

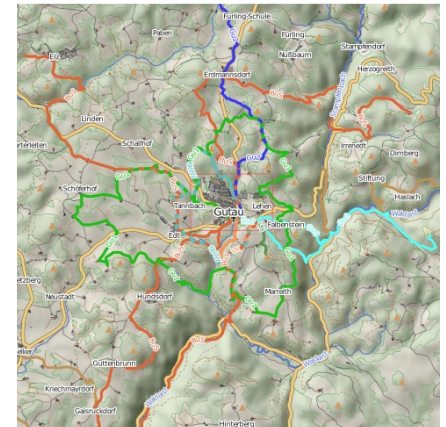


The Dream of Your Own Map

Holger Schöner

Overview

- Background OSM (OpenStreetMap)
- Maps, Data, Styles, Rendering and Printing with Open Source Software
- Licenses for Open (Spatial) Data



OSM Background

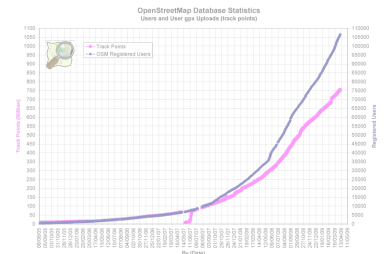
- Founded 2004, by Steve Coast in UK

”OpenStreetMap creates and provides free geographic data such as street maps to anyone who wants them. The project was started because most maps you think of as free actually have legal or technical restrictions on their use, holding back people from using them in creative, productive, or unexpected ways.”
- Since about 2006, infrastructure is in place for large scale mapping; since then an exploding number of participants

03/2009: 100,000 registered users, about 10% active each month
- Organization so far very community oriented

Wiki, email lists, irc, forums, mapping parties, groups
- Creation of more formal organization

OSMF: Collection of donations, servers, ”support”, local chapters
Marketing, Press and legal contact — License change



OSM Data

- Elements in OSM database

Basically everything with coordinates someone has an interest in:

Roads (motorway, ..., residential, service, track, cycleway, footway, bridleway, path), rivers, railroads, skiing lifts/slopes

POIs (traffic, touristic, historic, shops, ...)

Places, forests, landuses residential/industrial/farm/..., parks, buildings, airports

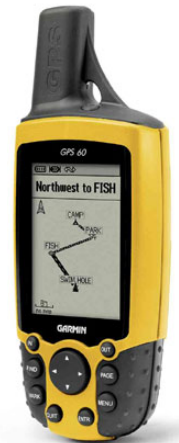
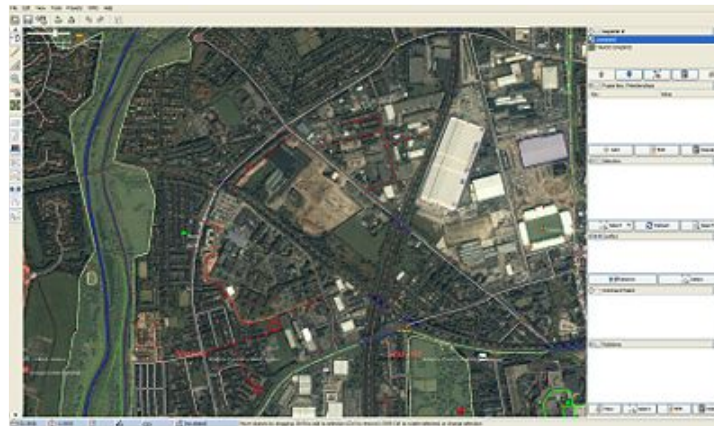
- Data collection

Local Knowledge in
relation to existing data

Imports

- Editing

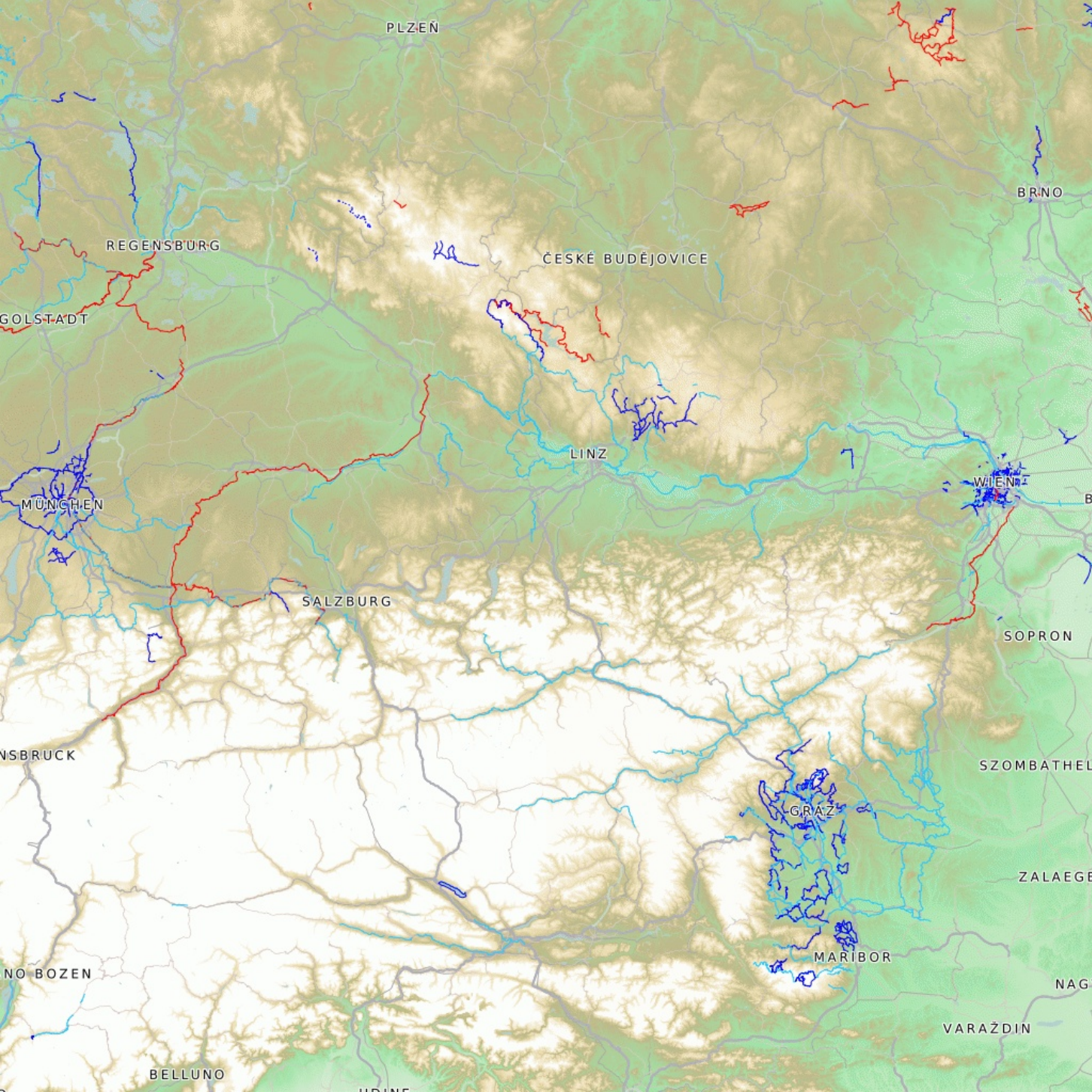
Online editor Potlatch, Java application JOSM,
Merkaartor, Mobile devices viewers, basic editors



