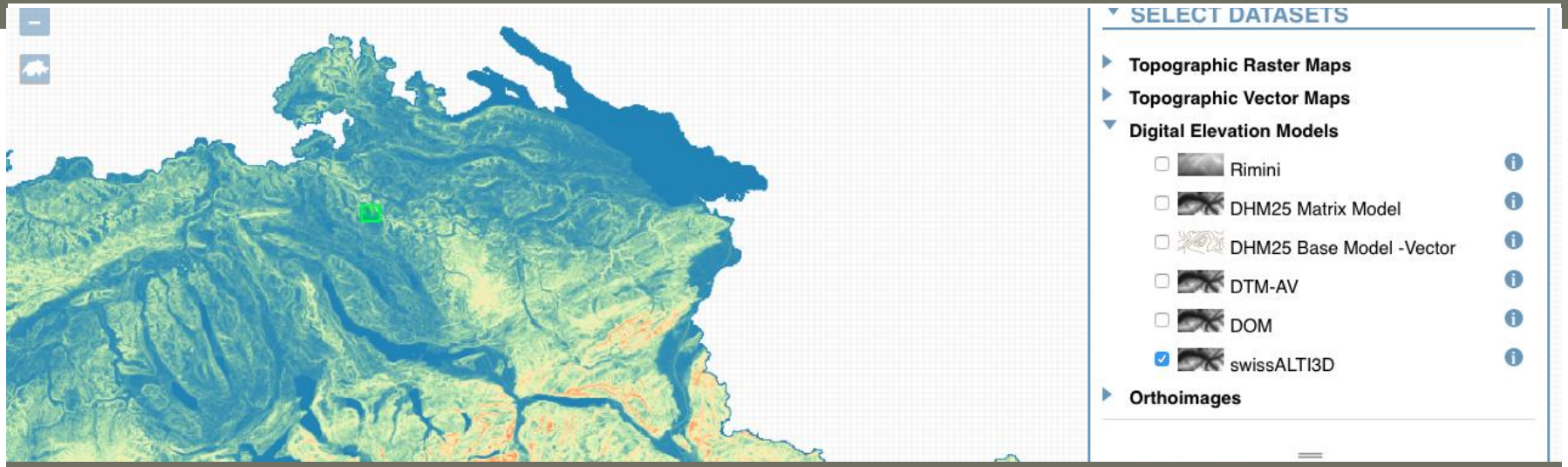


The Wheel of Design – Usability Driven Improvements to the GeoVITe User Interface

1st ICA European Symposium on Cartography,
10-12 November, Vienna, Austria

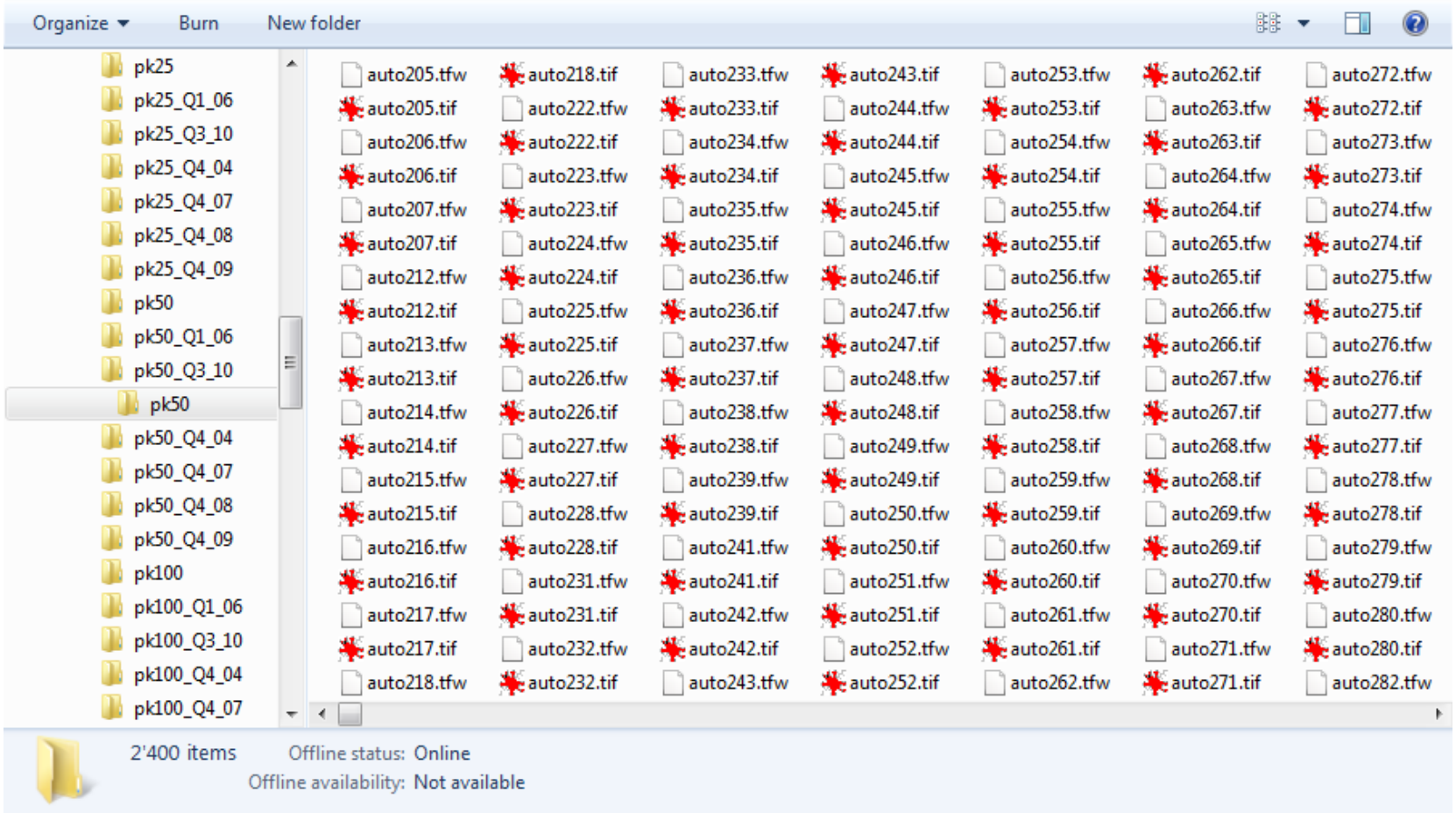
Ionuț Iosifescu Enescu, Raluca Nicola, **Benjamin Kellenberger**, Cristina M. Iosifescu Enescu, Roman Walt, Meda Hotea, Arlette Piguet and Lorenz Hurni

