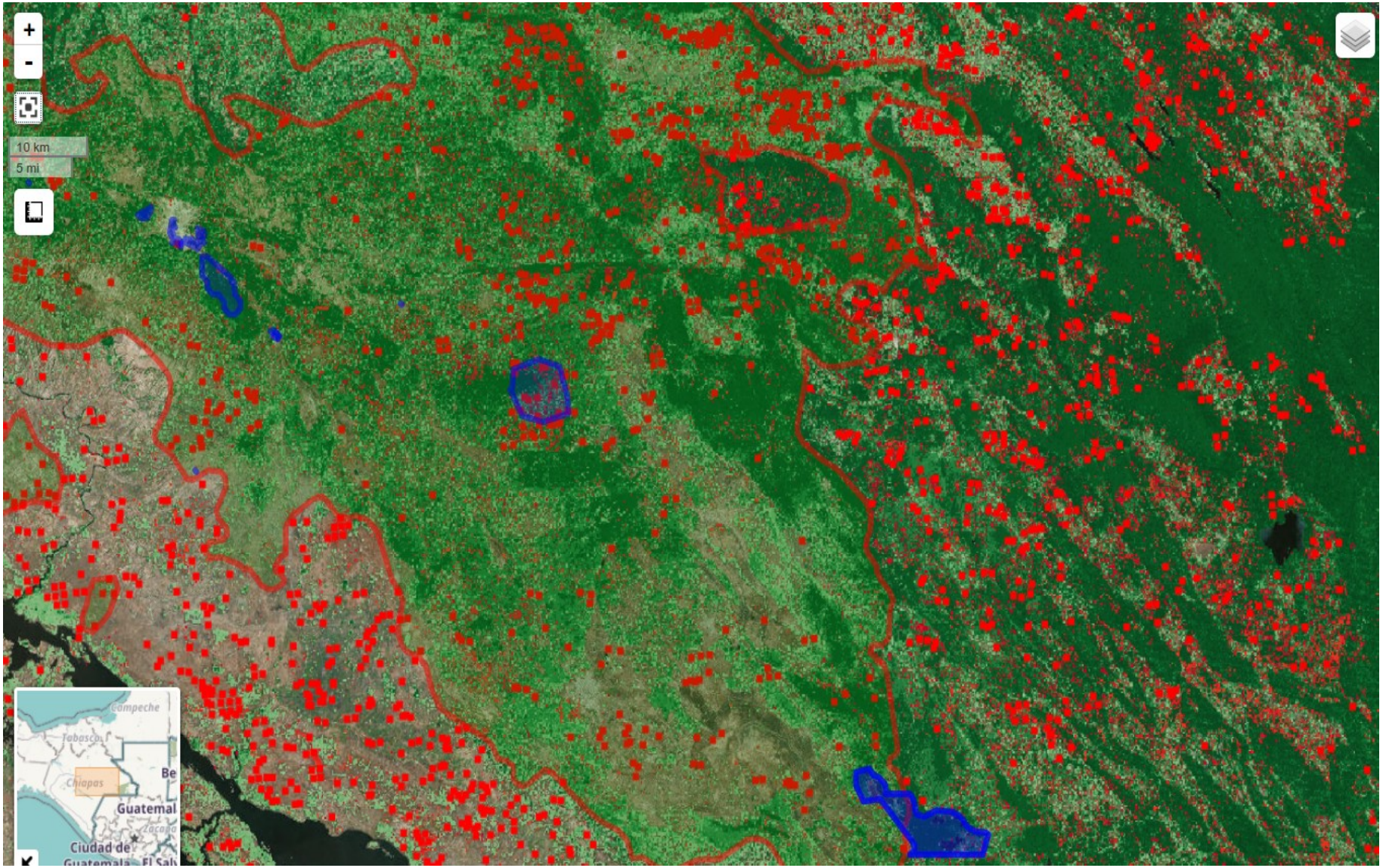
GIS resources

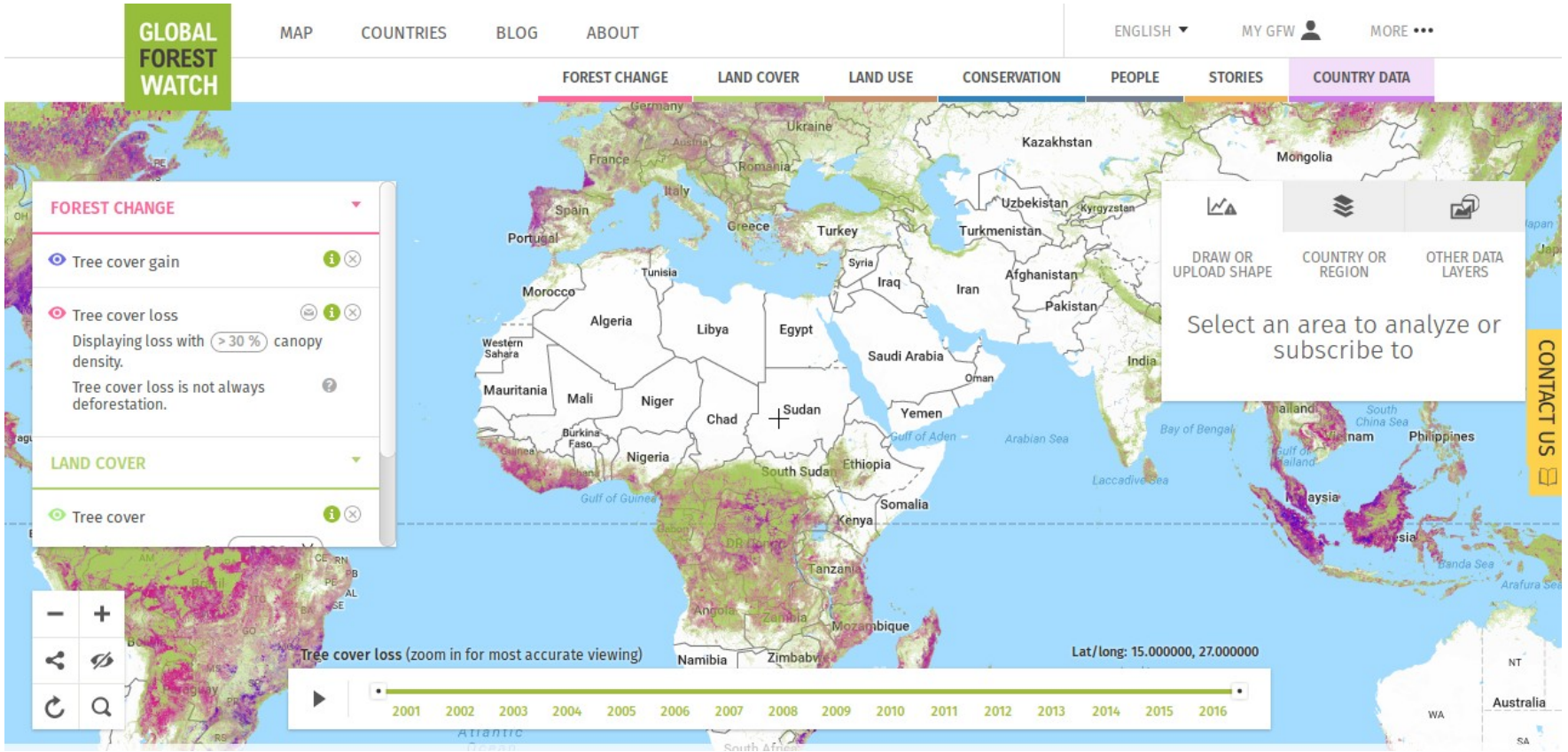


Local web maps

- http://r.bournemouth.ac.uk:3838/Ecoregions2/
- http://r.bournemouth.ac.uk:3838/Fires/
- http://r.bournemouth.ac.uk:3838/climateexplorer/
-

Global forest watch site

http://www.globalforestwatch.org/map



GIS data types

- Hansen's map consists of large **raster** tiles
- Ecoregions and protected areas are **vector** polygons
- Fire occurrences are point **vector** data

Challenges in processing raster data

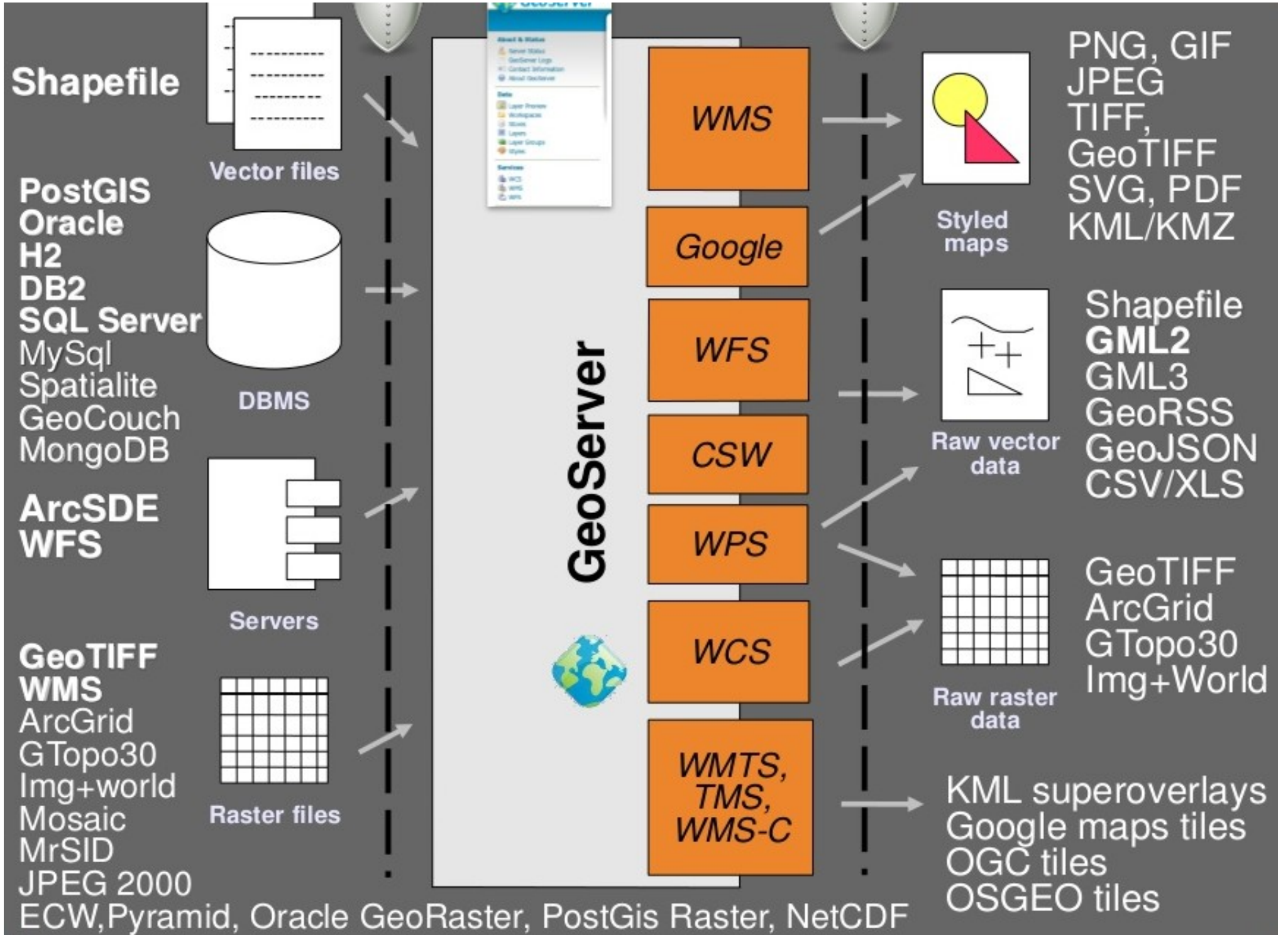
- Large files
- Landsat for UK consists of 200 billion pixels
- Image processing and classification well established. Use very efficient algorithms written in low level coding languages
- Multiple iterative operations that calculate bespoke raster statistics can be **very** time consuming

Pyramids and zooming

- Large raster files cannot be seen on screen with a fine grain resolution
