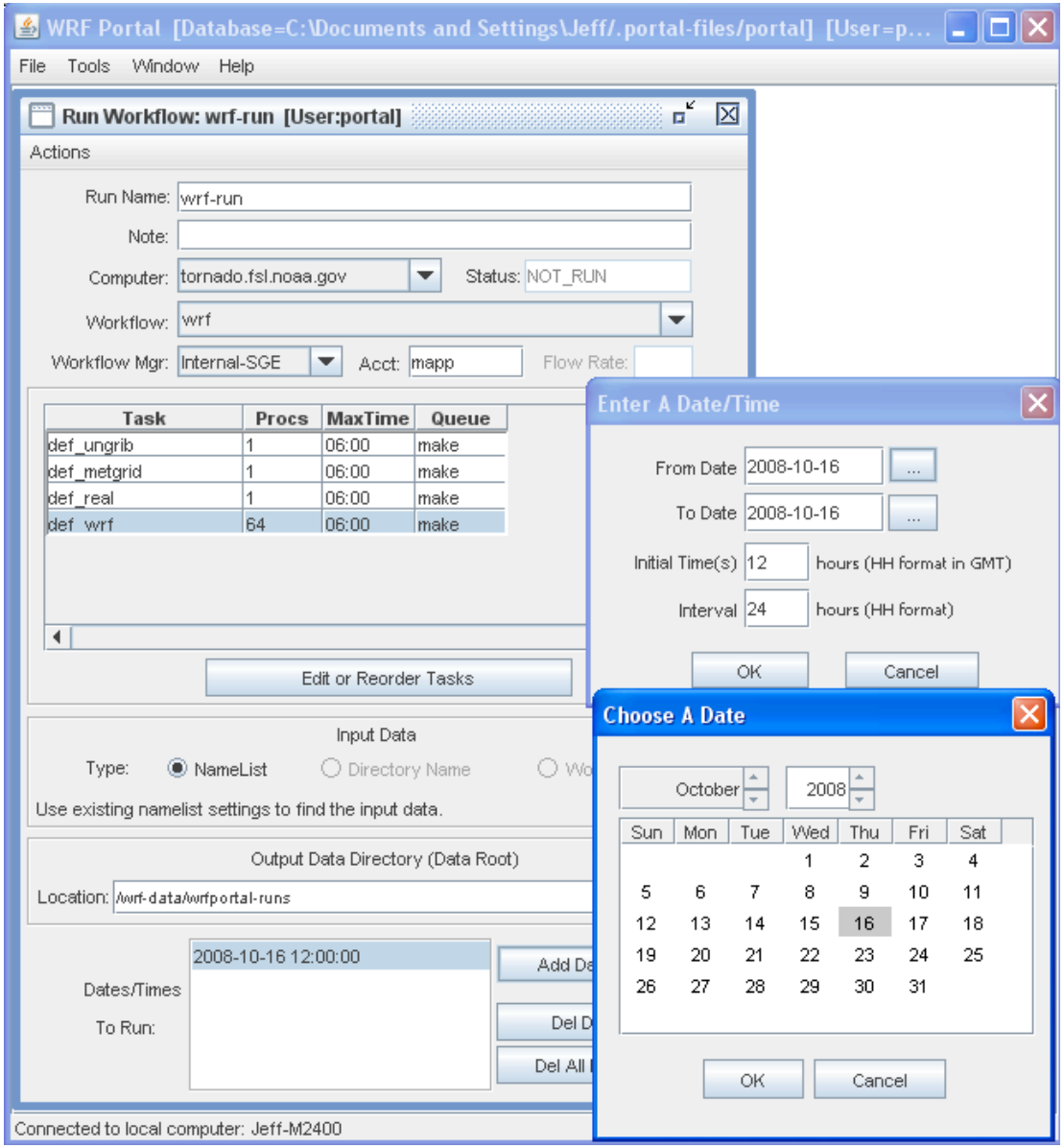
- **Portal Wizard** walks you through the process of configuring your computers and the tasks in your workflows



