

persona v2.0
How to graphically patch a mask variable
WN-CMGC-15-57
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« persona » is a graphical device, commanded by a simple shell script tool, based on UNIX commands (atobm,bmtoa) and the NCO toolkit. Developed at CERFACS since 2002, it is fully open source. The 2.0 version includes the GIMP Image Manipulator instead of the X11 BITMAP command, to simplify handling of larger arrays.

This tool allows a mouse controlled handling of binary images from files in NETCDF format. It was originally designed for modification of land/sea mask arrays, like those commonly used by ocean/atmosphere sciences community.

2.0 version is available at CERFACS' FTP site:

ftp://ftp.cerfacs.fr/pub/globc/exchanges/maisonna/persona_2.0.tgz

1. User Guide

Persona is launched at command line, with the following syntax:

```
> persona arg1 [arg2]
```

with arg1: NETCDF file name and arg2: mask variable name (default: nmask). The mask variable name has to be provided in the second argument of the command line if different from "nmask". Example:

```
> persona meshmask.nc tmask
```

To precise the modification strategy, users have to first choose between:

```
>1: modify by hand an existing mask variable ?  
>2: create a new mask variable entering lat/lon limits ?  
>3: define lat/lon limits for an existing mask variable ?  
>1 , 2 or 3 ?
```

With choice 1, an existing mask can be interactively modified by computer mouse. With choice 2, a new mask can be defined from latitudes and longitude bounds (to be specified at command line). The 3rd choice combines the first two: a limited lat/lon domain intersects the existing mask, and the resulting mask can be modified interactively.

Troubleshooting:

- only a few predefined dimension names are recognized (x X longitude lon LON jpio jpia). For other names, please directly modify the corresponding line in the header of the "persona" shell script.
- please reduce the input file content to the variable you wish to modify

2. Input file format

The mask variable is necessarily a 2D variable (no handling of 1D variable, like on

Gaussian reduced grid, for example). Variable type does not matter (float, integer, etc). Masked values can be either 1 or 0 (the GIMP graphical tool can easily invert them), but in case of choice 2 or 3 (lat/lon bounds), the 0 value will be set outside these bounds. Latitude (longitudes) bounds must be kept between -90 and 90 (-360 and 360) degrees.

For 3D mask variable, persona automatically detects the vertical dimension (in the list `z Z depth deptht depthu depthv`, please modify this list in script header if necessary) but the graphical tool will allow to modify the first level only. The modified 2D array will be saved on the first level of the 3D input variable.

For choice 2 or 3 (lat/lon domain definition), latitude and longitude must obviously be described in variables of the NETCDF input file. For a regular mesh, coordinates have to be stored in 1D variables, that must share their names with the corresponding dimensions. Example:

```
netcdf mesh_11 {
dimensions:
    lon = 360 ;
    lat = 180 ;
variables:
    float lat(lat) ;
        lat:units = "degrees_north" ;
        lat:long_name = "Latitude" ;
        lat:actual_range = 89.5f, -89.5f ;
    float lon(lon) ;
        lon:units = "degrees_east" ;
        lon:long_name = "Longitude" ;
        lon:actual_range = 0.5f, 359.5f ;
    ...
}
```

In case of irregular mesh, the user has to provide the associated coordinate variable names at command line:

```
>Longitude variable (x X lon LON jpio jpia) not found in file
$file_name
>Please, specify longitude variable name
>nav_lon
>Please, specify latitude variable name
>nav_lat
```

In this case, only 2D variables are accepted for lon/lat description. Example:

```
netcdf header_orca_T {
dimensions:
    y = 149 ;
    x = 182 ;
    z = 31 ;
variables:
    float nav_lon(y, x) ;
        nav_lon:missing_value = 1.e+20f ;
    float nav_lat(y, x) ;
        nav_lat:missing_value = 1.e+20f ;
}
```

...

3. Graphical handling

The GIMP Image Handler is launched when mask variable is ready to be modified. After modification, never forget to save your working file (File/Save menu) before exiting (File/Quit).