- Pyramids allow fast panning and zooming by using fewer pixels
- Processing or downloading the **whole** image can be **much** slower than might be expected

Geoserver

- Geoserver is used to “serve” data over the web
- Can be linked to many different GIS programs for data processing
- QGIS and ArcGIS are desktop GIS
- Data processing takes place locally
- Download the data first then **save a copy** to local disk for processing


Shapefile
Vector files
PostGIS
Oracle
H2
DB2
SQL Server
MySql
Spatialite
GeoCouch
MongoDB
DBMS
ArcSDE
WFS
Servers
GeoTIFF
WMS
ArcGrid
GTopo30
Img+world
Mosaic
MrSID
JPEG 2000
Raster files
ECW,Pyramid, Oracle GeoRaster, PostGis Raster, NetCDF
GeoServer
WMS
Google
WFS
CSW
WPS
WCS
WMTS,
TMS,
WMS-C
Styled
maps
PNG, GIF
JPEG
TIFF,
GeoTIFF
SVG, PDF
KML/KMZ
Raw vector
data
Shapefile
GML2
GML3
GeoRSS
GeoJSON
CSV/XLS
Raw raster
data
GeoTIFF
ArcGrid
GTopo30
Img+World
KML superoverlays
Google maps tiles
OGC tiles
OSGEO tiles