ETH Zürich, Switzerland

ICA European Symposium on CARTOGRAPHY
VIENNA, 10–12 NOVEMBER 2015

IKG
Institute of Cartography and Geoinformation

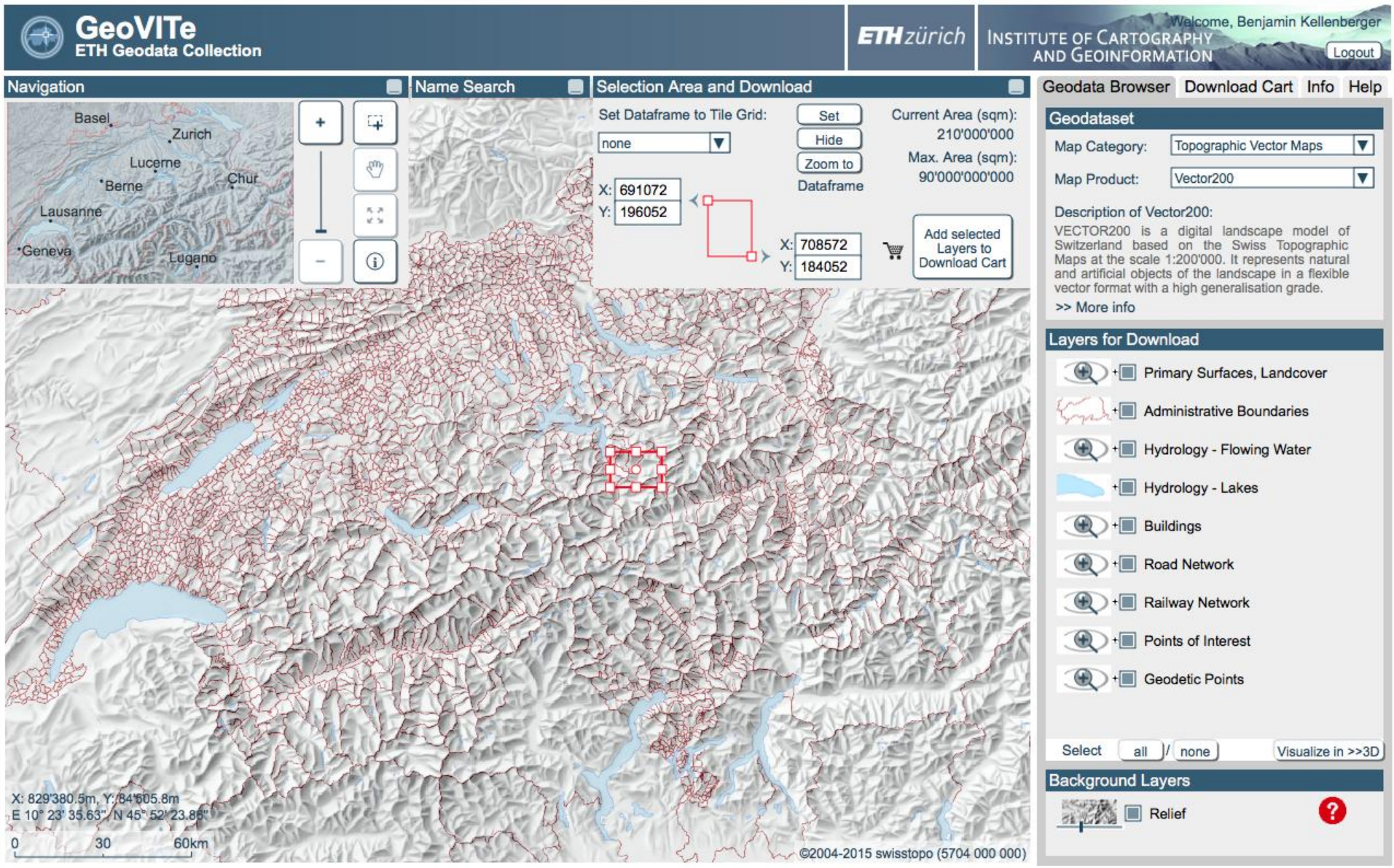
Geodata Access: The Conventional Way



GeoVITe

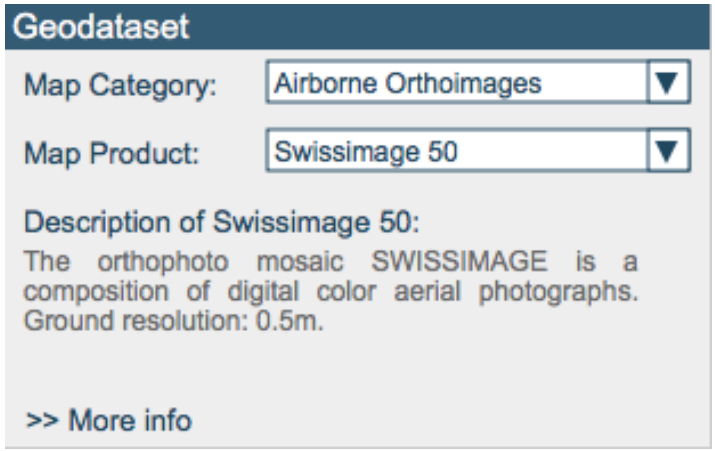
- **Geo**data **V**isualization and **I**nteractive **T**raining **E**nvironment
- Spatial Data Infrastructure (SDI) for ETH Zurich
- ETH-wide beta version launched in 2010
- Based on custom SVG technology (carto.net framework)

- Geo-portal functionalities: after Resch & Zimmer 2013
  - *discover* geo-datasets
  - *portray* data on map
  - *retrieve* data for further usage


GeoVITe
ETH Geodata Collection
ETH zürich
INSTITUTE OF CARTOGRAPHY AND GEOINFORMATION
Welcome, Benjamin Kellenberger
Logout
Navigation
Basel
Zurich
Lucerne
Chur
Berne
Lausanne
Geneva
Lugano
Name Search
Selection Area and Download
Set Dataframe to Tile Grid:
none
Set
Hide
Zoom to Dataframe
Current Area (sqm):
210'000'000
Max. Area (sqm):
90'000'000'000
X: 691072
Y: 196052
X: 708572
Y: 184052
Add selected Layers to Download Cart
Geodata Browser
Download Cart
Info
Help
Geodataset
Map Category:
Topographic Vector Maps
Map Product:
Vector200
Description of Vector200:
VECTOR200 is a digital landscape model of Switzerland based on the Swiss Topographic Maps at the scale 1:200'000. It represents natural and artificial objects of the landscape in a flexible vector format with a high generalisation grade.
>> More info
Layers for Download
Primary Surfaces, Landcover
Administrative Boundaries
Hydrology - Flowing Water
Hydrology - Lakes
Buildings
Road Network
Railway Network
Points of Interest
Geodetic Points
Select
all
/
none
Visualize in >>3D
Background Layers
Relief
X: 829'380.5m, Y: 84'505.8m
E 10° 23' 35.63" / N 45° 52' 23.86"
0
30
60km
©2004-2015 swisstopo (5704 000 000)