OSM Data (2)

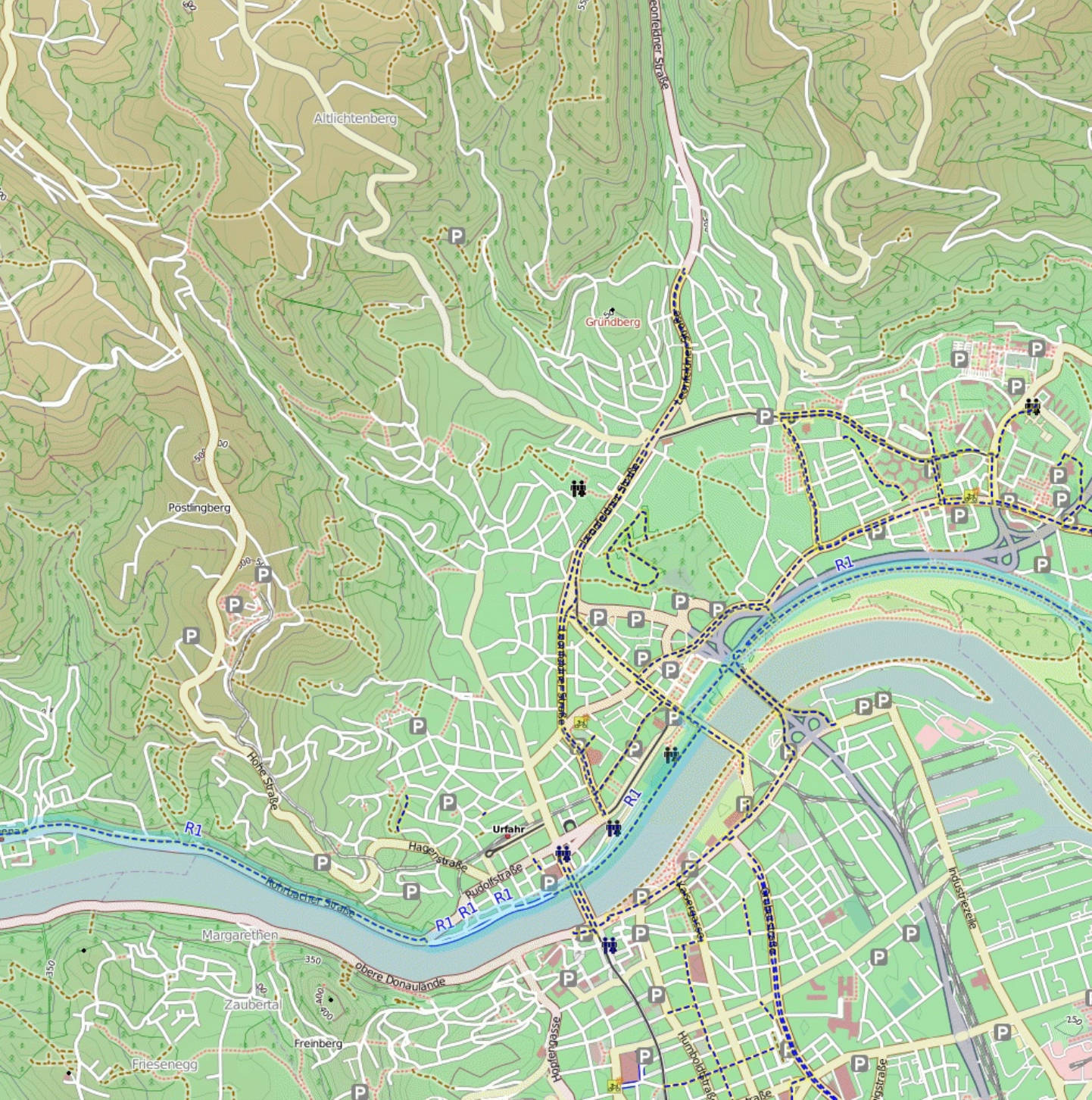
- Data types in OSM database
 - **Nodes**
The only elements having geographical coordinates
POIs, locations, building blocks for more complex shapes
 - **Ways**
For linear elements; for polygons/areas when closed
Roads, waterways, landuse polygons, forests, countries
 - **Relations**
Arbitrary collection of nodes, ways or other relations, with roles
Routes, turn restrictions, collections of ways with similar properties
 - **Tags**
Key-value lists, arbitrary number for nodes, ways, and relations
name=Linz, landuse=forest, highway=primary, historic=castle, ...
- Tags are "free"
Recommended, often used keys or key/value pairs in MapFeatures
Everyone can introduce new or more specific tags or tagging schema