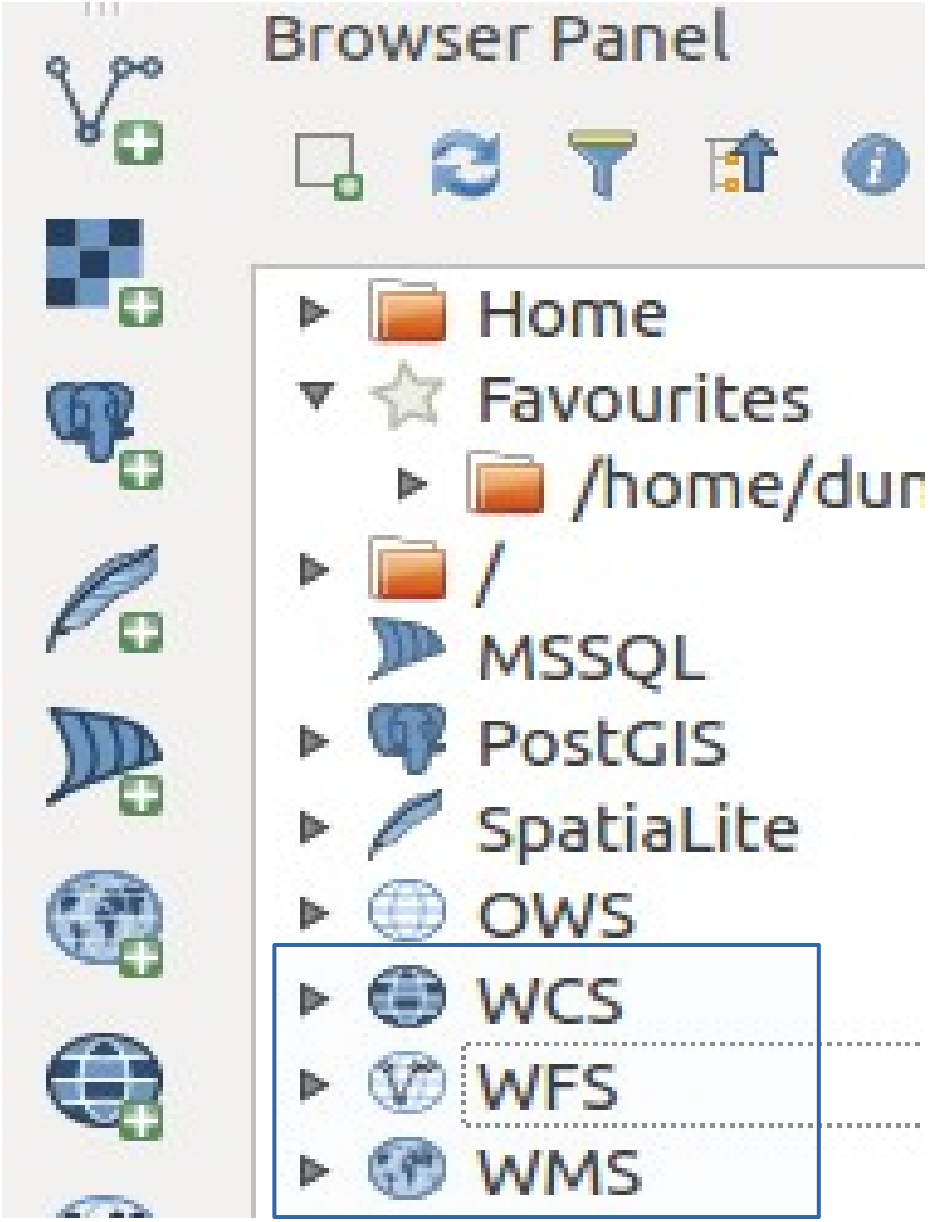
Some protocols

- **W**eb **M**ap **S**erver WMS
  - Displays a picture of the data. Fast
- **W**eb **F**eature **S**erver WFS
  - Provides the features (attributes) of vector layers. Can be slow if vector layer is large and complex
- **W**eb **C**overage **S**erver WCS
  - Provides underlying raster data. Slow, as large amounts of data are being downloaded

Geoserver usage

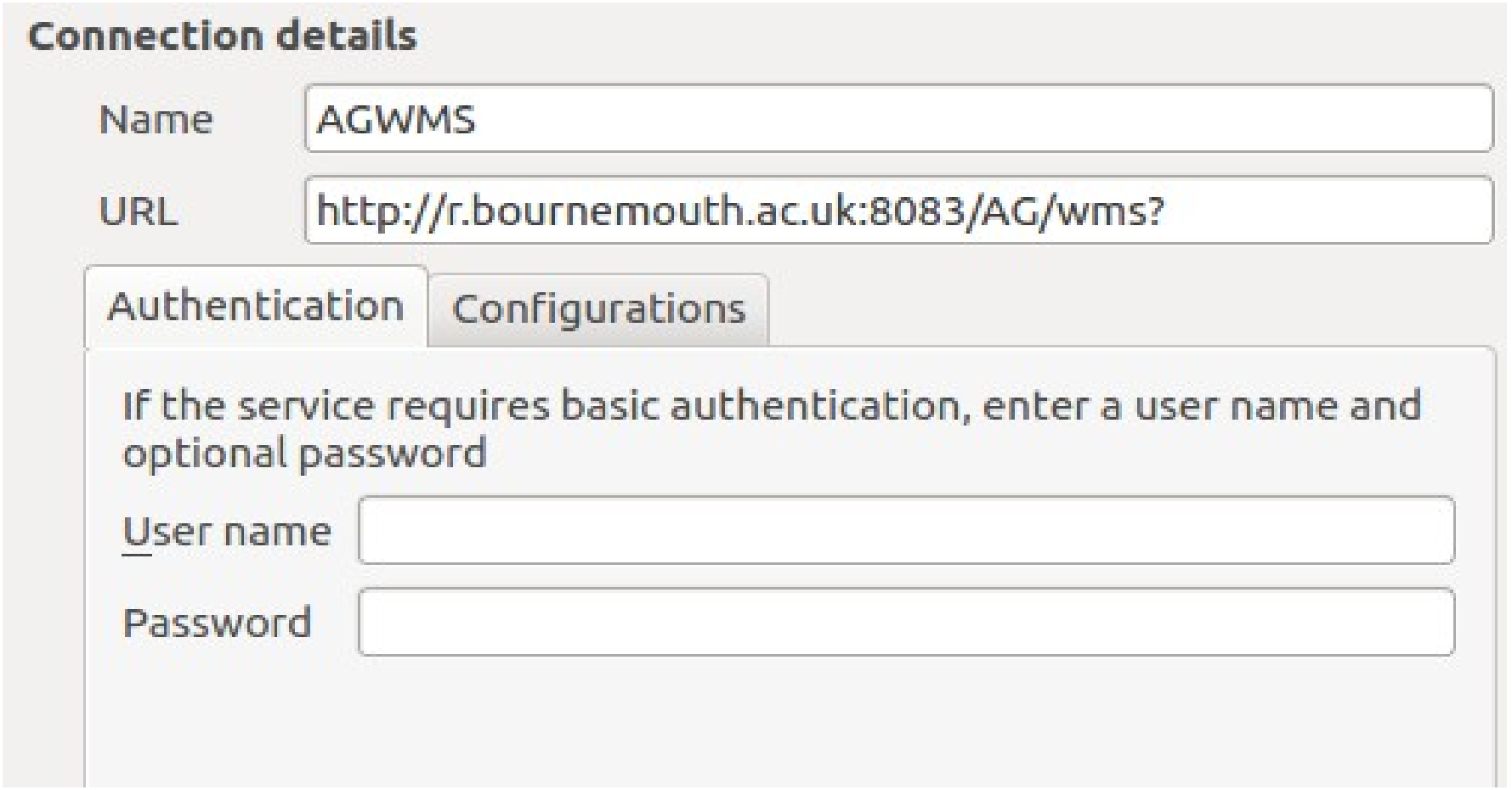
- WMS is often used in web maps
- Data filtered and limited to speed up display
- WFS and WCS are **not** usually exposed directly as this can slow down server
- They are usually queried through a pre filter on the web map in order to limit scope
- If used for research in a desktop GIS it must be **used carefully.**

