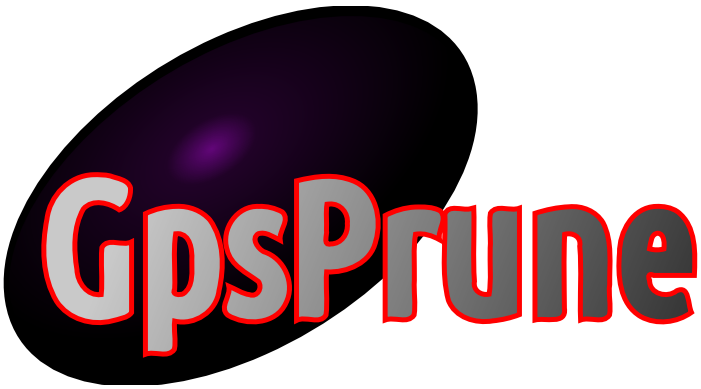
# GpsPrune User Guide

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for more information, see https://gpsprune.activityworkshop.net/userguide.html

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# Chapter 6

# Viewing maps

**Whirlwind Summary:** GpsPrune can download and display free maps together with your data. You can choose from a large variety of sources, and you can add more sources if you want. Maps can (and should) be saved to your disk to speed things up, and you can then use them offline.

In chapter 5 we discussed how to view the point data, including panning, zooming and selecting. Now we'll look at how to show and configure the map images underneath that data to make it all come to life.

There are three main settings which control the map display. Firstly, which map source to use, and you can configure several map sources and switch between them. Secondly, whether you want to fetch map images from the internet or not, and thirdly, whether you want to save the images to your own disk or not. Saving images to disk is recommended, so that they don't have to be repeatedly downloaded from the internet.

Note that GpsPrune is only able to display maps which are in the same format as OpenStreetMap tiles. This means that they must use the same map projection, must be split into square tiles of either png or jpg format in a standard size, and must be put in some kind of predictable folder structure.

All of the maps listed in this section are in the required format, but GpsPrune is not able to display your own scanned maps, for example, or proprietary maps you have bought, and cannot render vector map data. If you want to be able to use OpenStreetMap's vector data, you will need to use your own renderer, as described in section 6.4.3, to create the tiles in the right format.

## 6.1 Enabling maps

In recent versions of GpsPrune, display of the background maps is enabled by default. You can switch the maps on and off using the map control toggle or you can use the "Show map" checkbox in the View menu. The transparency of the map is controlled by the slider control at the top of the map panel, as described in section 3.1.1.

If you do not currently have an internet connection, you can still view the maps from your disk cache. Then you may want to use offline mode, so that GpsPrune does not try to download missing tiles. This setting is controlled by the checkbox "Load maps from internet" in the Settings menu.

If you have enabled the maps but still don't see any images, there are a number of possible explanations:

- The selected map source isn't available, or could be wrongly defined (for example, an incorrect URL or image format)
- You might have just defined a transparent layer without the base layer underneath
- The selected map source doesn't have maps for the zoom level or the area you have chosen
- You might have used the transparency slider to make the maps really faint
- The maps need to be downloaded but you have specified offline mode
- The maps need to be downloaded but you don't have a working internet connection
- The selected map source is currently having problems and can't serve the tiles to you
- You have a firewall which prevents java programs from accessing the internet
- The directory which you specified to use for the disk cache can't be found, or can't be read
- The images in the cache have somehow been corrupted or overwritten, and need to be manually deleted

Using the default OpenStreetMap (Mapnik) server is the most reliable way to troubleshoot any problems. But as we'll see in the following section, there is a huge variety of other map types and styles available.

## 6.2 Selecting a different map server

Because the data in the OpenStreetMap database is freely available (under a CC BY-SA or ODbL licence), it is possible for countless projects to take the data and produce their own specialized renderings with different styles, aesthetics, focus and themes.

OpenCycleMap[1] is just one example, taking the same data as the regular OpenStreetMap server but emphasizing certain aspects such as cycle routes, cycle repair shops and cycle parking facilities, and reducing the prominence of motorways and car parks. There are various other projects specially themed for skiing, sea activities, hiking, public transport and so on.

Some projects only concentrate on a certain geographical area, but GpsPrune includes several examples of worldwide sources to select from. These included sources are listed overleaf in table 6.1.