OpenCycleMap Overview

opencyclemap.org



OpenCycleMap Details

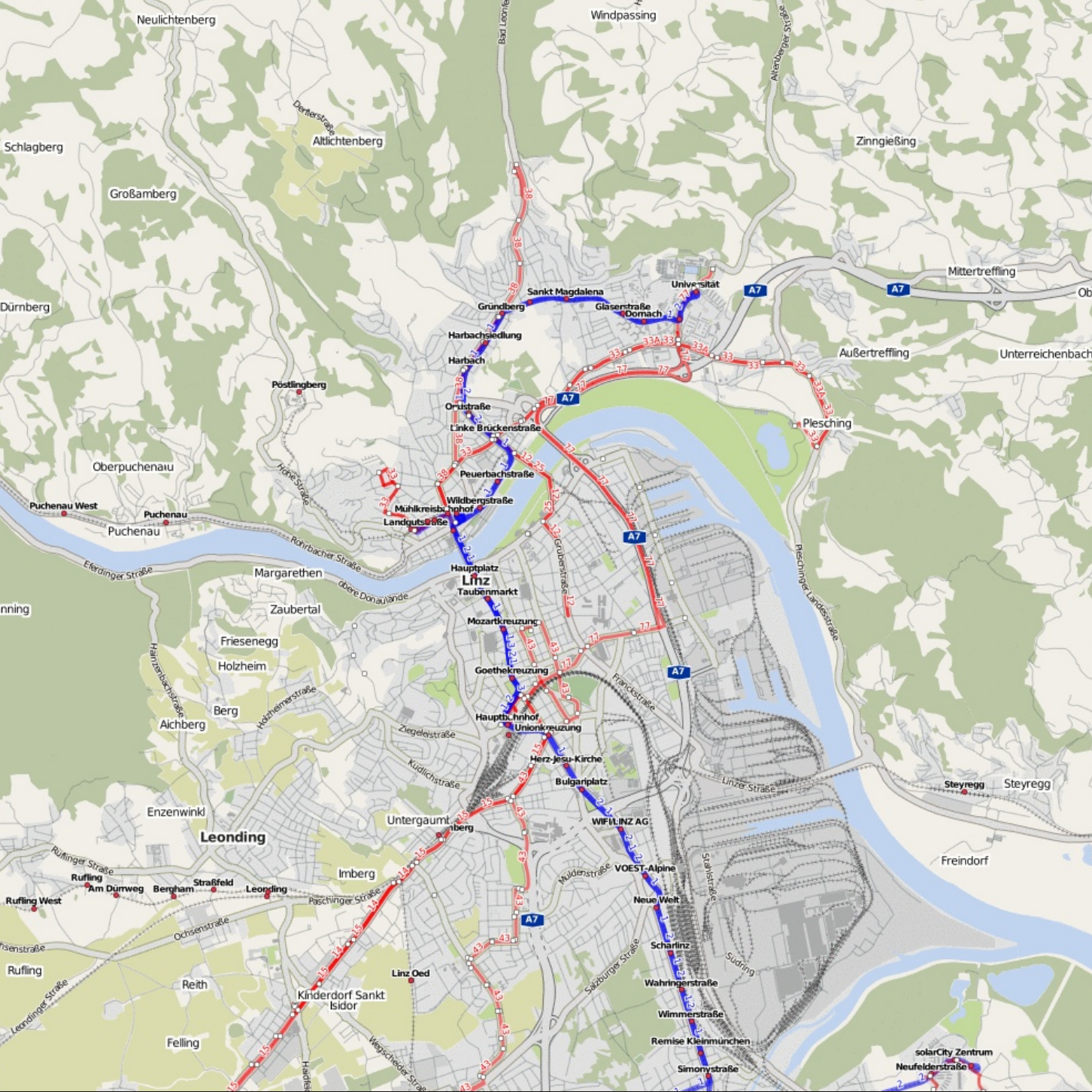
opencyclemap.org



Riding and Hiking Map

osmc.broadbox.de

(Lizenz: CC-BY-SA-NC)



ÖPNV Map

www.öpnvkarte.de

Main OSM Map – Details

openstreetmap.org



Rendering – Context

- Motivation for map, what do I want to achieve?
- Target Medium
 - Online: sloppy map, picture
 - Print: home printer (color/bw), A0 color inkjet, offset printing
 - Mobile device: GPS devices, PDAs/Smartphones, Netbooks
- Target Format, Region
 - Projection: global, local, Spherical Mercator, properties to conserve
 - Format, size (width/height of paper/screen), resolution (dpi)
 - Renderer: Mapnik, Osmarender, Kosmos, MapServer, mkgmap
- Elements to show, appearance, emphasis
 - Target audience
 - Important/useful/pleasant (and superfluous) features



Rendering – Data

- Sources

- OpenStreetMap

- Availability of raw vector data (api small areas, planet files, excerpts)

- Different prerendered map tiles and styles available (base layer or style template)

- Features which are not present in commercial data (footways/paths, routes, building polygons)

- In rural areas often still less details; house numbers still very incomplete

- DEM data (Digital Elevation Model)