QGIS browser panel

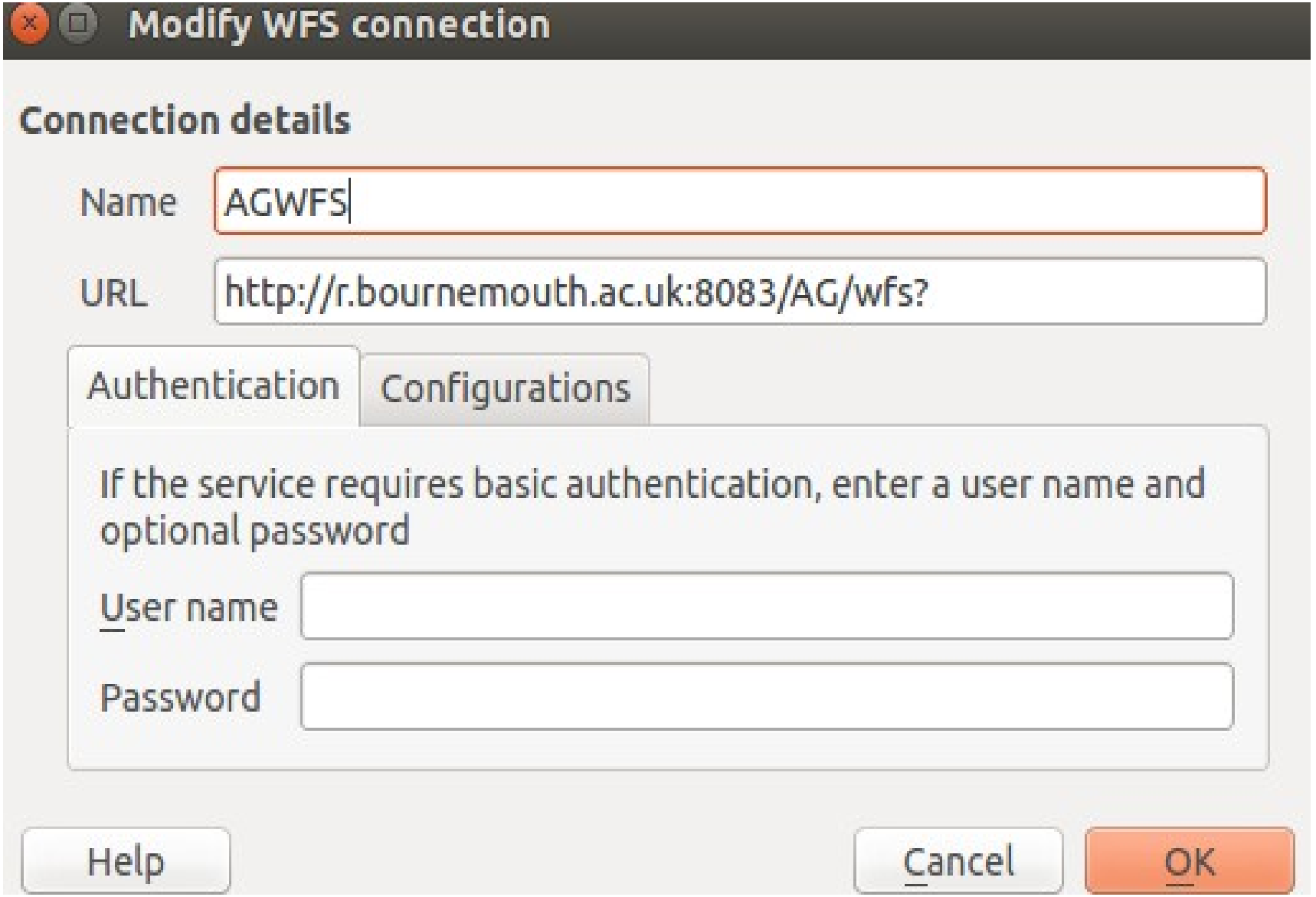


QGIS usage

- Always zoom to limited area before adding WMS-.