The "Set map background" command in the Settings menu brings up the dialog shown in figure 6.1. This can also be accessed from the right-click menu on the map itself. This dialog shows a list of all the built-in map sources, from which you can select another source simply by clicking on the name and pressing OK.

[1] `https://www.opencyclemap.org`

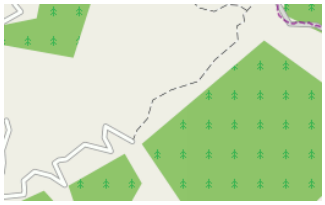
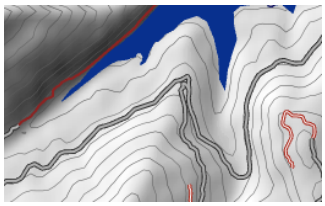
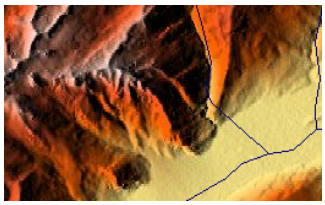
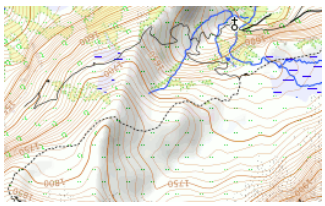
| | | |
|---|---|---|
| Mapnik | Default renderer for OpenStreetMap and default for GpsPrune |  |
| CyclingTrails | Overlay on top of Mapnik showing cycling trails | |
| Reitkarte | Lots of terrain shading and contours |  |
| Mapsforfree | Bold and colourful at low zoom levels |  |
| OpenTopoMap | Topographical features like contours (including shading) |  |
| Openseamap | Mapnik base with sea-related features on an overlay | |

***Table 6.1:*** *List of built-in map sources*

As well as the default Mapnik source, there are five other map sources available online. These are made available by the services of WaymarkedTrails[2], Reitkarte[3], Mapsforfree[4], OpenTopoMap[5] and OpenSeaMap[6]. You can also use their online map websites as well as using their tiles within GpsPrune.

You can add your own sources to this list with the "Add new" button, as described in the following section.

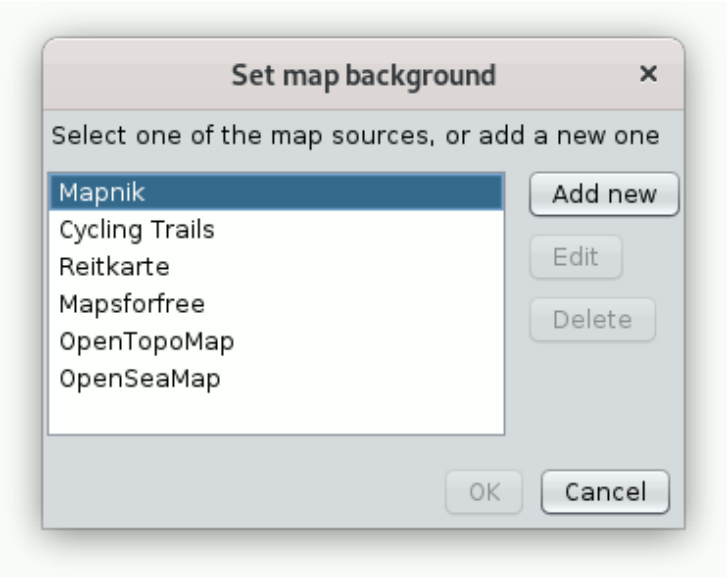



***Figure 6.1:*** *Dialog to change the map background*

If you're using a disk cache (see section 6.4), then you can save the maps for each source independently. Each set of images gets saved in its own subdirectory inside the specified cache directory.

## 6.3 Adding a new map server

Although GpsPrune already comes configured with the map servers shown in the previous section, perhaps there are other servers you want to use, serving specialist themes or only covering certain geographical areas. In this case you can add them yourself as new map sources.

To add a new source, go to the "Set map background" dialog described earlier, and then press the "Add new" button to insert a new source in the list. The resulting dialog is shown overleaf in figure 6.2.

Each source can have either one or two layers, and each layer is defined by a URL underneath which the image files can be found. The source must also be given a name by which GpsPrune will refer to it.