- contour lines, relief, or hill shading

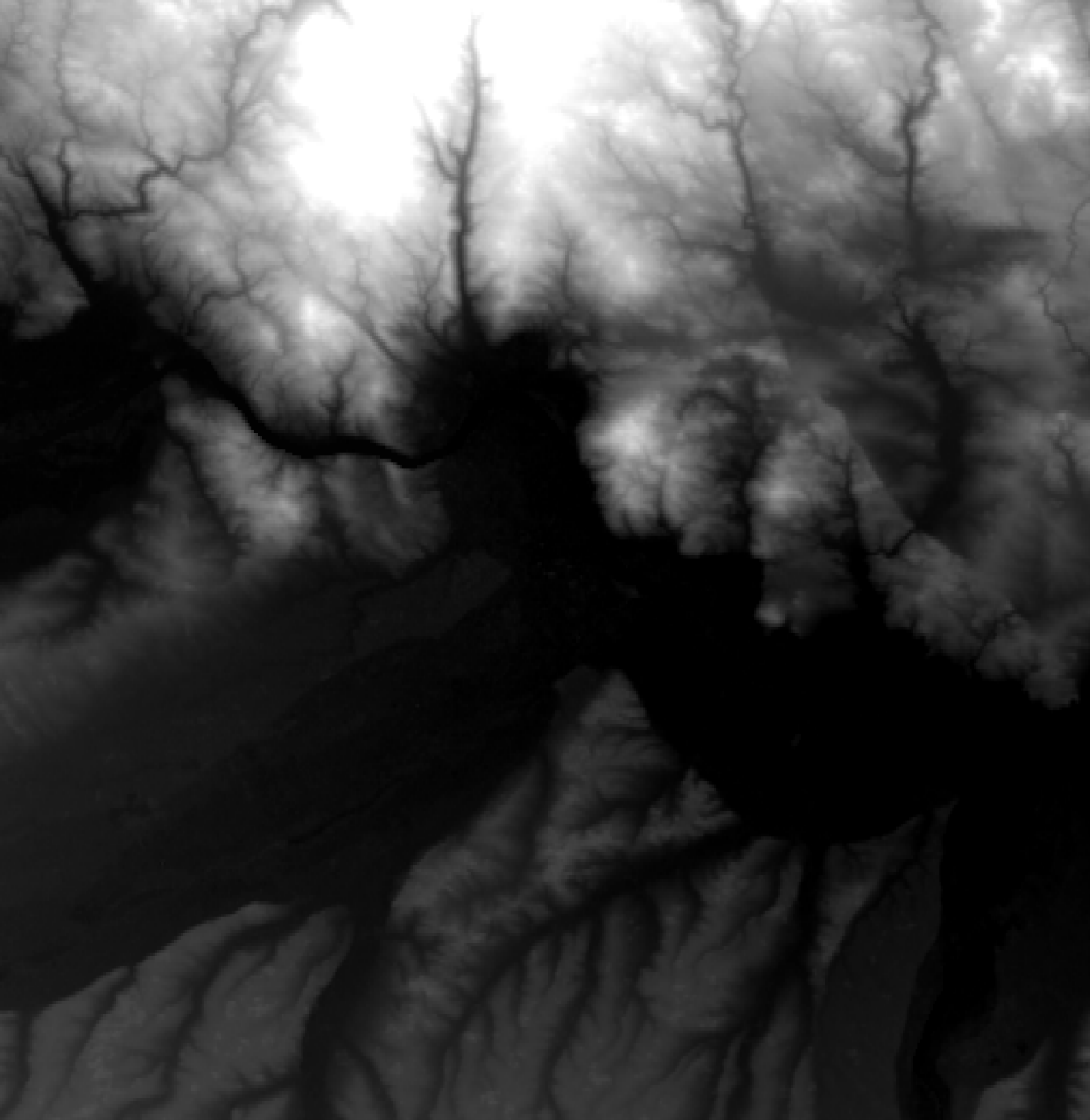
- NASA SRTM data (Shuttle Radar Topography Mission 2000, public domain):