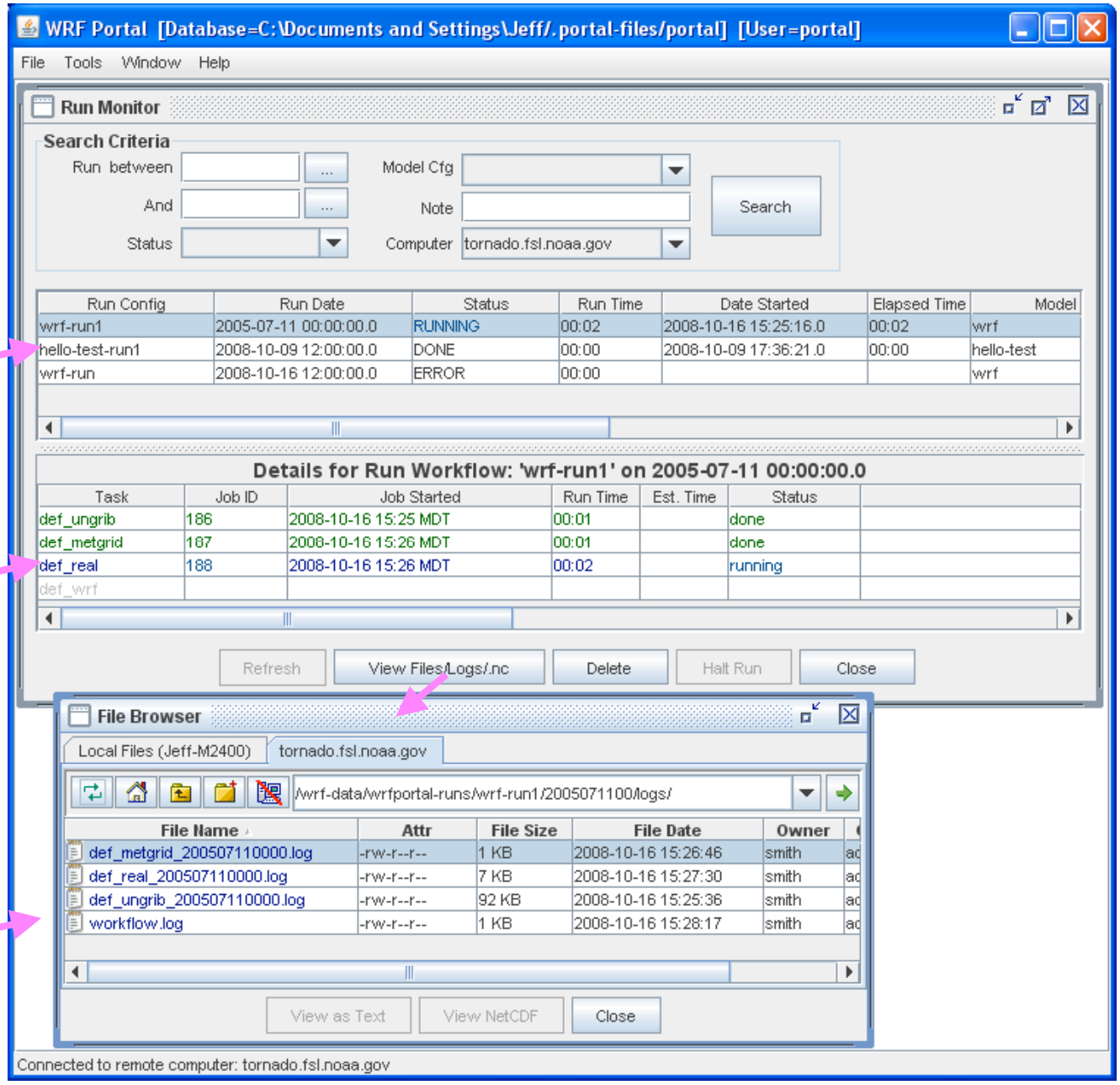
- **Workflow Window** is where you add tasks (scripts) to your workflow, configure any required env vars, etc.