[2] `https://waymarkedtrails.org`
[3] `https://wiki.openstreetmap.org/wiki/OSMC_Reitkarte`
[4] `https://maps-for-free.com/`
[5] `https://opentopomap.org`
[6] `https://openseamap.org`

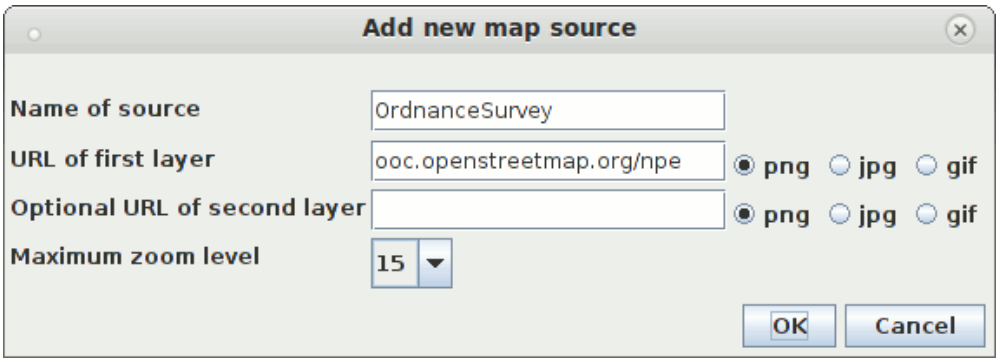



***Figure 6.2:*** *Dialog to add a new map source*

Some of these layers are available as mostly transparent overlays, so they can be combined with any other base layer. For example, you could define a new source with the first layer from Mapnik ("`tile.openstreetmap.org`", png format) and then add a transparent source as the second layer. If you define a second layer, it is always displayed on top of the first layer.

The following list gives some examples of additional map sources you could add.

- lonvia's hiking map[7] provides a transparent overlay of the tagged hiking routes on top of a regular OpenStreetMap set. Use the server "`https://tile.waymarkedtrails.org/hiking`" (png format) on top of Mapnik tiles, for example.
- what was once a German-speaking öpnvkarte.de (from *öffentlicher Personennahverkehr* or public transport) is now a multinational openbusmap.org, and offers maps with a focus on various kinds of public transport. You can use the maps in GpsPrune by adding the tile server "`tile.memomaps.de/tilegen`" (as png).
- Openstreetmap.de offers a worldwide map very similar to the regular OpenStreetMap maps but using styles which you might find more appealing. And the labels for place names are in German too, like "Schottland" or "Frankreich". Use for the first layer "`https://tile.openstreetmap.de/tiles/osmde`" (png format) with a maximum zoom of 18.
- Mapquest unfortunately no longer provides access to their aerial photo tiles. If you do want to use aerial imagery you'll have to look for a country-specific service covering your area. Google's Terms of Service famously forbid applications like GpsPrune from using their aerial images.
- 4UMaps[8] is specially for hiking and cycling. It isn't worldwide, but does cover large parts of Europe, north America and Asia. Use "`https://tileserver.4umaps.com`" (png format) with a maximum zoom of 15.
- toposm[9] used to have nice topographic maps of the USA with multiple layers, but unfortunately the service seems to have been discontinued.

[7] `https://hiking.waymarkedtrails.org/`
[8] `https://www.4umaps.com`
[9] `https://wiki.openstreetmap.org/wiki/TopOSM`

- OsmAnd[10] is a popular application for mobile phones which provides tiles with a large rendering style, especially suitable for those with high-dpi screens but also good for 3d renders. Just use "`https://tile.osmand.net/hd/`" in png format (hd means high-definition).
- Ordnance Survey's NPE or "New Popular Edition" doesn't appear to provide compatible tiles any longer (but obviously any that you have already downloaded to your cache can still be used). More information at `http://www.npemap.org.uk`.

Tiles from your added map sources will be cached onto your computer in exactly the same way as the other tiles. This is configured for the whole program, not for each source individually. See section 6.4 for how to specify whether to save tiles or not.

If you want GpsPrune to remember which map sources you have added, you need to save your settings, as described in chapter 8. If you have already saved your settings, and selected to automatically save settings on exit, then the additional map sources (and the currently selected source to use) will be saved for you.

## 6.4 Using a disk cache

Saving the downloaded map tiles in a so-called cache on your computer is a useful way to speed up the map display and reduce unnecessary network traffic. This is just a folder inside which all the map tiles are saved according to the source and zoom level.