- Filled/interpolated data (SRTM based) available under non-commercial licenses

- Specific own data sets

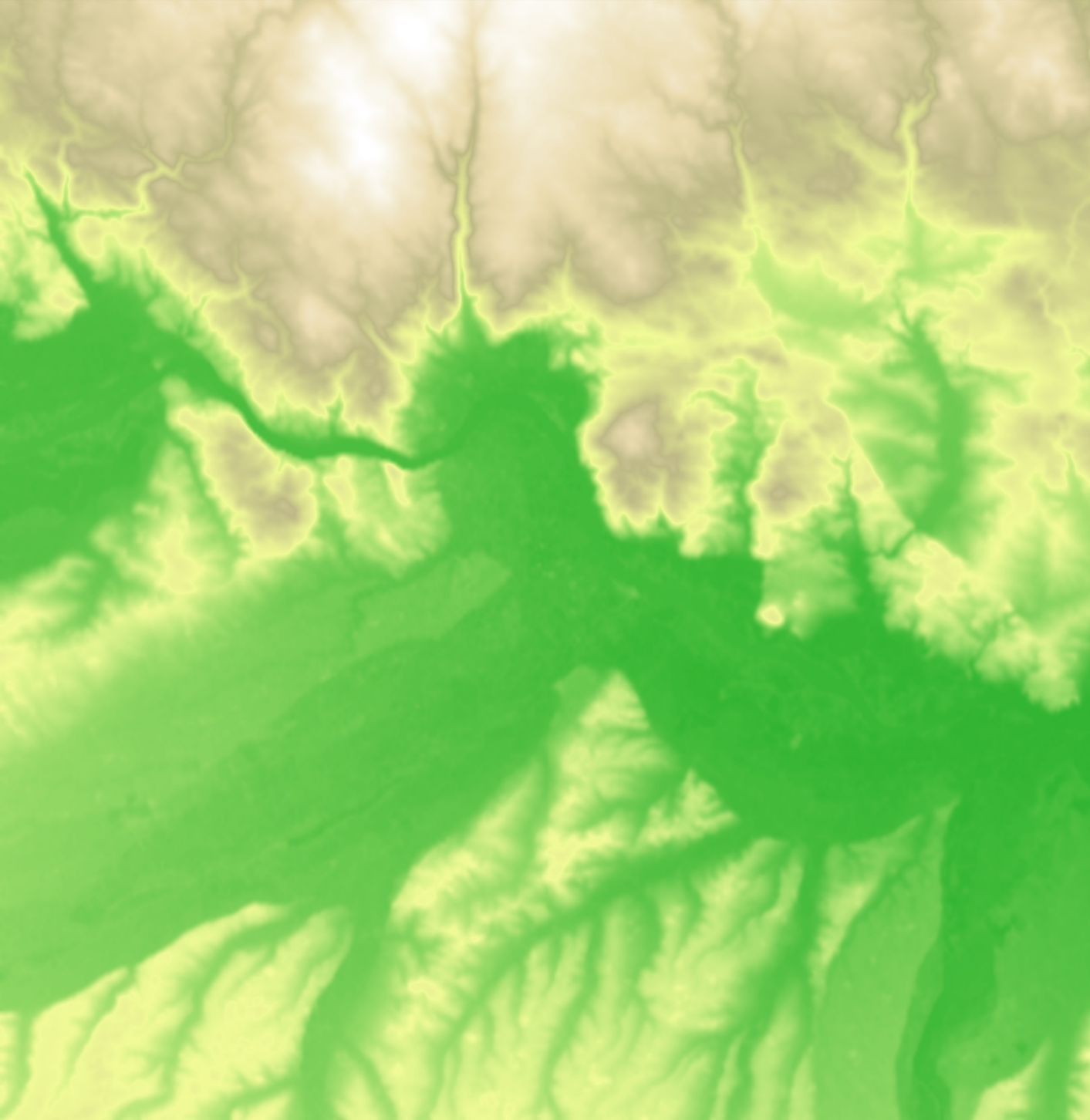
- (POIs, regions, annotations, routes/tracks, ...)





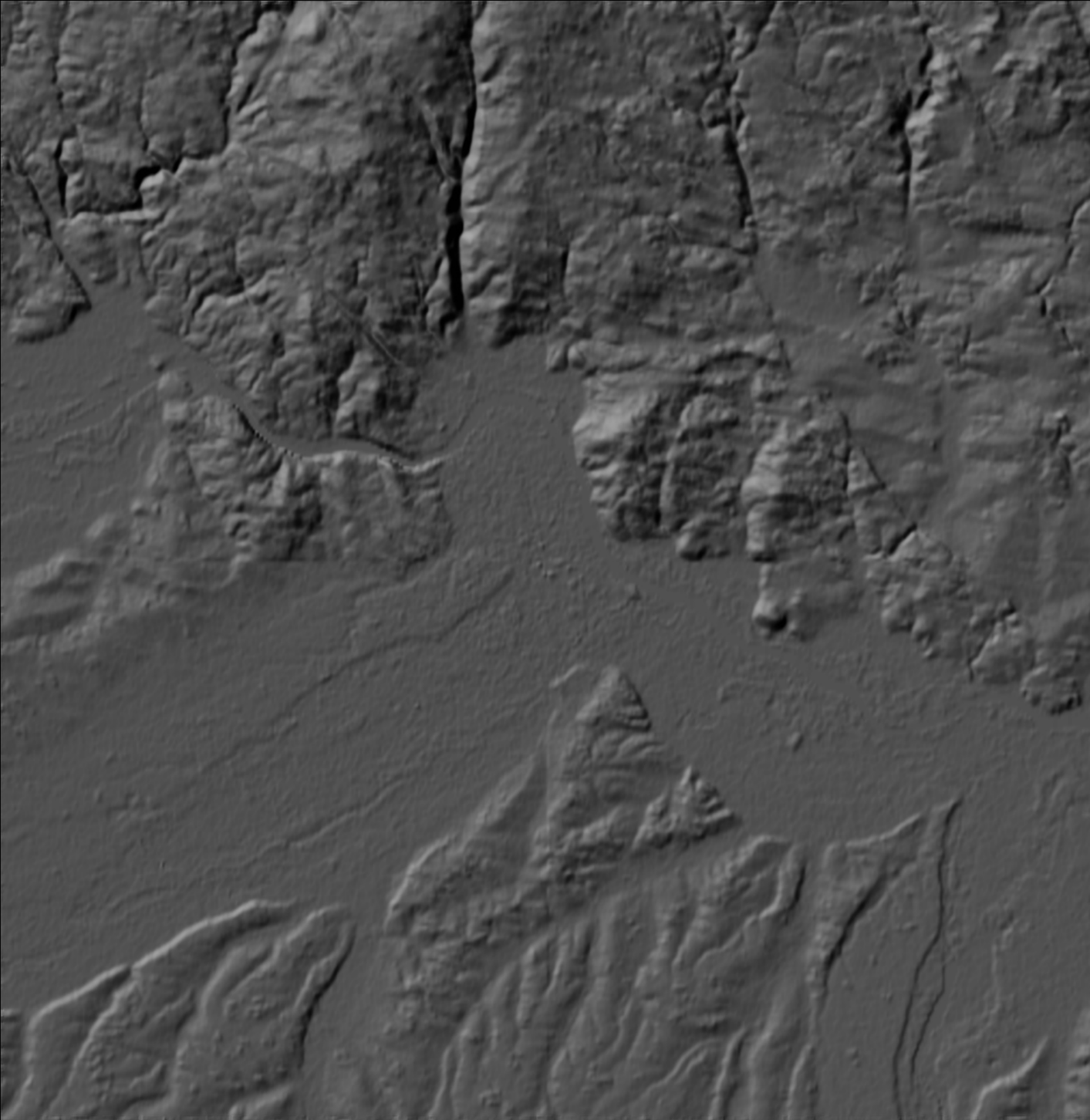
SRTM-DEM from NASA

gdal_transform,
gdalwarp:
 region extract
 rescaled
 conv. to image



Relief from SRTM-DEM

PerryGeo demtools
color-relief



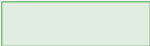























Hillshading SRTM-DEM

PerryGeo demtools
hillshade
(gamma-corr.)