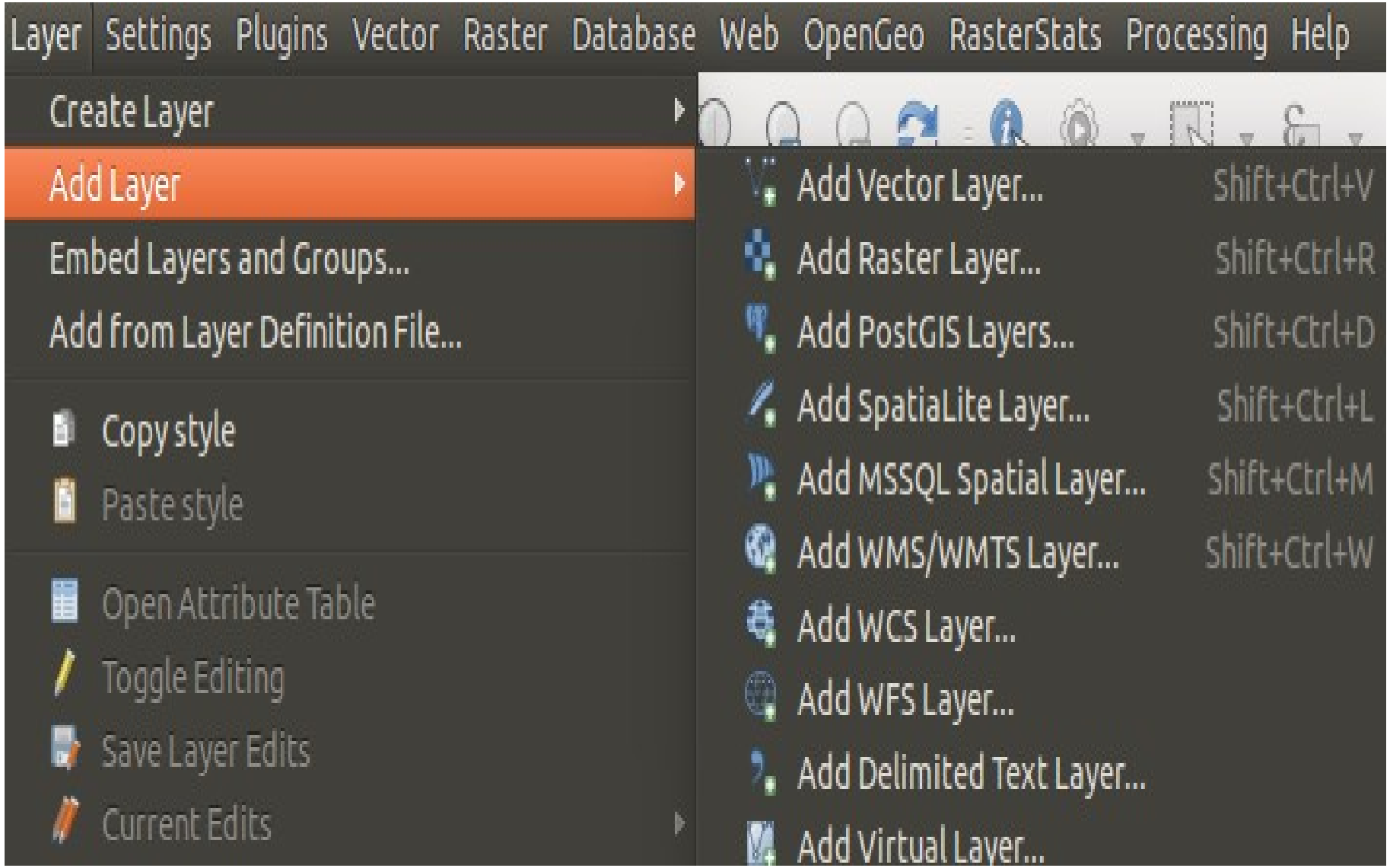
WFS connection



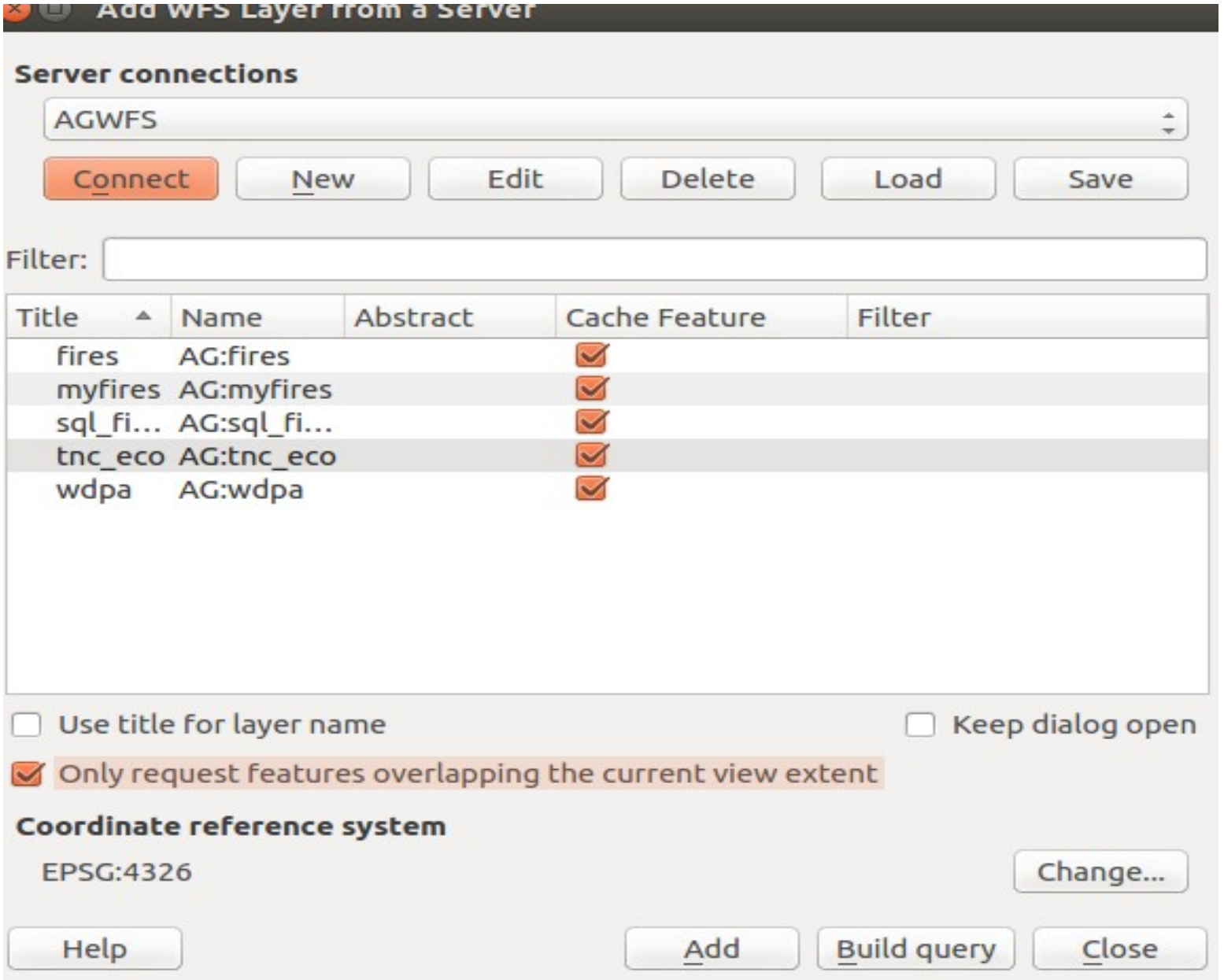
Adding a WFS layer

- Always use the full menu dialogue
- Always check that you are zoomed to a small area
- Don't accidentally try to load the whole layer