- **Run Workflow** window is where a user selects the workflow, computer, tasks, nbr of procs allocated to each task, & dates



Run Monitor enables a user to follow the progress of runs

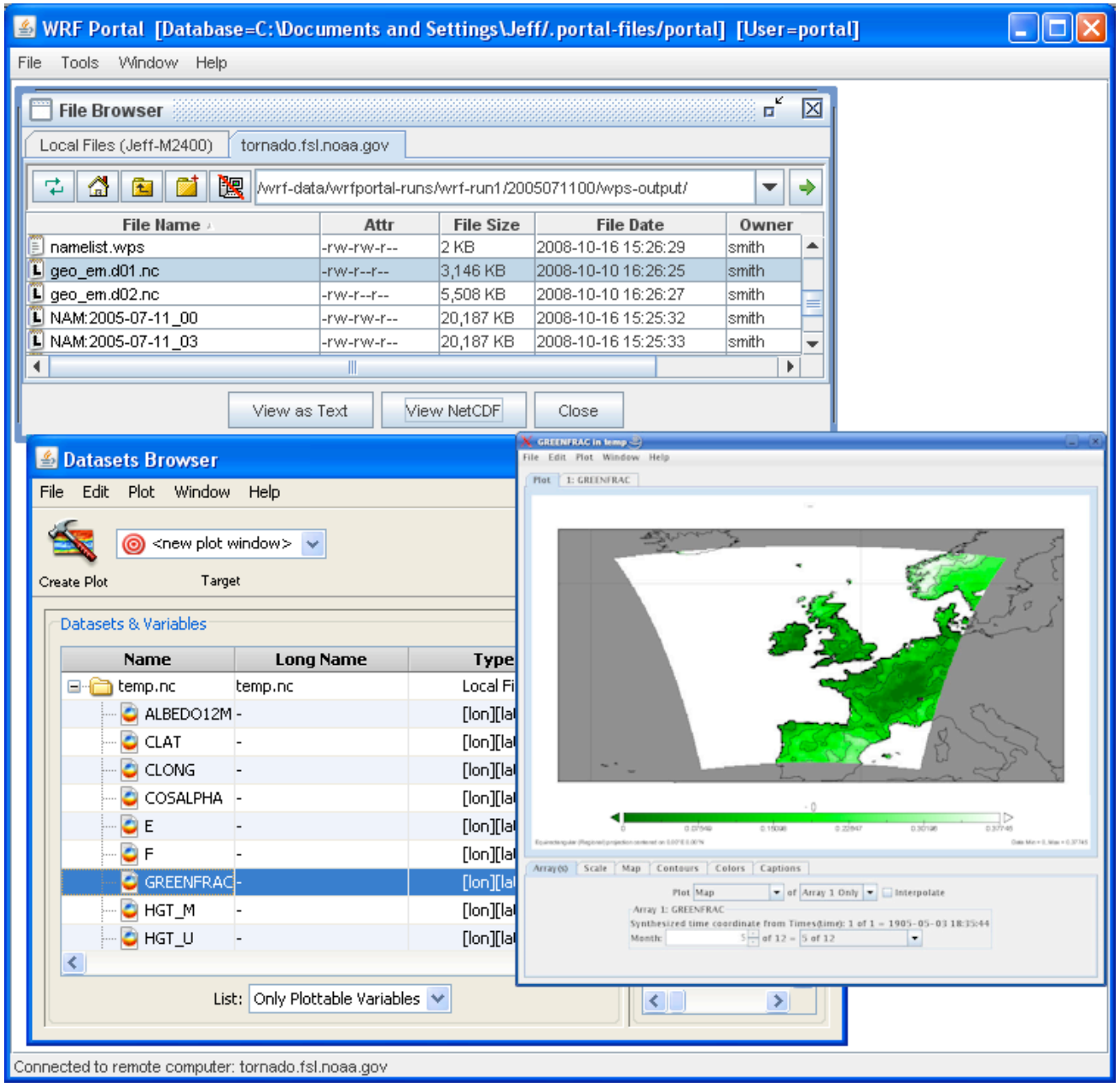