Rendering – Process Overview

- Data download (OSM, DEM)
- Processing
 - Vector data processing in OSM-XML, PostGIS
(filtering, simplification, merging, generalization, annotation, projection, movement of labels)
 - Raster processing with gdal, GRASS, PerryGeo
(projection, relief, hill shading, interpolation)
 - Conversion raster into vector format (eg. contours, digitizing)
 - Editing of rendered map (annotation, in SVG arrangement of labels)
- Development of styles



	Waldfläche
	Wiese, Park
	Deponie, Schüttgebiet
	Fluss, Bach
	Berg, Hügel, Kliff
	Hauptstraße, Güterweg/Wohnstraße
	Zufahrt, Schotter-/Feld-/Waldweg
	Karrenweg, Pfad
	Stufen, Fußweg
	Parkplatz
	Schranke/Tor
	Öffentl., tourist., sonst. Gebäude
	Kirche, Kapelle, Bildstock/Wegkreuz
	Restaurant
	Hotel, Urlaub auf dem Bauernhof
	Aussichtspunkt, Färber-Museum
	Schloss/Ruine/Burg, Attraktion
	besonderer Baum
	Sportplatz, Reitplatz
	Tennis, Fußball
	Bogenschießen, Reiten, Klettern
	Hallenbad, Sauna
	Burgen- und Schlösserweg
	Vogelkundeweg

Nodes:

icons

labelling

Ways:

line width, color, dashing,

opacity,

fill color, fill opacity,

labelling,

repeated line/fill graphics

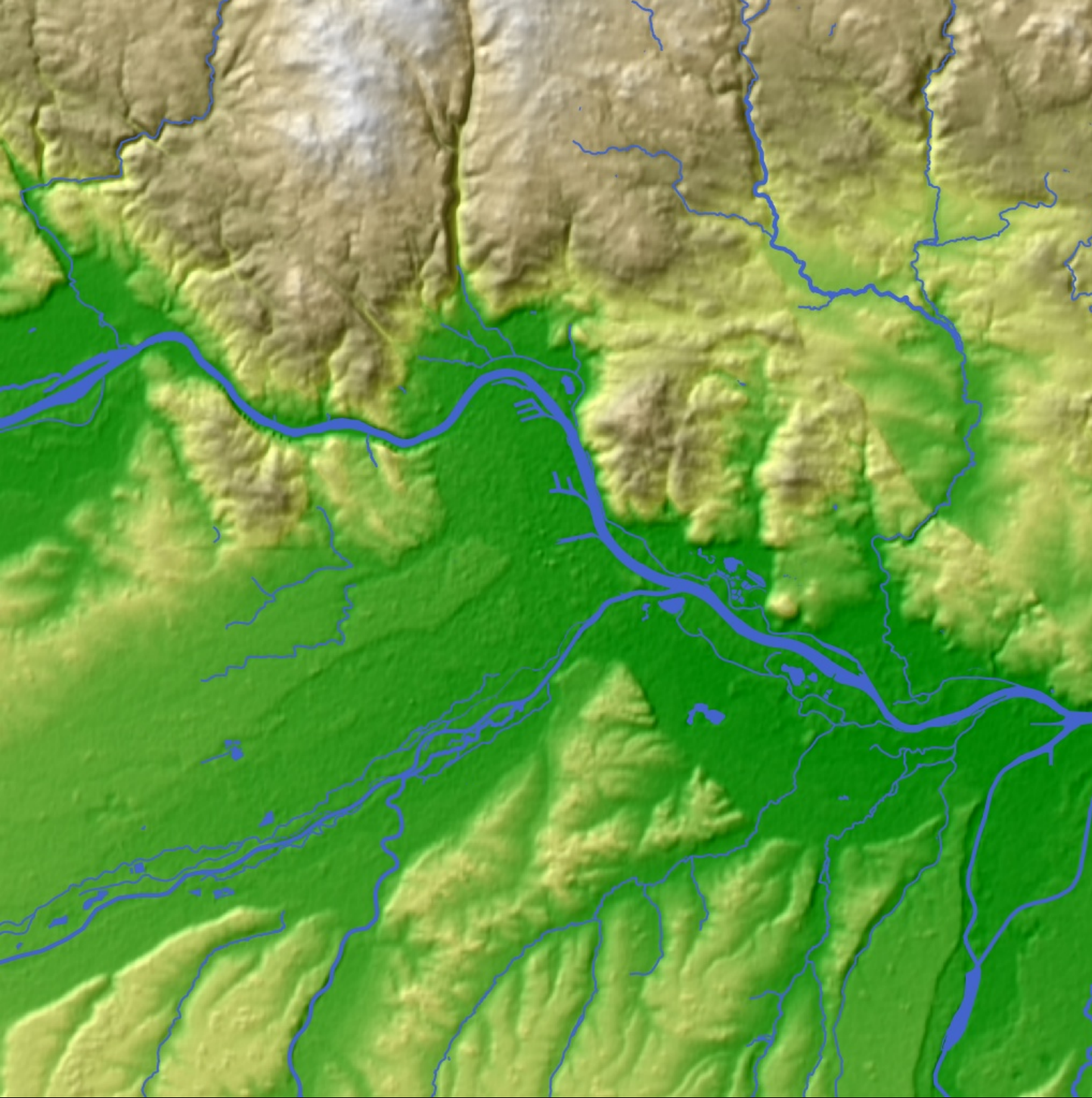
Raster:

interpolation,

opacity, merge style

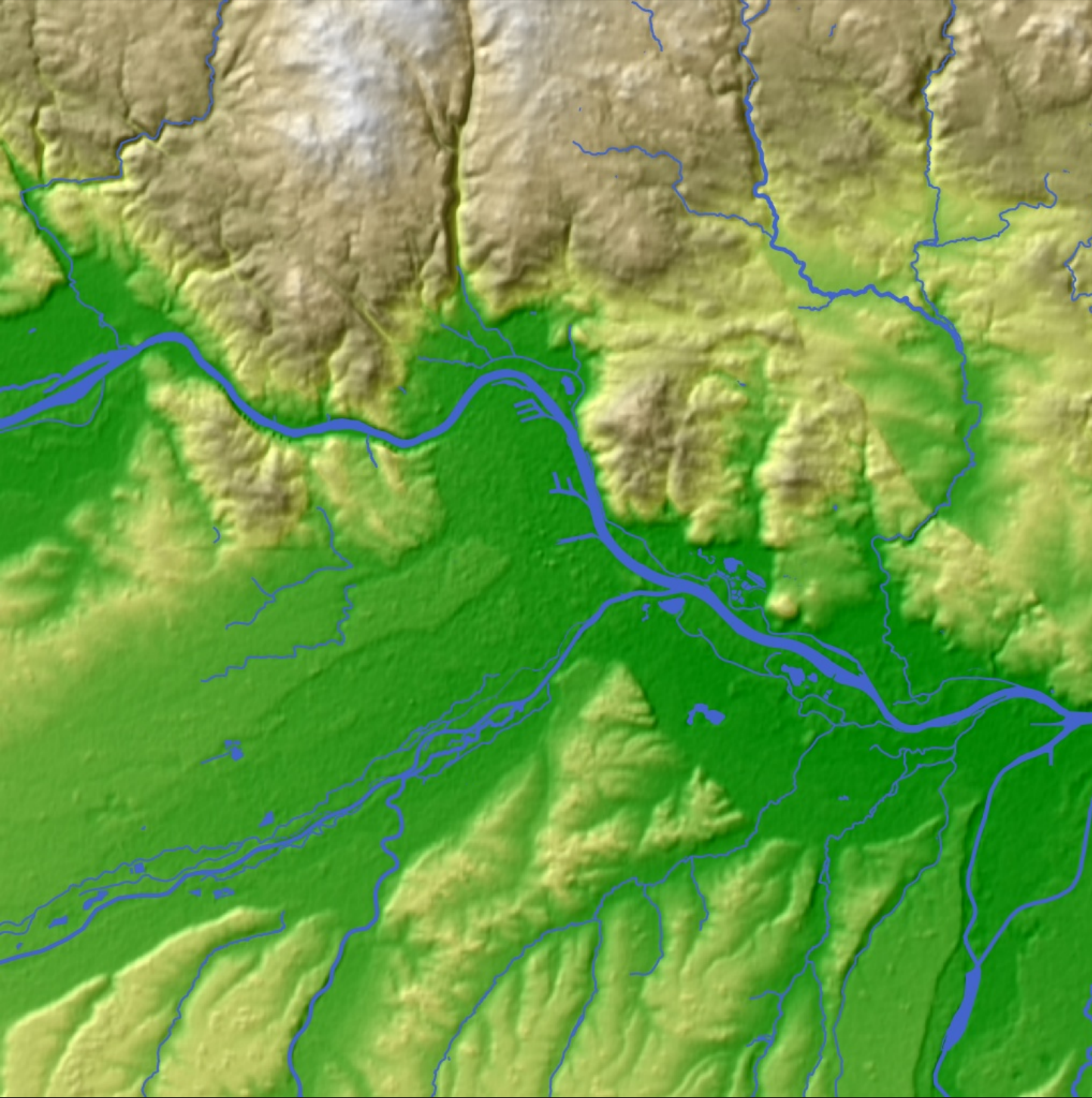
Min/max scale to show each feature, or to show it differently at zooms