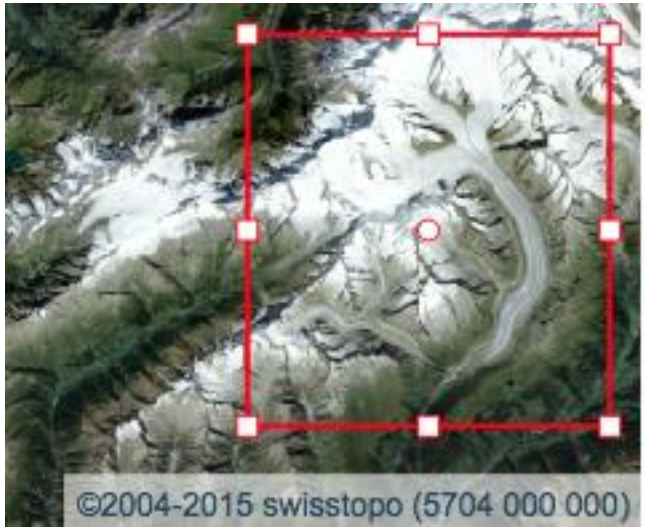
GeoVITe Usage Workflow

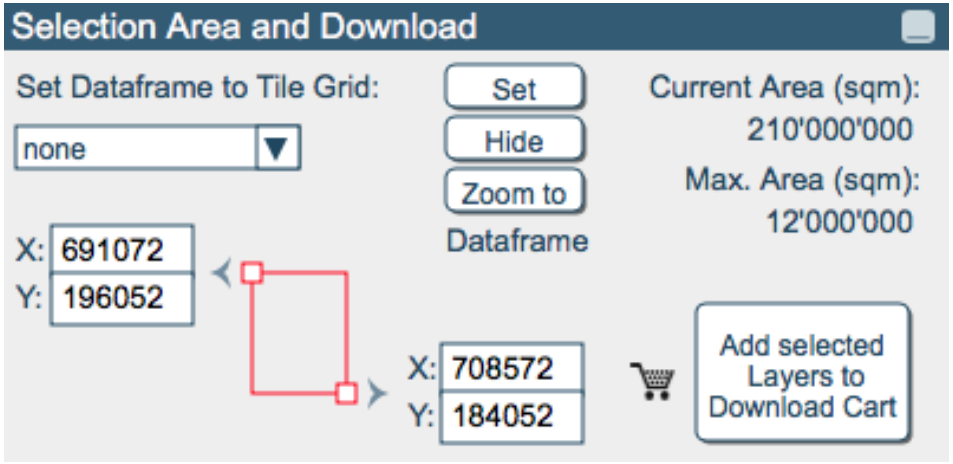
- Select product



GeoVITe Usage Workflow

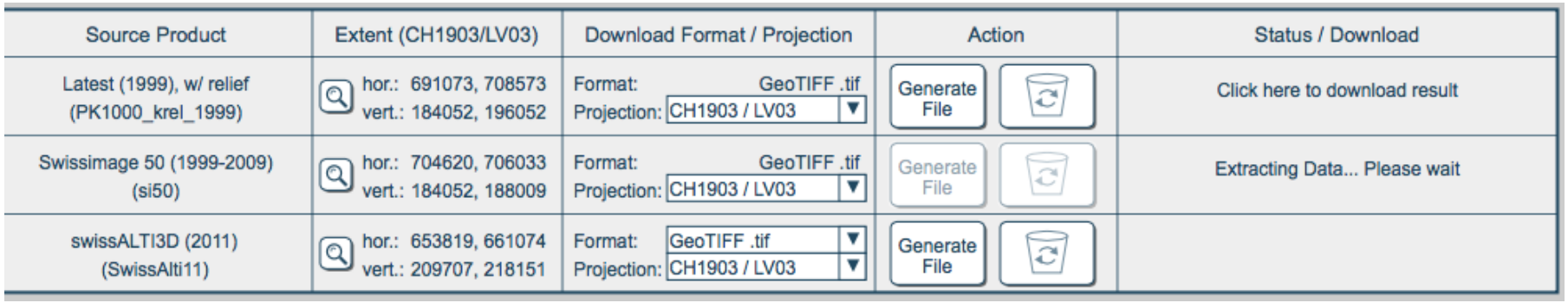
- Select product
- Select extent



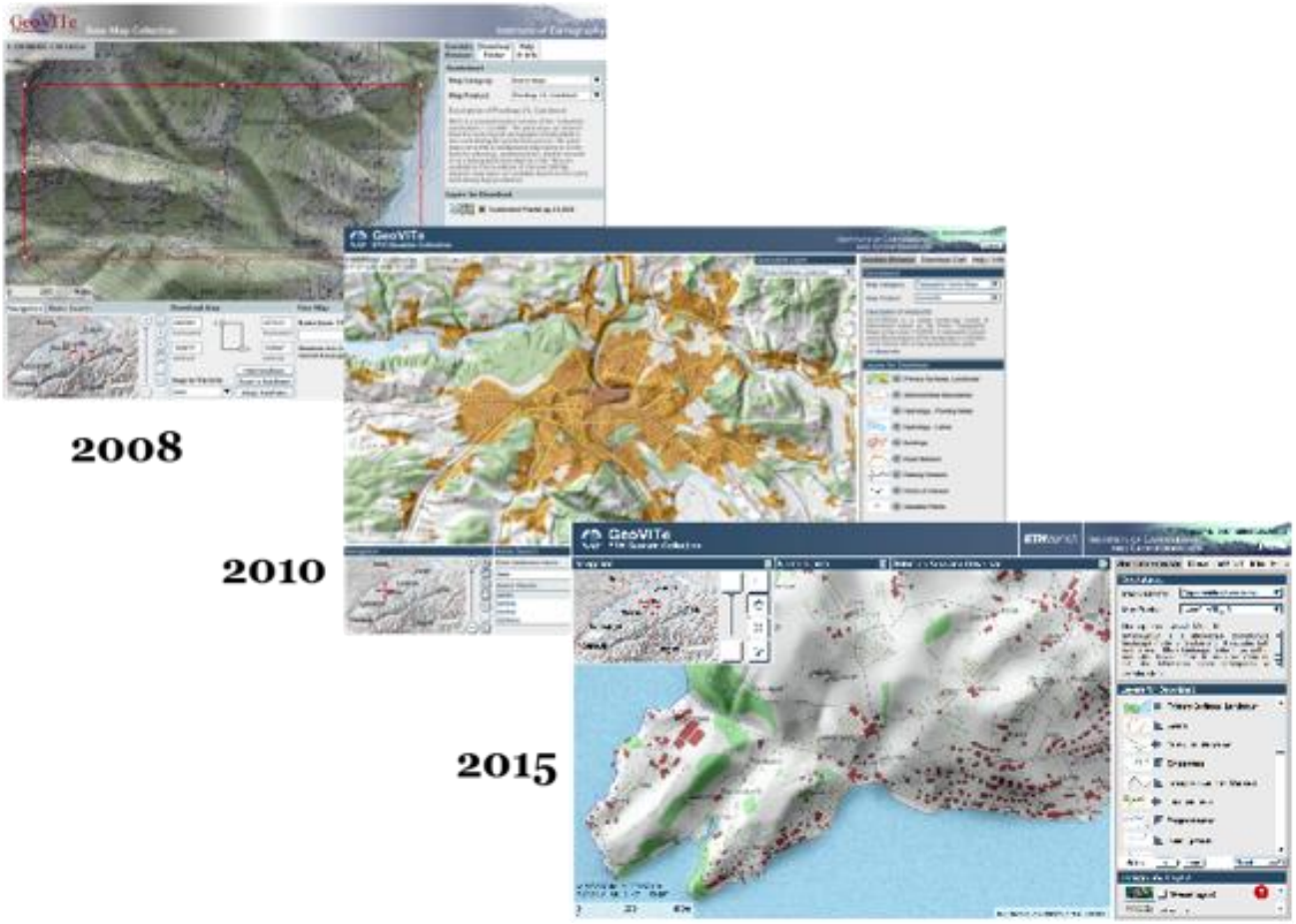


GeoVITe Usage Workflow

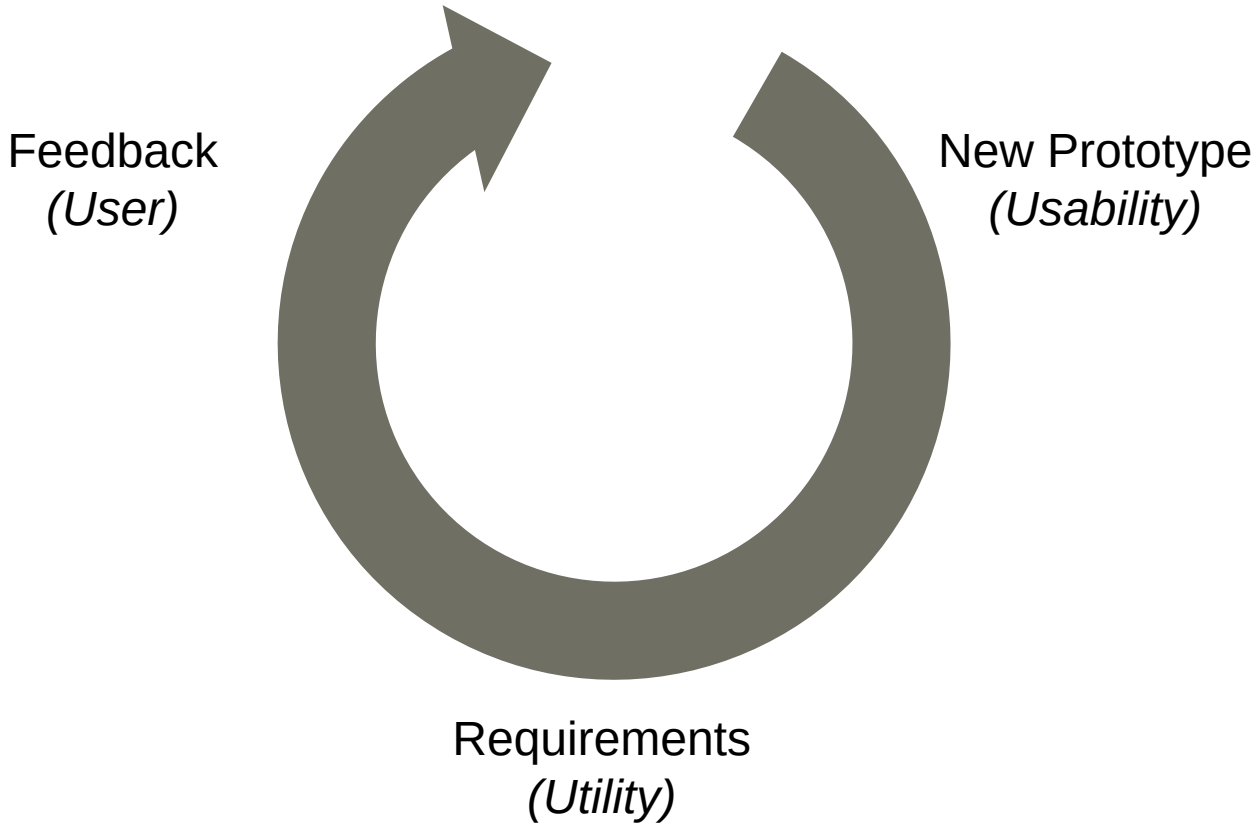
- Select product
- Select extent
- Add to cart and download