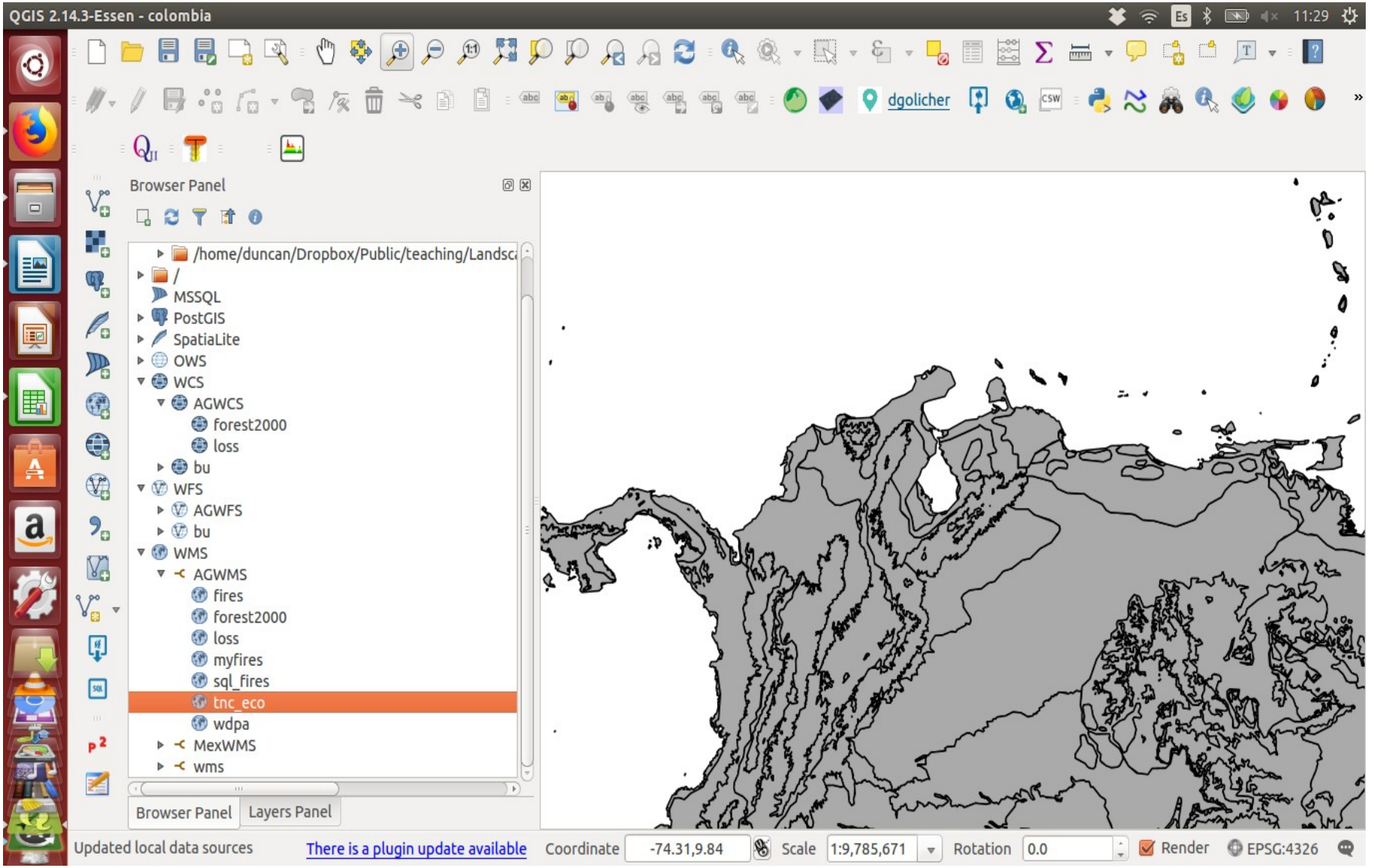
Adding WFS from layer menu



Only request features overlapping current view



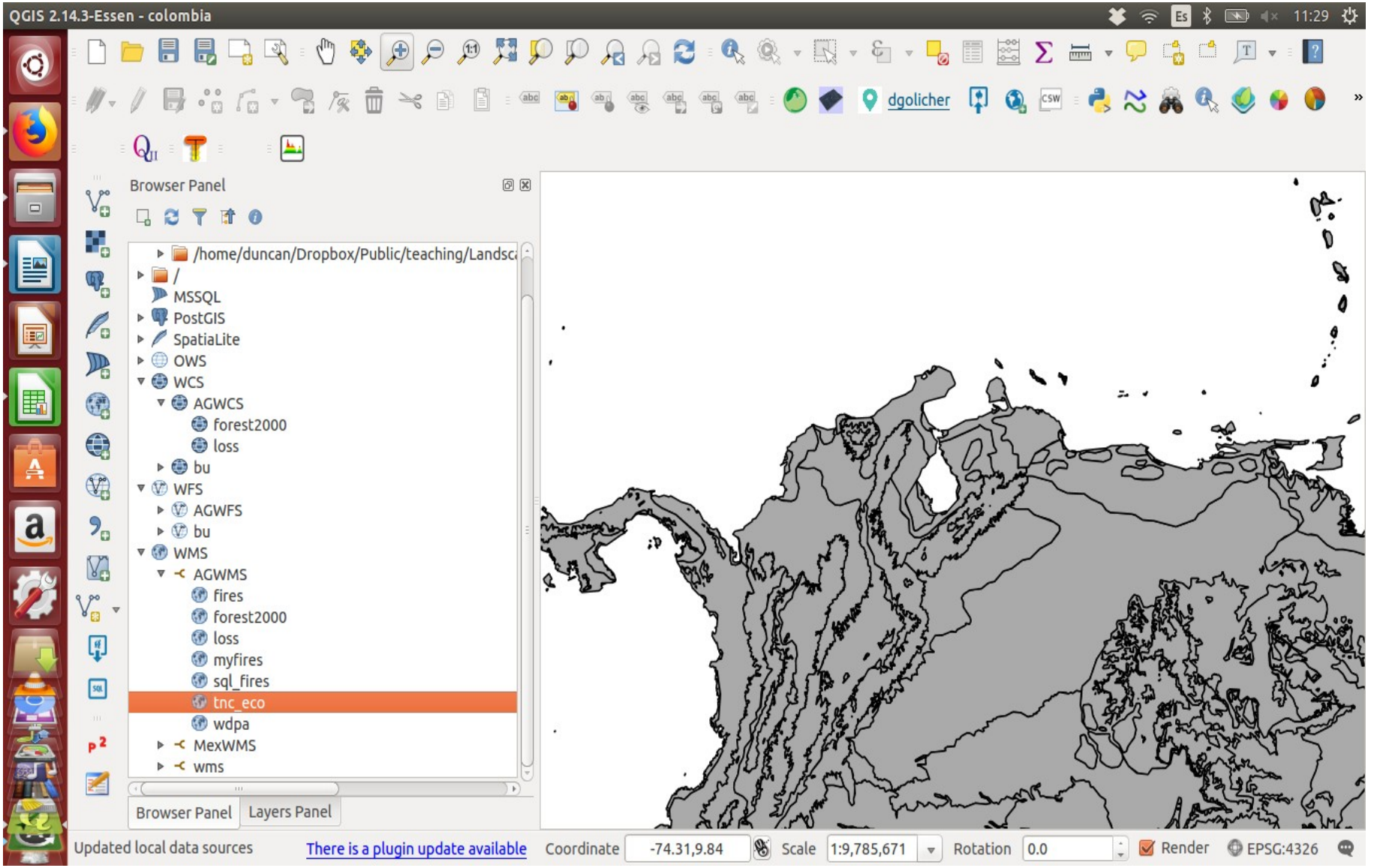
Example for Columbia



Example for Columbia

- First select the area for which you want to download the data
- You can load the tnc_eco WMS layer for the whole world quite quickly and use this to select the area.
- The smaller the area, the quicker the files will load and the smaller the saved files will be