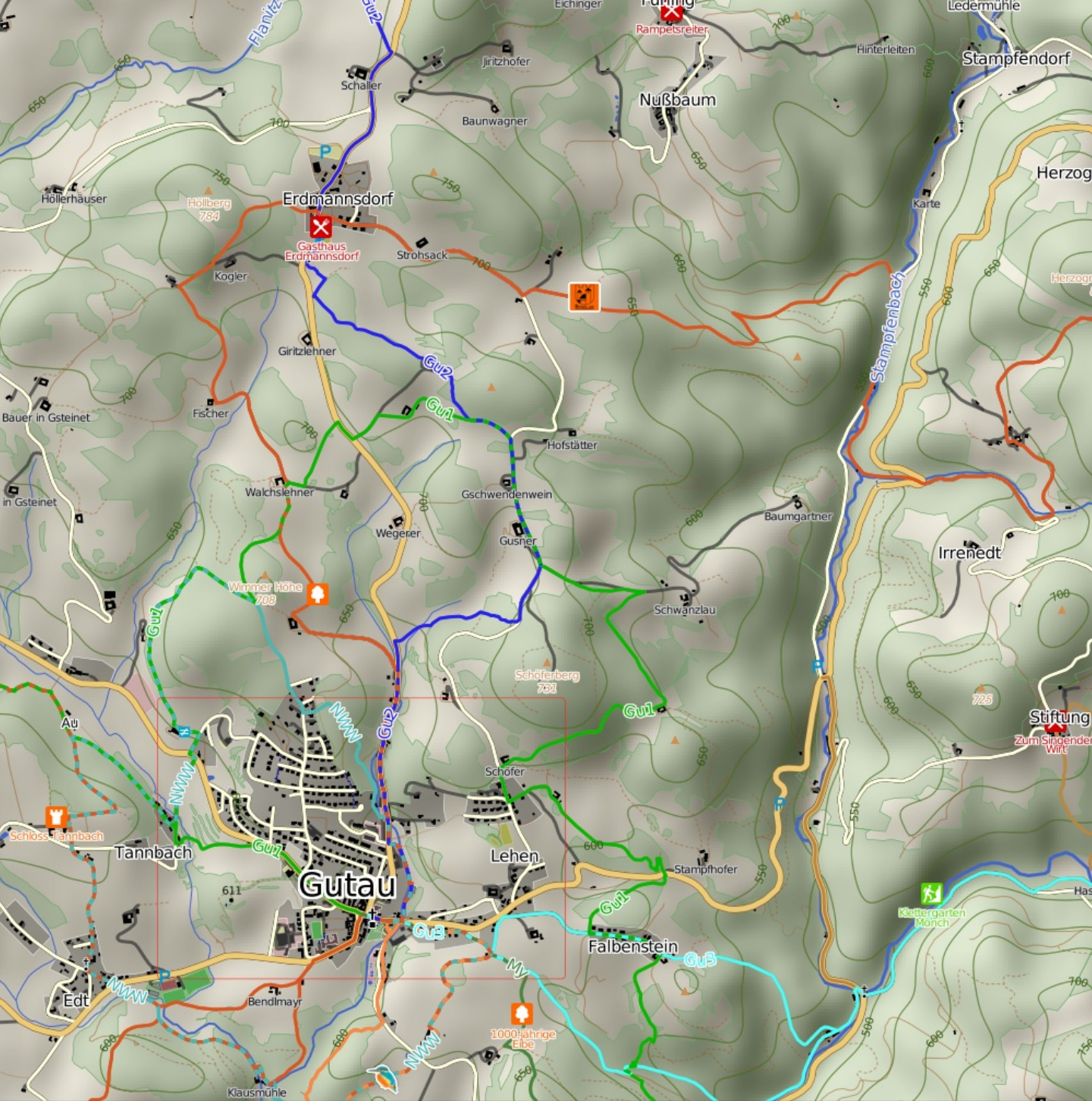
Mapnik Rendering



Mapnik Rendering

relief,
hillshade
combined with
"grain_merge"
of Mapnik 0.6.0
water areas, streams
from OSM





Gutau Hiking Map

base color
hillshade
transparent areas
elevation contours
roads, water
buildings
hiking routes
POIs
labelling

rendered for
offset printing

Rendering – Special Styling

- These simple styles allow rendering of complex situations:
 - **Roads:** Casing, Layering (painters algorithm)
 - **Text / Icons:**
Overlap avoidance: movement, hiding
Repetition along lines, avoidance of intersections or sharp bends
Buffers
 - **Rasters:**
Merging/transparency for combinations:
Ambient color, hill shading, relief, pictorial area styles
Interpolation
 - **Legend**
Rendering of artificial data set with same style file
 - **Scale Bar**
Introducing lines, ticks, text labels into original data set
Scales with rendered map



Rendering – Print Preparation

- Combination into one document (PDF?) with
 - Copyright/license
 - Legend
 - Title
 - Detail maps
 - Introductory text, descriptions, fotos, ads

- Proof printing

Very different from color laser or color inkjet output (resolution, color)
Color Management / experience can greatly reduce the need for proofs

- Good experience with Scribus

- + PDF export, color management, accuracy, large file handling
- learning curve / usability, stability



Licenses of Map Data

- Discussion about new license for OSM data
 - CC-BY-SA not applicable to factual information and databases
 - Attribution of each individual contributor?
 - After selection of new license: Vote
- Differences in licensing data and software
 - a lot of similarity, of course: philosophy, copyright, team work
 - project size: software 1-100-1000; OSM 100,000
 - no sophisticated "library concept" – what ways to merge data?
 - not processor to produce some result
 - but source or result (and present in further results in modified form)
 - facts are not covered by copyright
 - but a large collection of facts may be protected as database (Europe)



Licenses – OpenStreetMap

- Basic philosophy of OpenStreetMap
Free, open, as little rules as possible
- But the details
 - Commercial use
 - Virulence (BSD vs. GPL)
 - Attribution
 - Discerning between database and product?
 - Compatibility with other data sources
- How to represent a diverse community in one license?
- Other data sources use
PD, non-commercial use, commercial use, CC-BY-SA
 - Further options: CC0, BSD, ODbL/FIL (protect db not products)



Licenses – OpenStreetMap (2)

- Arguments for ShareAlike
 - Similar in spirit to current CC-BY-SA
 - Easiest way to keep most of the data together (contributors, imports)
 - Enforcing fair use (in the sense of giving back any improvement)
- Arguments for PD/CC0/BSD
 - Really free to use for all purposes
 - No incompatibility hassles with other geographic data licenses
 - Very clear and easy to understand, no questions about border cases
 - Possibility to give back to data providers (e.g. OpenGeoDB)
- Open questions/problems of ODbL
 - Making available any derivative database – hosting several GB?
 - Incompatibility with very similar licenses like CC-BY-SA?
 - Contract needed, which could complicate handling of data



Links

- OSM: <http://www.openstreetmap.org/>
- OSM Wiki: <http://wiki.openstreetmap.org/>
- SRTM Data: <http://www2.jpl.nasa.gov/srtm/>
- Collection of data sources:
http://wiki.openstreetmap.org/wiki/Potential_Datasources
- PerryGeo Utilities: <http://www.perrygeo.net/wordpress/?p=7>
- Map of Gutau: <http://www.ancalime.de/gutau.html>
- Some technical details: OSM Wiki, HikingBikingMaps page

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