The Wheel of Design: GeoVITe Evolution



The Wheel of Design

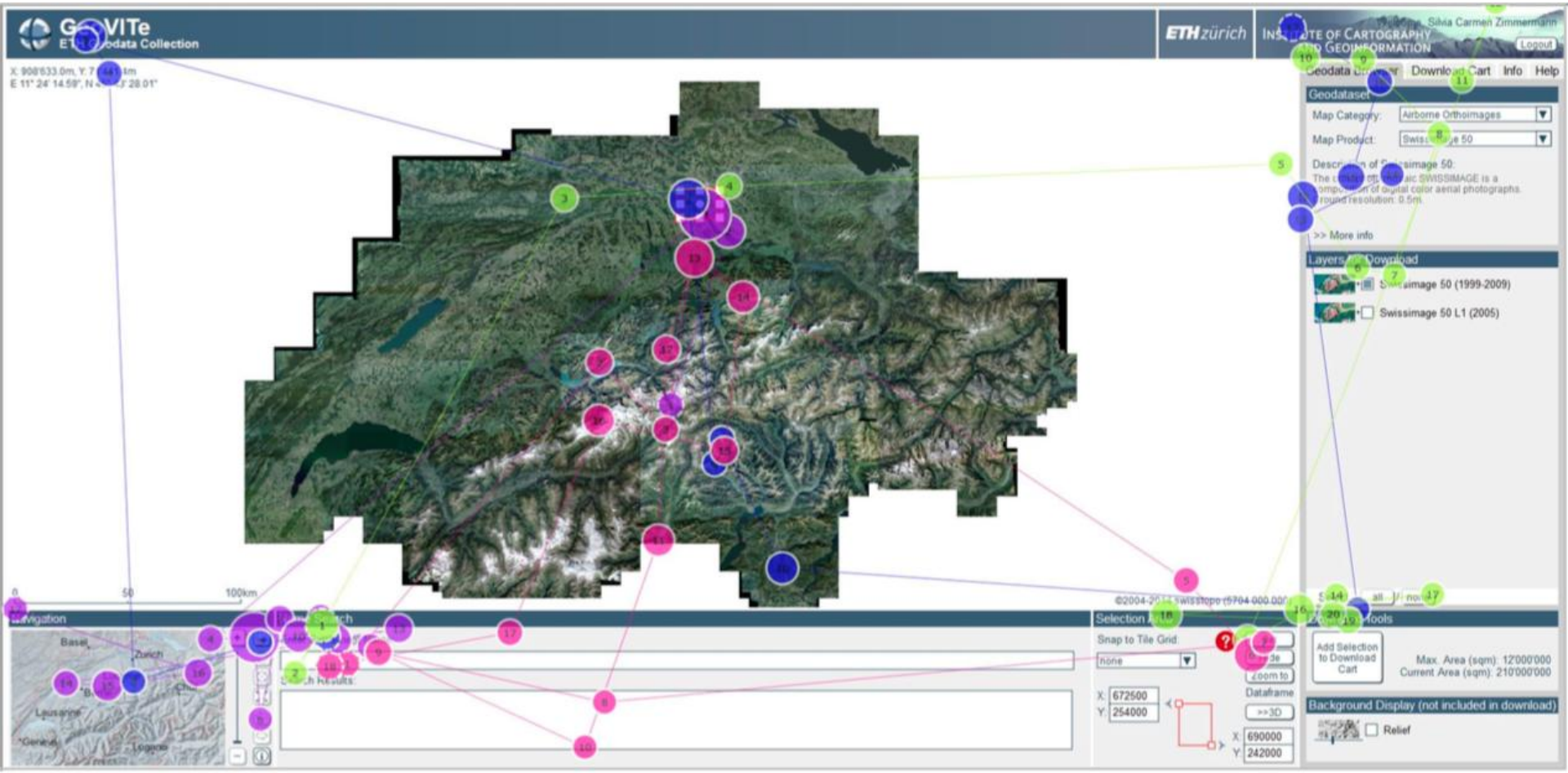


after Roth et al. 2015

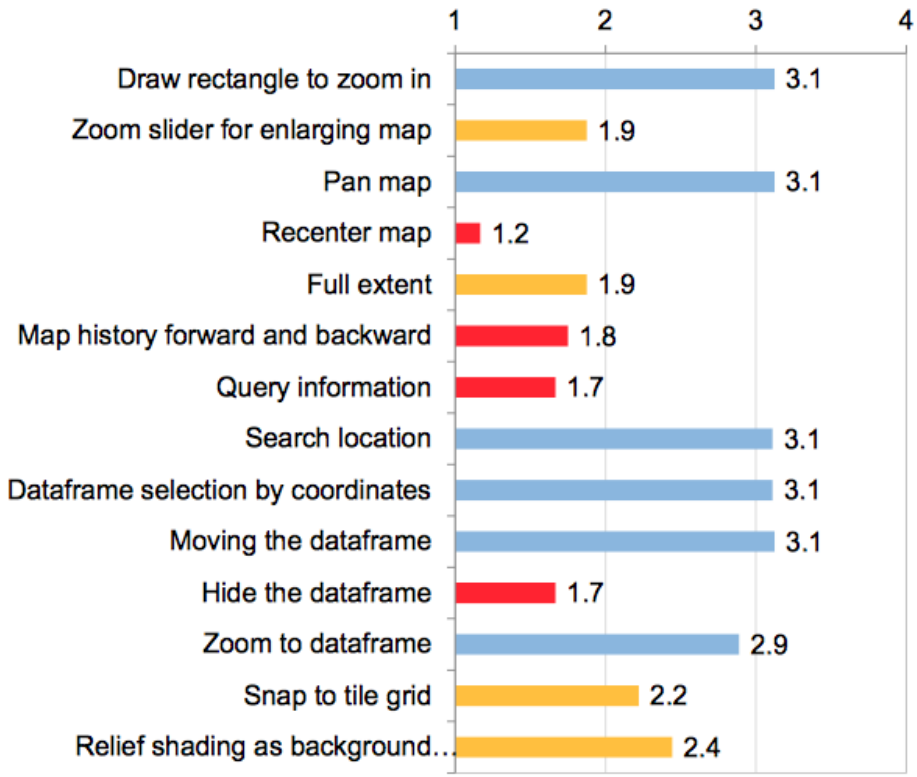
Usability Evaluation – Background

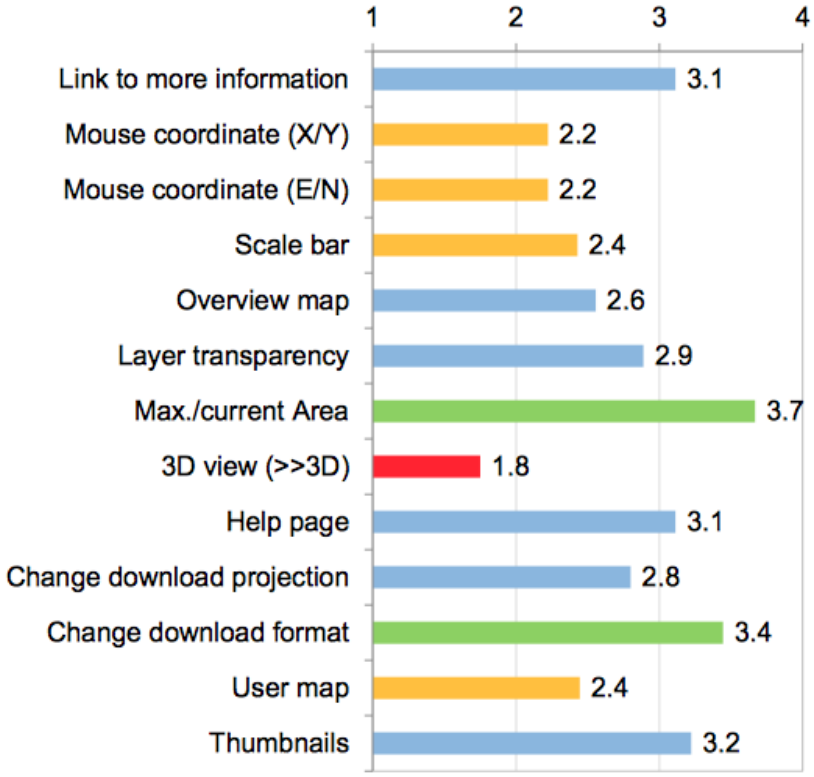
- **U**ser **C**entered **D**esign (UCD) Tsou 2013
- 3 Components Roth et al. 2015
  - Usability
  - Utility
  - User
- Methodologies:
  - Questionnaires
  - Interviews
  - Eye-tracking