List of runs

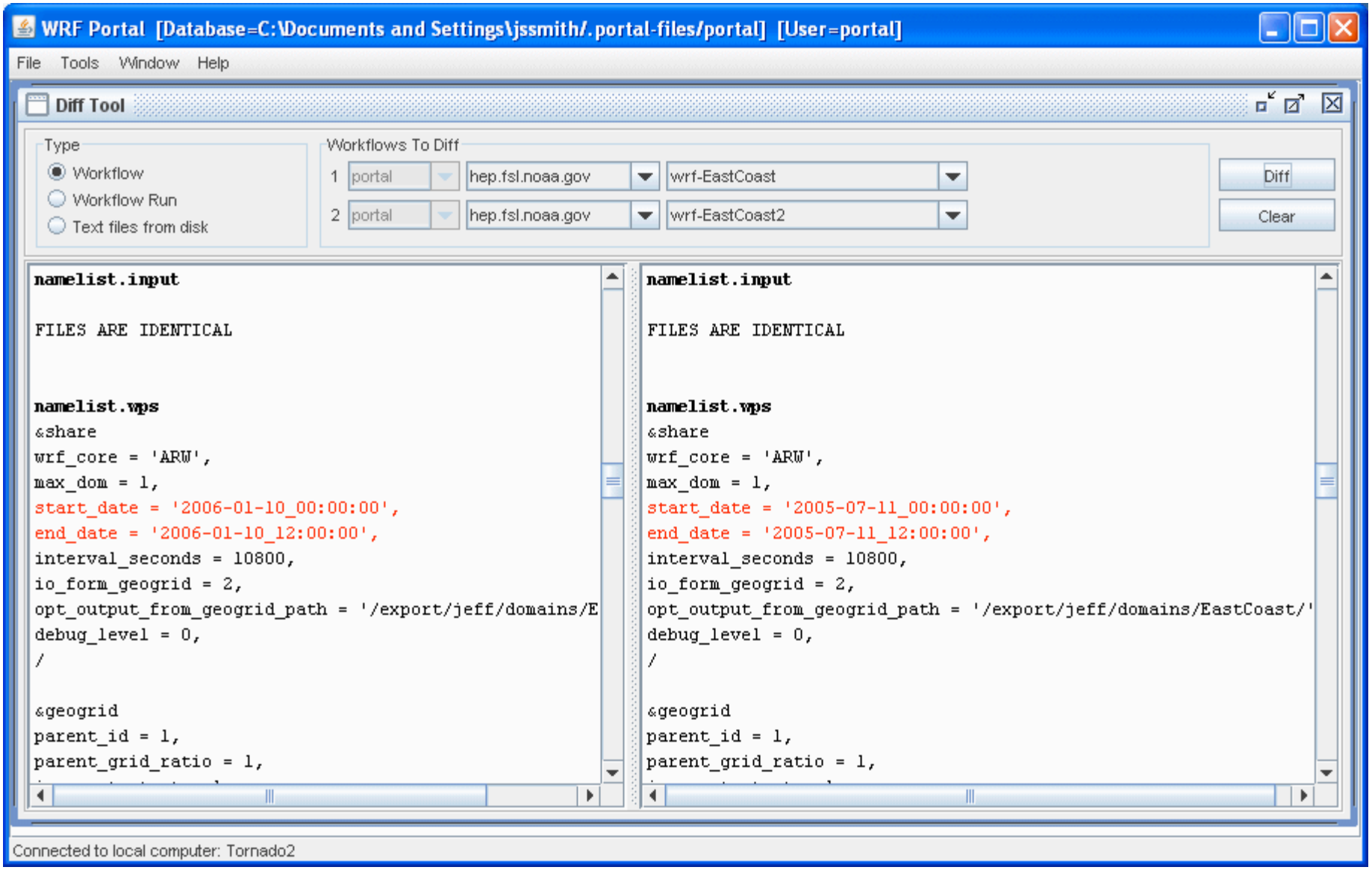
Tasks in run

Log files

NetCDF and GRIB Viewer



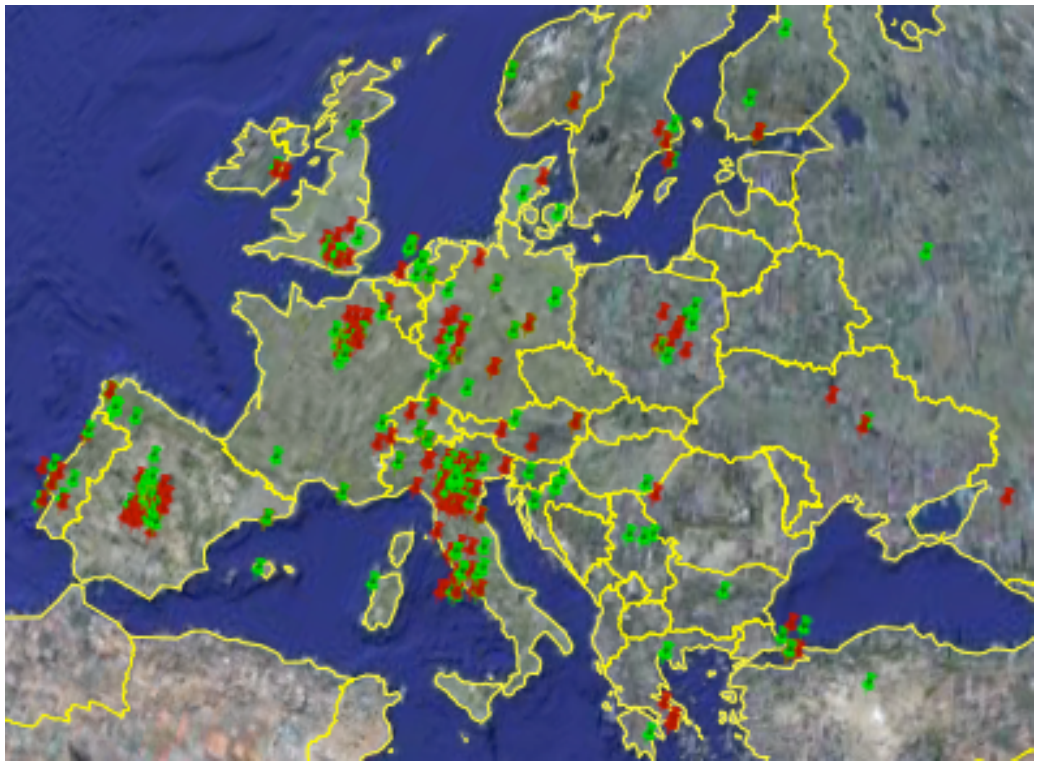
Diff Tool compares workflows, runs, text files (e.g. namelists)

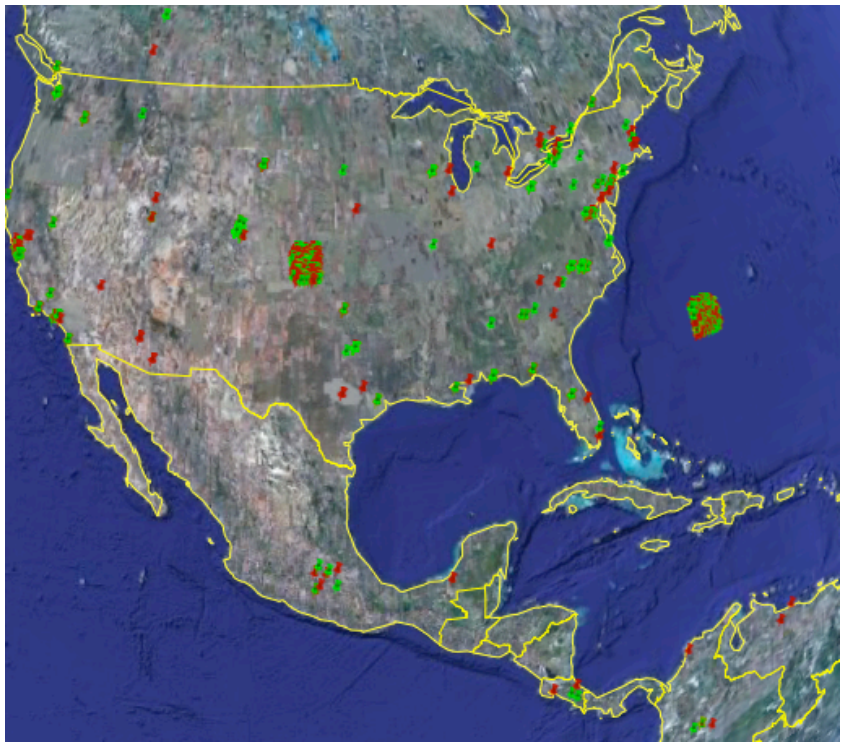


Worldwide Users Of This Software -1

Software	Est. Users	Countries	Google Earth
WRF Portal	827	64	open in Google Earth
WRF Domain Wizard	1221	67	open in Google Earth
Ext. Workflow Mgr	71	18	open in Google Earth