Without a disk cache, GpsPrune has to download each map tile from the internet as it is needed, and can therefore download the same image several times. With a disk cache, GpsPrune looks first if it already has the image, and only downloads it from the internet if it needs to. This also means that you can use the already downloaded images in GpsPrune, even if you no longer have an internet connection.

By default, the disk cache is disabled, because GpsPrune doesn't know where you want to save the images. It would be impolite to just start saving files without your permission! So although using a disk cache is recommended, you have to explicitly switch it on, and specify a directory to use for the cache. This is done with the menu command Settings -> Save maps to disk, bringing up the dialog shown in figure 6.3.

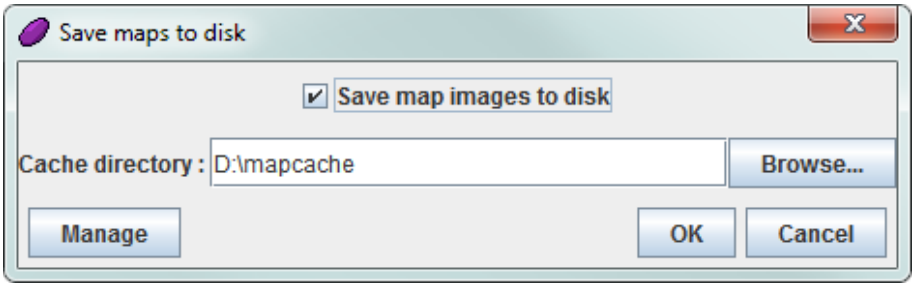



***Figure 6.3:*** *Dialog to setup the map disk cache*

[10] `https://en.wikipedia.org/wiki/OsmAnd`

If the directory specified does not already exist, then GpsPrune can create it for you. If the directory is read-only for some reason, then GpsPrune will be able to use it to obtain images but of course won't be able to save new ones there — in this case you'll get a warning message that the cache can't be used properly.

Note that there are some other functions which rely on a map cache. For example, the image export function (see section 15.6) only works with map tiles which have been saved locally. Similarly, if you wish to use a base image for the 3D functions (see chapter 16), you need to activate a disk cache and save the required tiles.

There is one more use of the disk cache worth mentioning – it is possible to also save the altitude information from SRTM (see section 11.7) in the map cache to avoid having to download the same data several times. These will be saved in a directory called "srtm" inside the map cache, and can be reused by the lookup functions as well as by the 3d terrain views.

### 6.4.1 Managing the disk cache

Once a tile has been downloaded and saved to the disk cache, it will remain there until it is needed again — it will not be automatically deleted. When GpsPrune needs that image again, it will check the age of the file, and if it is older than a set limit (by default 20 days), the image will be downloaded and saved again. However, it could be that old tiles build up in the cache even when they are no longer needed.

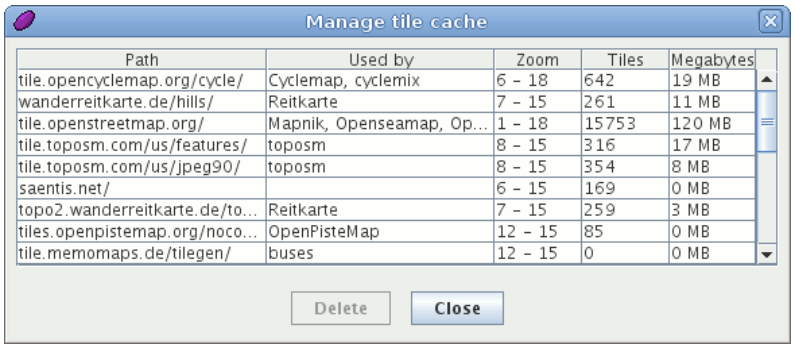
As mentioned earlier, each map source is stored separately in the cache, and each source may have up to two layers, in multiple zoom levels, so over time the cache can grow to substantial size. In order to clean up the cache and recover disk space, you can use the "Manage" button on the disk cache dialog (figure 6.3) to check which sources are stored and how much disk space they are occupying.

It may take some time to search through the subdirectories if the cache contains a large number of files. The resulting dialog (figure 6.4a) lists the directories found, and which of the current map sources they are used by.