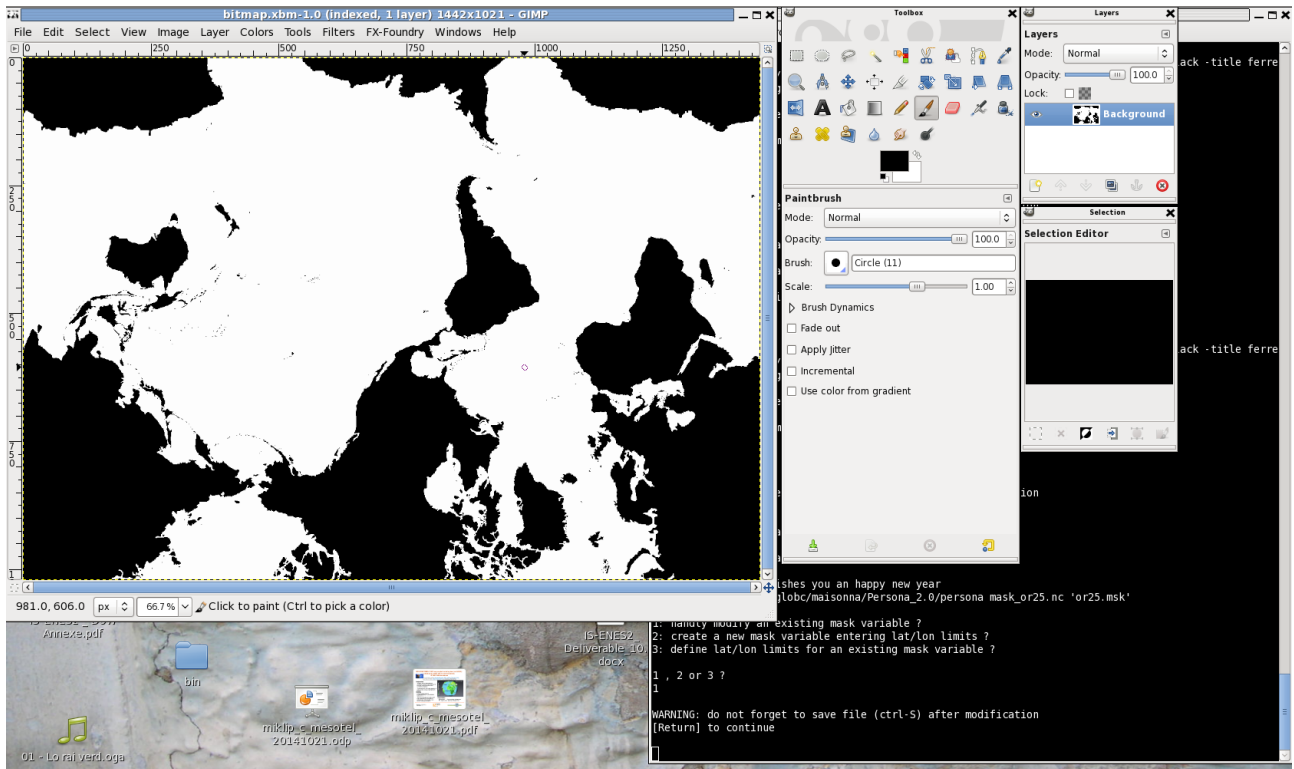


Figure 1: Land-sea mask edited with GIMP for corrections with “Pencil” tool

A world of functionality is offered by the GIMP Image Handler. Among possible operations, we can cite:

- View/Zoom : to precisely modify a high resolution mask
- Image/Transform/Flip Vertically: to visualize an upside-down variable
- Tools/Paint tools/Pencil: for point to point modifications
- Tools/Paint tools/Bucket fill: to fill large areas
- Color/Value invert: to proceed on “1” values

For advanced features, we can emphasize the edge detection (Tools/Edge-Detect/Edge), very useful to help oceanographers define river mouth grid points. Be careful that this operation requires to change color mode from “indexed” to “RGB” (Image/Mode) and vice-versa when saving.

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¹ <http://sourceforge.net/projects/pypago/>