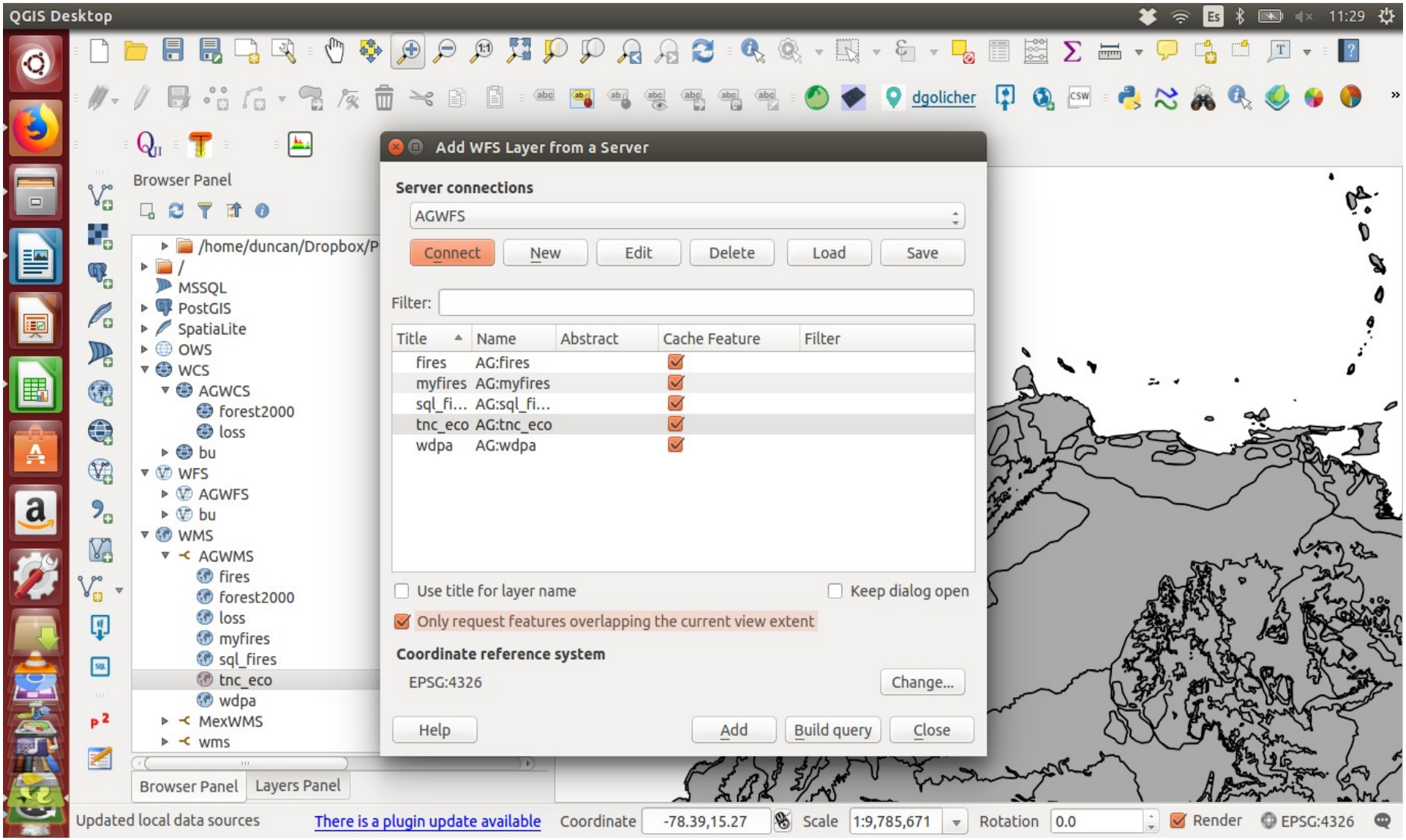
Zoom to area


QGIS 2.14.3-Essen - colombia
11:29
dgolicher
Browser Panel
/home/duncan/Dropbox/Public/teaching/Landsc
/
MSSQL
PostGIS
SpatiaLite
OWS
WCS
AGWCS
forest2000
loss
bu
WFS
AGWFS
bu
WMS
AGWMS
fires
forest2000
loss
myfires
sql_fires
tnc_eco
wdpa
MexWMS
wms
Browser Panel
Layers Panel
Updated local data sources
There is a plugin update available
Coordinate
-74.31,9.84
Scale
1:9,785,671
Rotation
0.0
Render
EPSG:4326

Download WFS layers

- Download the WFS polygons for the World Data Base of protected areas and the TNC ecoregions
- Use the layer menu at the top of the window
- Select add layer, then add WFS layer
- Press connect to connect to the server or add the wfs connection if not yet added
- http://r.bournemouth.ac.uk:8083/AG/wfs?