Results: Eye-tracking

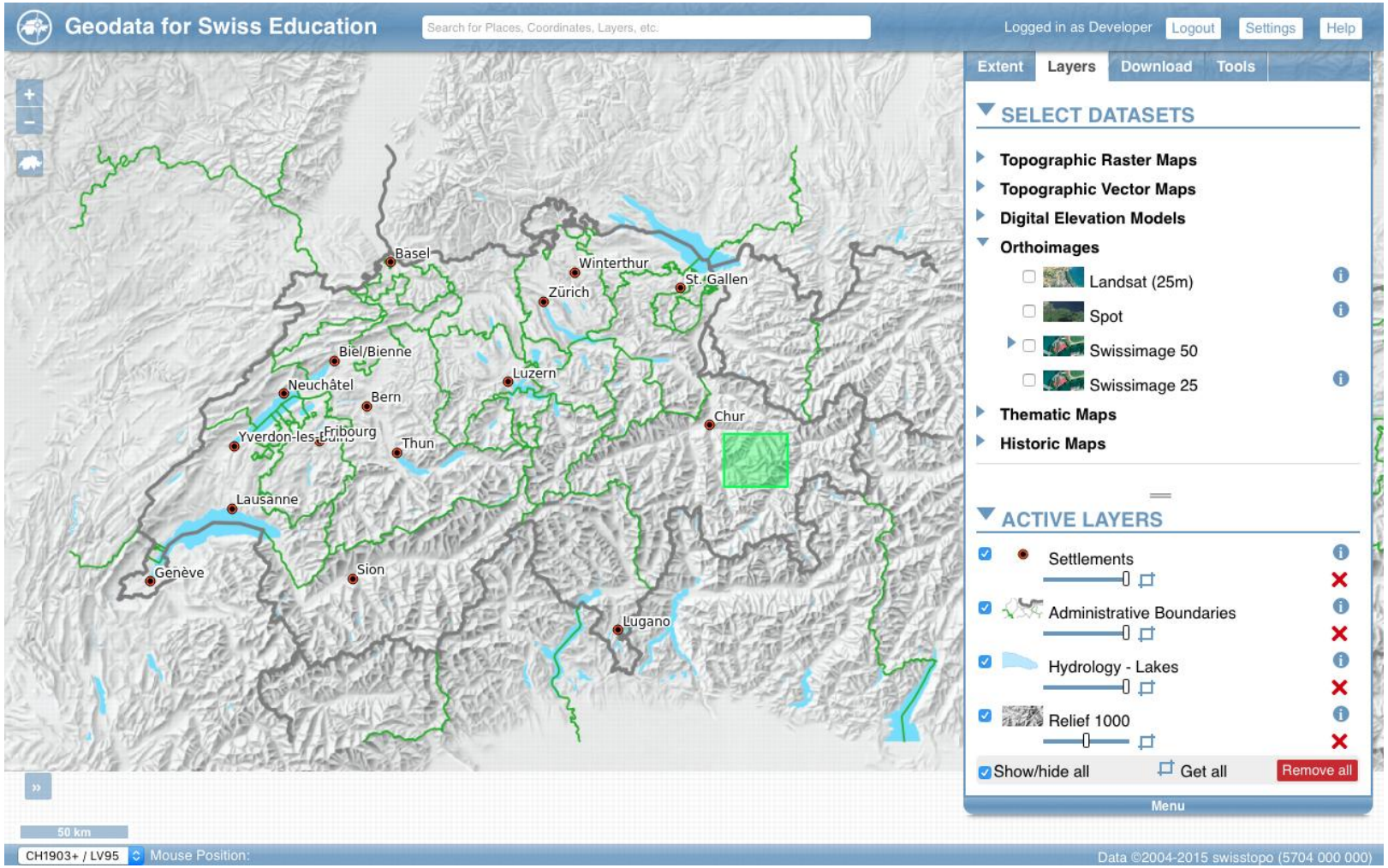


Results: Necessity of Functionality



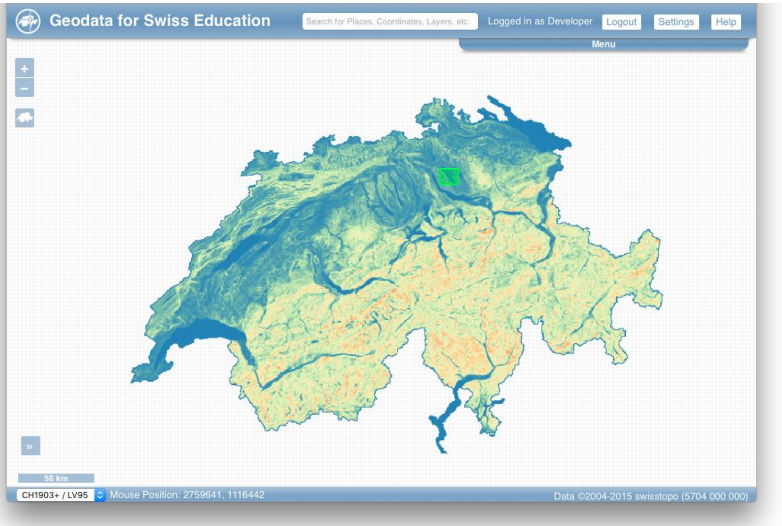


The Next Design Step: *Geodata4SwissEDU*



Usability-Driven Recommendations

- Use a **Full Screen Map**
  - Overlay controls in collapsible & customizable menus
- Implement **“Standard” Navigation Controls**
  - Click and drag to pan, scroll to zoom, click to query, etc.