These users have downloaded the software from unique IP addresses during these time spans in 2008: May 4 - July 15, Sep 14 - Oct 20, Nov 9 - Dec 11.
http://wrfportal.org/about.html

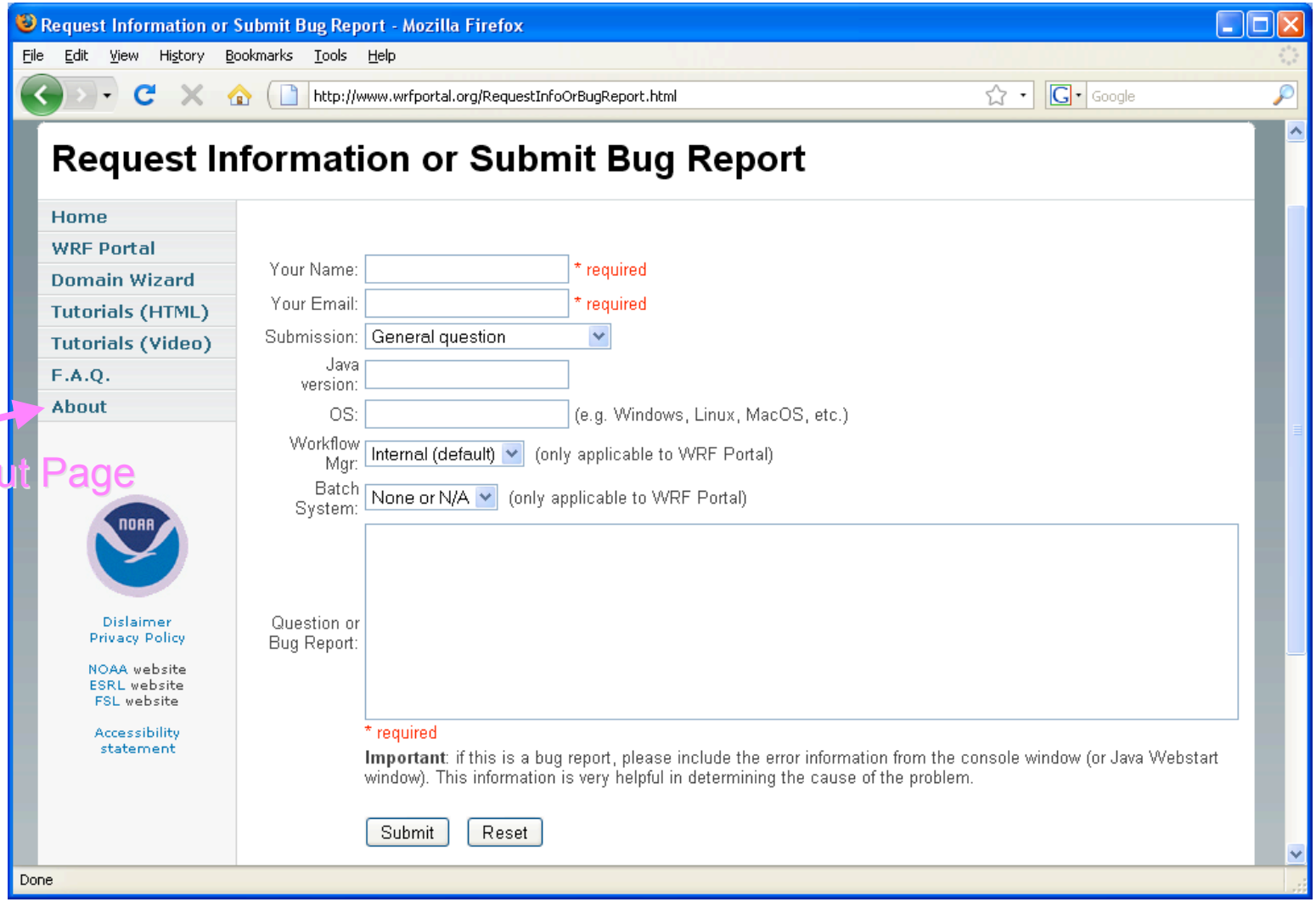




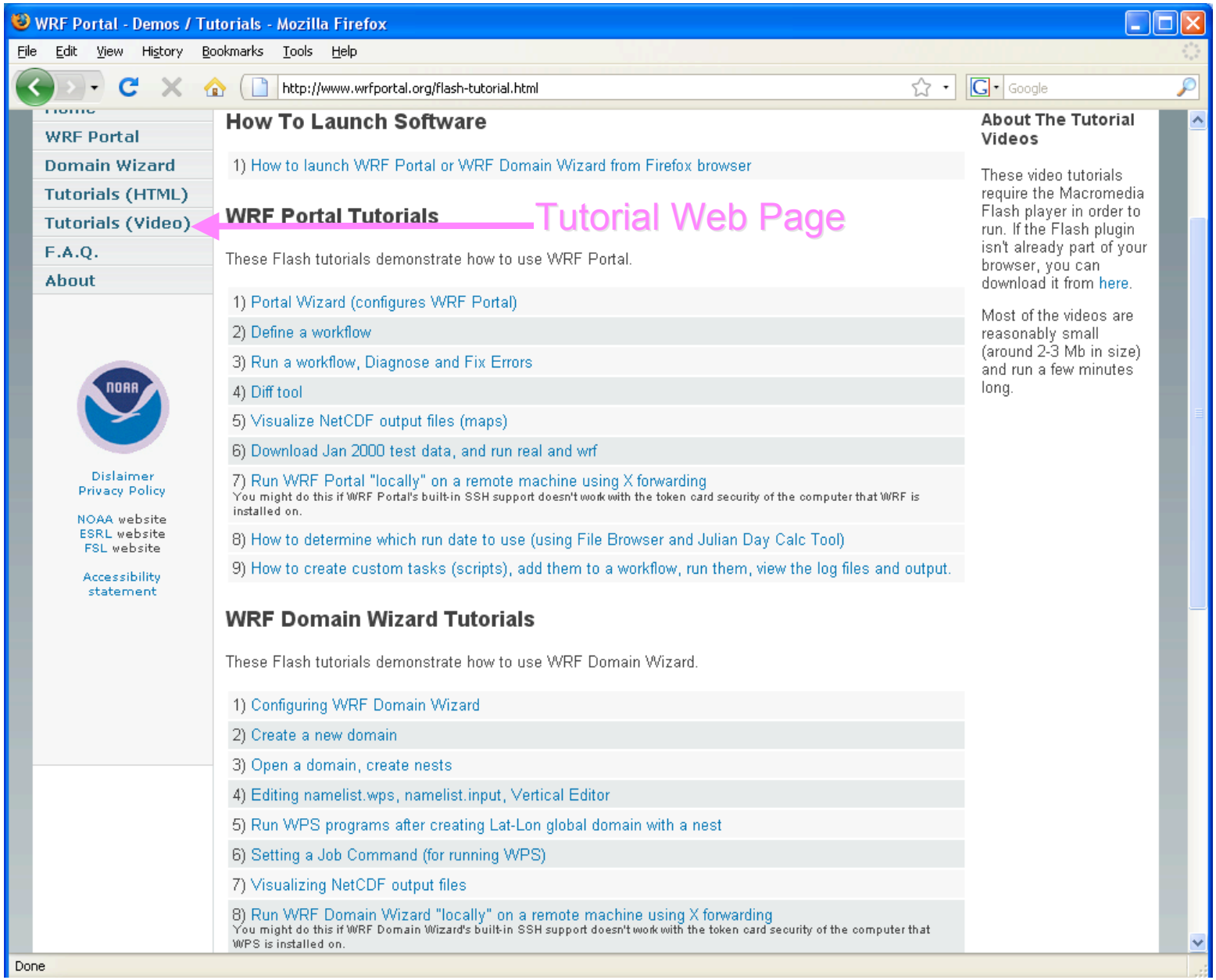
WRF Portal and WDW Support

- Web form for submitting bug reports or to ask questions: http://wrfportal.org/RequestInfoOrBugReport.html

Link on About Page



Tutorials on wrfportal.org



Future Work

- WRF Domain Wizard
  - Support Rotated Lat-Lon ARW projection
  - Support creating domains from LAPS namelists
- Portal
  - Improved support for running FIM (global) model

Thank you!

You can contact me at wrfportal.org

jeff.s.smith@noaa.gov