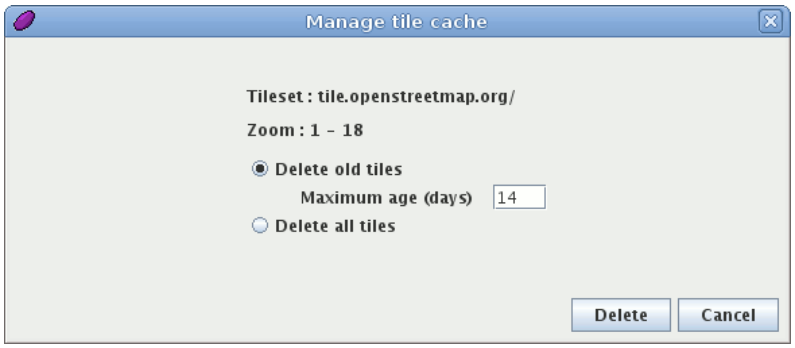
It is possible that a directory is not used by any map source any longer, because the source has been removed or changed. In that case it is probably safe to delete that entire directory. It is of course also possible that a directory is used by more than one source, for example in combination with various transparent overlays. In the other columns of the table, it shows the zoom levels covered, the total number of image tiles found, and the number of megabytes used for each directory.

In this list you can select one or more rows, by clicking, Ctrl-clicking, Shift-clicking or dragging with the mouse. Pressing the "Delete" button then brings up the second panel (figure 6.4b) for the selected directory or directories.

In the second panel, you can choose whether to delete *all* the images in the selected paths, or just those older than a specified threshold. Selecting the "Delete old tiles" radio button allows you to enter a maximum number of days for the file age — only the files older than this limit will be deleted.




**(a)** directory list




**(b)** delete options

***Figure 6.4:*** *Cache management dialogs*

Pressing the "Delete" button then deletes all the files matching the criteria, and a message is shown confirming how many images (if any) were deleted. If GpsPrune needs to display these tiles again, they will have to be downloaded once again from the internet.

### 6.4.2 Using a tile downloader

Although GpsPrune downloads and saves tiles automatically as required, there are cases when it can be useful to download a complete set of tiles for a given area, making sure that all the tiles from all the zoom levels are downloaded. For example, before taking a mobile device away from its regular internet connection, one can download all the tiles which will be needed, and then use them offline later.

GpsPrune doesn't include such a batch tile downloader, although it is possible to download tiles using the "map image" dialog of the image export function (see section 15.6).

Alternatively, a separate utility can be used to just do the downloading, and store the files in a cache which GpsPrune can then load from. However, with any such downloader, *please* take care with the settings of the program so as not to overload the servers. In particular, be kind with the download rate, the number of parallel requests and the maximum zoom level. Bulk downloading can cause big problems for the server and for other users if the bombardment is too intense, particularly for the independent servers run by volunteers. The official OSM position is given in the OpenStreetMap wiki.[11]

[11] `https://wiki.openstreetmap.org/wiki/Tile_usage_policy`

In general, it's a bad idea to run a bulk downloading tool against any tile server unless it's specifically allowed, and in those cases the server will probably provide an alternative way of bulk downloading themselves.

### 6.4.3 Rendering your own maps

Rendering is the process of converting the vector data stored in OpenStreetMap's database into picture form to use as a map. Obviously there isn't a single correct way to do this, the results depend on a multitude of settings, colours, themes and design choices. It's a very complicated topic in itself, and GpsPrune doesn't get involved. GpsPrune just takes the rendered output, whether it came from an official server or from your own locally-produced tiles.

The OpenStreetMap wiki has a page listing some of the many rendering options[12] including information on tools such as Mapnik, Maperitive and Mapsforge.

Historically, the installation and configuration of such rendering tools (some of which are open source and some proprietary) was a daunting prospect requiring significant resources, but I was recently informed about a lighter-weight option called MapsforgeSrv[13]. This doesn't spend hours rendering millions of images in advance, it just renders tiles as they're requested over a `http://localhost` web connection, which is perfect for GpsPrune. It should also be possible to customize the rendering options of this tile server to change the appearance and styles, but I haven't delved deeply into this yet.

[12] `https://wiki.openstreetmap.org/wiki/Rendering`
[13] `https://github.com/telemaxx/mapsforgesrv`