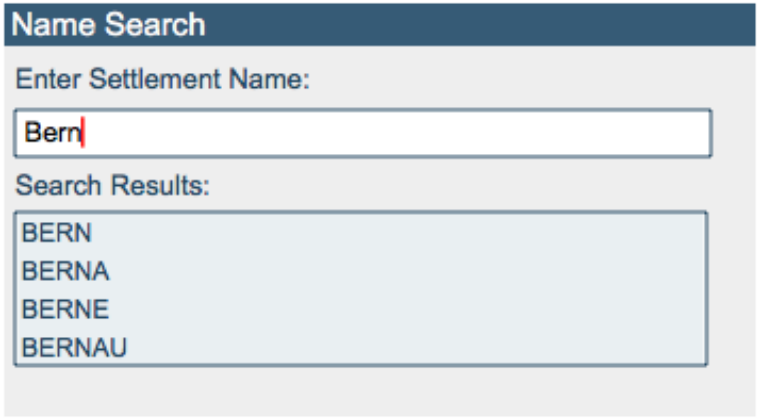


OpenLayers 3

Usability-Driven Recommendations

- Offer a **Multi-Purpose Search Function**
  - Search for places, coordinates, datasets, etc.
  - Allow imprecise search terms
  - Rank search terms according to relevance

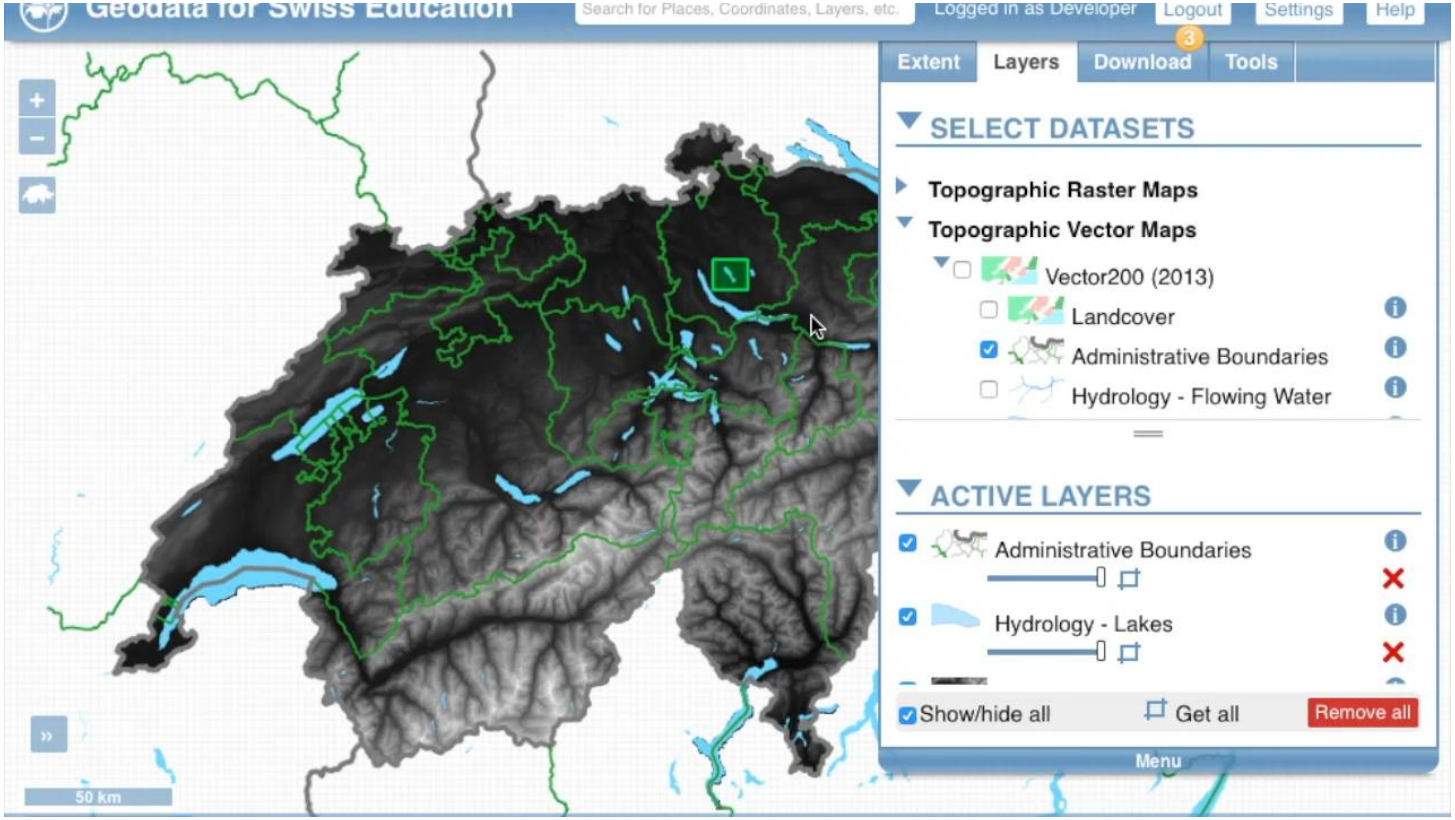
GeoVITe:



Geodata4SwissEDU:

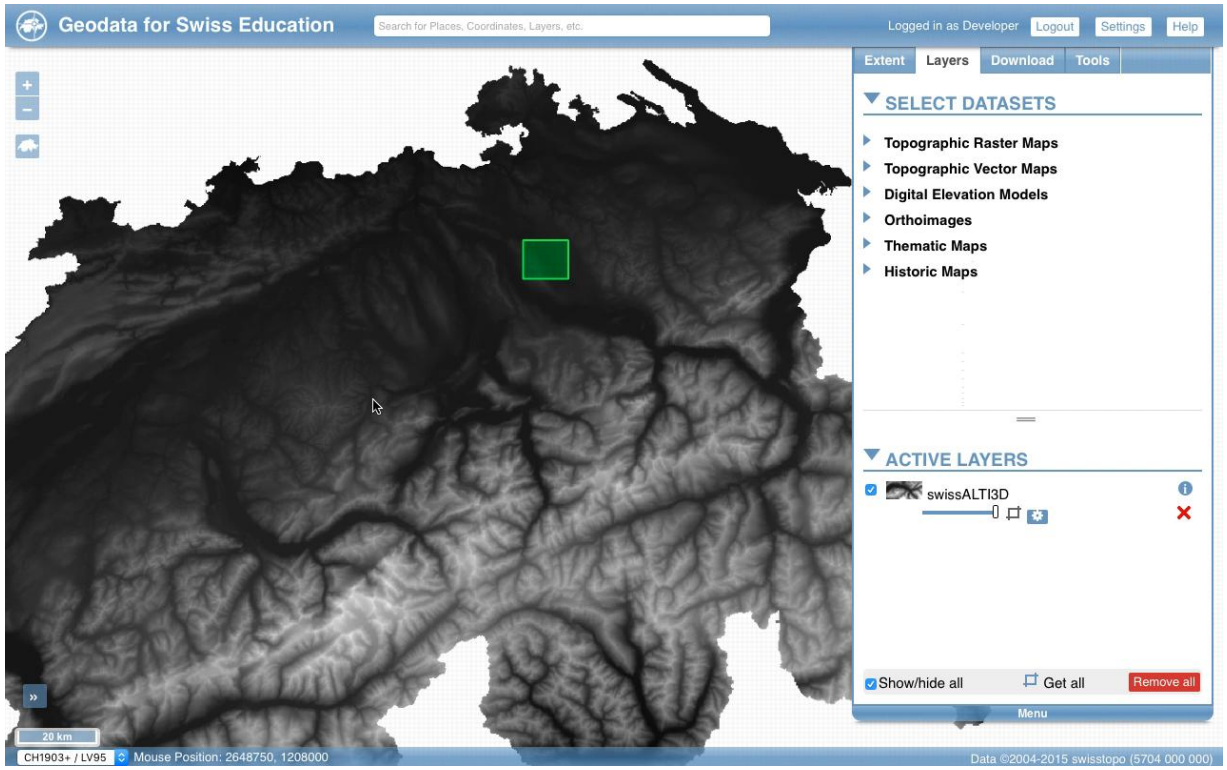
Usability-Driven Recommendations

- Allow **User Customization**
  - Collapsible panels, adjustable menus



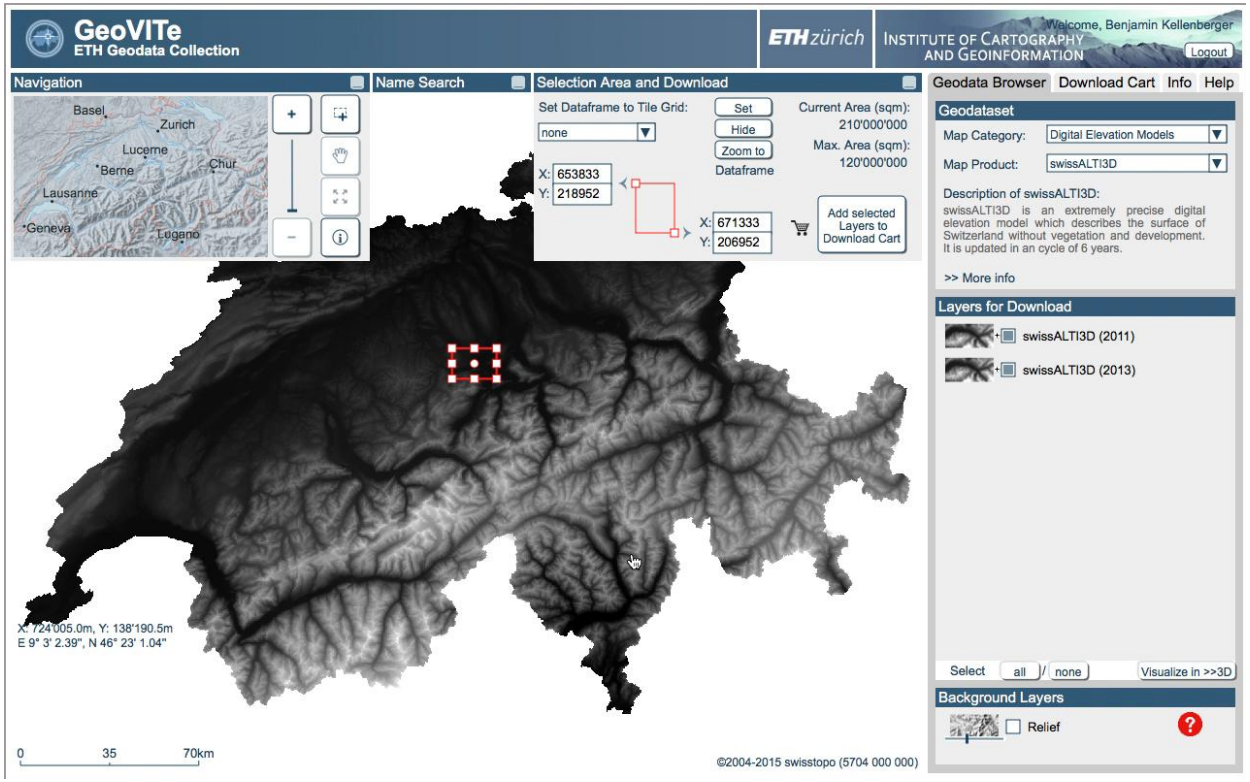
Usability-Driven Recommendations

- Allow **Map Mashups**
  - Content not limited to one topic, but layers arbitrarily combinable



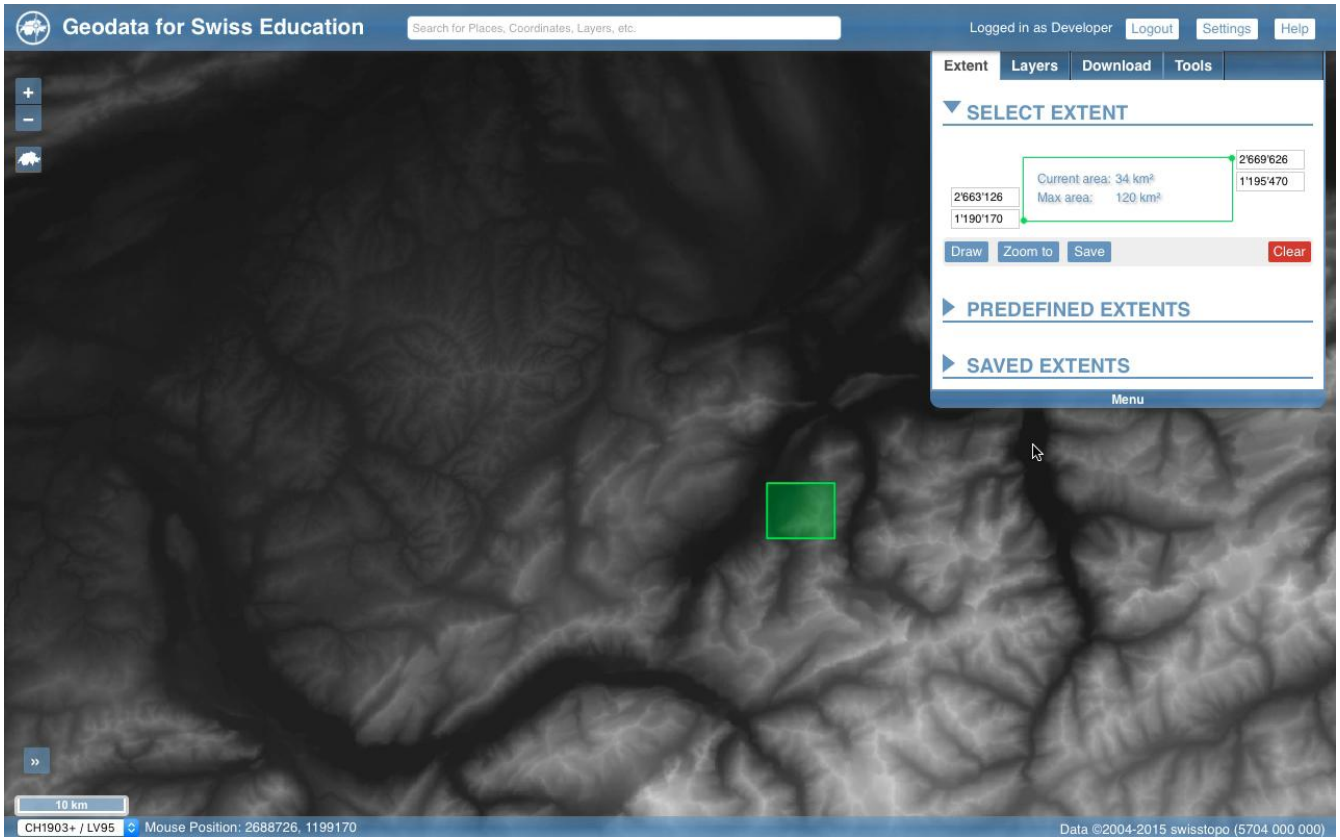
Usability-Driven Recommendations

- Provide **Instant User Feedback** for errors
- Before usability study in GeoVITe:



Usability-Driven Recommendations

- After usability study in Geodata4SwissEDU

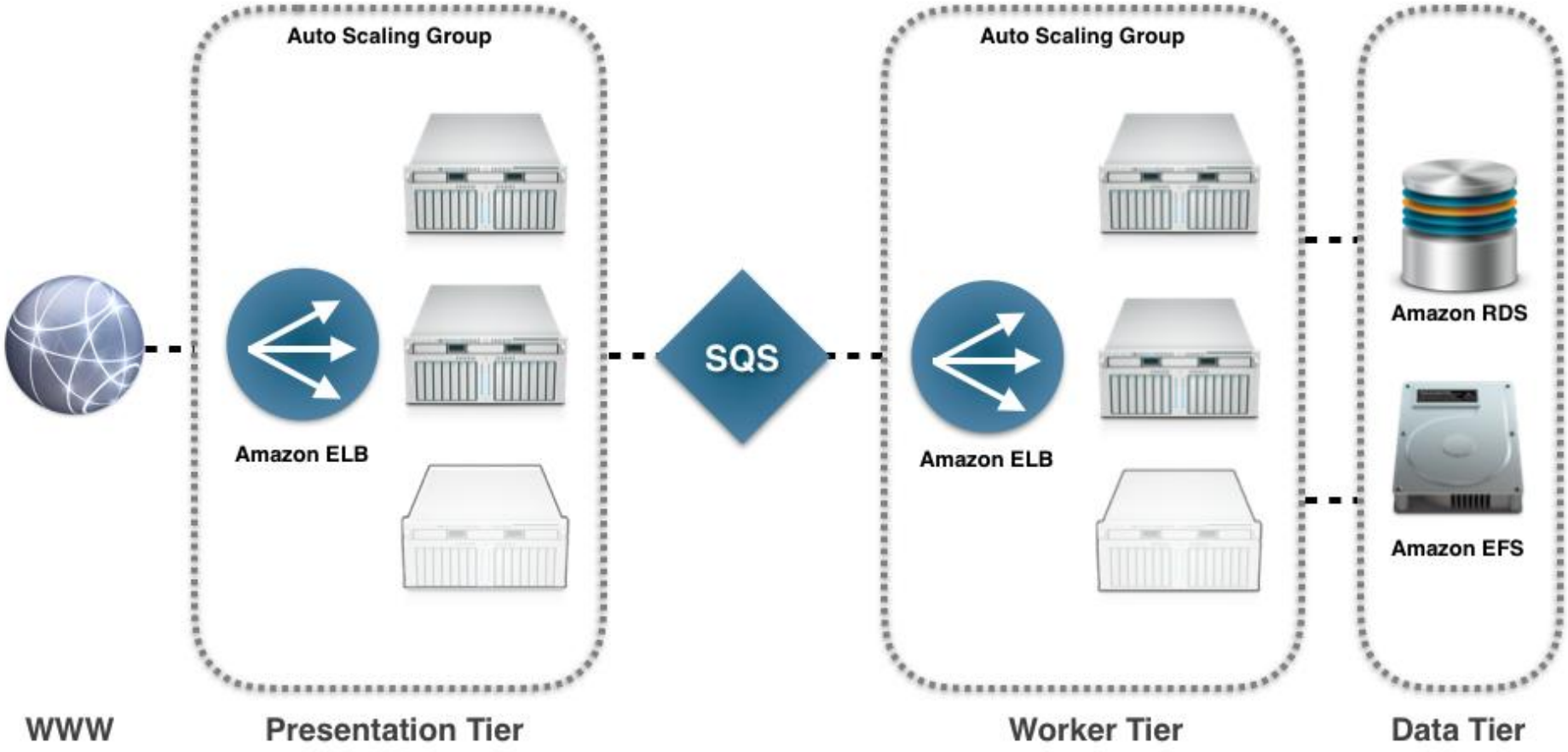


Outlook

- GeoVITe: more than just a User Interface
  - Expansion to national level (*Geodata4SwissEDU* project)
  - Goal: Swiss academic SDI

- Restructuring *under the hood*
  - New hard- & software for thousands of simultaneous users required
  - Intended solution: **A**mazon **W**eb **S**ervices (AWS) Cloud

Outlook: Towards an AWS Cloud Solution



Thank you for your attention!

Literature

- Resch B, Zimmer B (2013): *User Experience Design in Professional Map-Based Geo-Portals*. ISPRS International Journal of Geo-Information 2(4), 1015-1037.

- Roth RE, Ross KS, MacEachren AM (2015): *User-Centered Design for Interactive Maps: A Case Study in Crime Analysis*. ISPRS International Journal of Geo-Information 4(1), 262-301.

- Tsou M (2013): *Revisiting Web Cartography in the United States: the Rise of User-Centered Design*. Cartography and Geographic Information Science 38(3), 250-257.

GeoVITe Roadmap

- Current technical limitations in GeoVITe:
  - Limited to small user groups (max. 20 simultaneous users)
  - Custom SVG-based GUI hard to maintain

- Upcoming: the *Geodata4SwissEDU* project:
  - Upscaling of GeoVITe to national level (in Switzerland)
  - Joint-collaboration between ETH Library, IKG/ETH Zurich & Hochschule für Technik Rapperswil (HSR)
  - Funded by swissuniversities.ch

➡ Perfect time for a usability evaluation!

GeoVITe: Usability Evaluation

- 11 users (9 with previous GeoVITe experience)
- Predefined workflow:
  1. Pre-test interview: user behaviour, experience, etc.
  2. Eye-tracking on GeoVITe portal page
  3. Questionnaire: clearness of GUI elements, necessity of functionality
  4. Post-test survey: feedback on GeoVITe GUI quality

Usability Recommendations

- Use a **Full Screen Map**
  - Overlay controls in collapsible & customizable menus
- Implement **“Standard” Navigation Controls**
  - Click and drag to pan, scroll to zoom, click to query, etc.
- Be **Consistent** in the styling of **Controls**
  - Button symbols only if meaning salient, no automatic tab changes, etc.
- Offer a **Multi-Purpose Search Function**
  - Search for places, coordinates, datasets, etc.
  - Allow imprecise search terms
  - Rank search terms according to relevance

Usability Recommendations

- Allow **User Customization**
  - Collapsible panels, adjustable menus
- Allow **Map Mashups**
  - Content not limited to one topic, but layers arbitrarily combinable
- Provide **Instant User Feedback** for errors

The *GeoVITe-Geodata4SwissEDU* Portal

- Built from scratch with open source technology (OpenLayers 3, QGIS Server) → easier to maintain
- Based on usability evaluation feedback
- Omission of unused functionality
- Improved and new interoperability tools
- Much more customizability