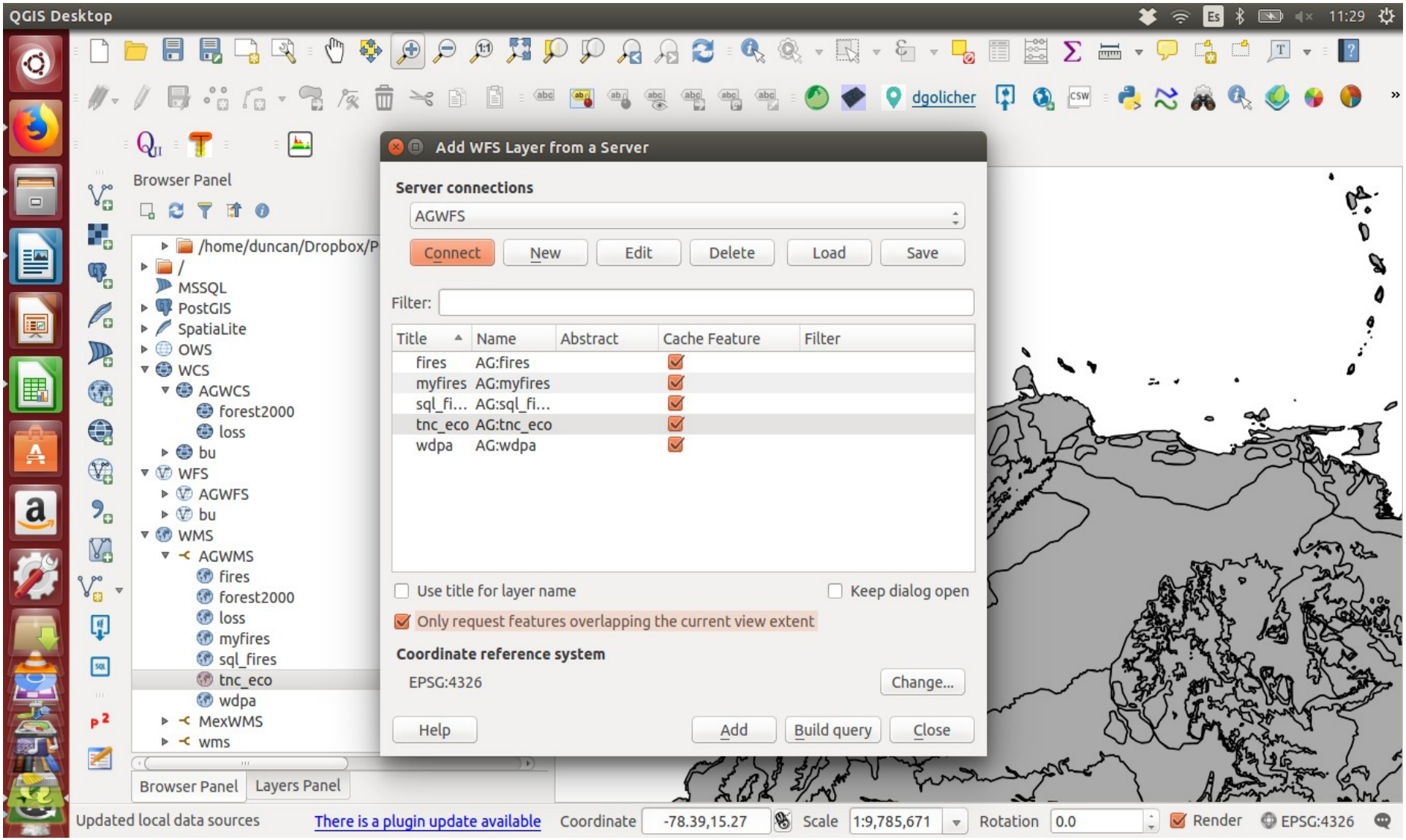
Select the layers to download



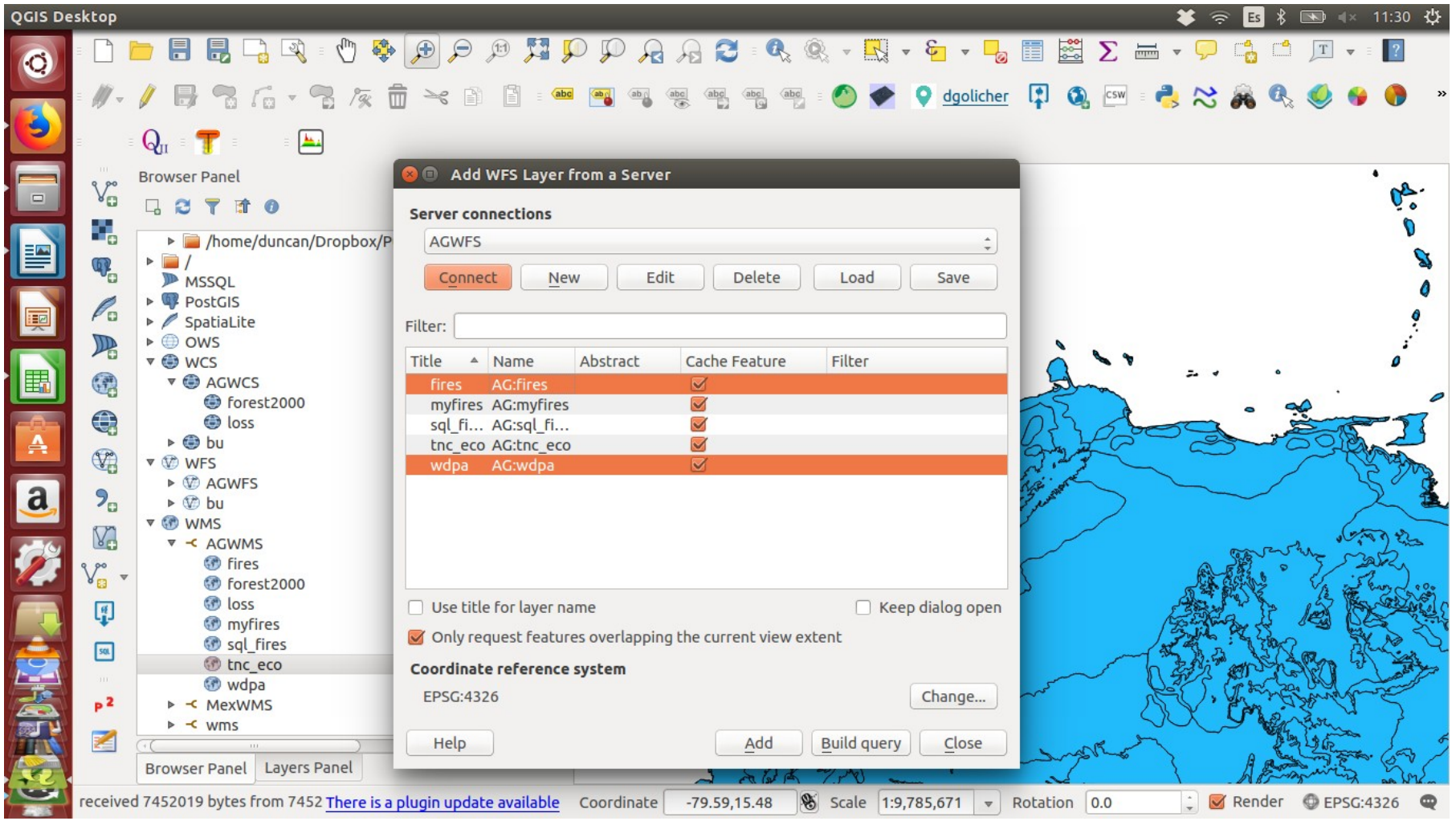
Select the layers to download

- **Make sure that you tick only request features overlapping current extent!**
- The fires layer is the slowest to load as there are so many points to filter. You may want to miss this first

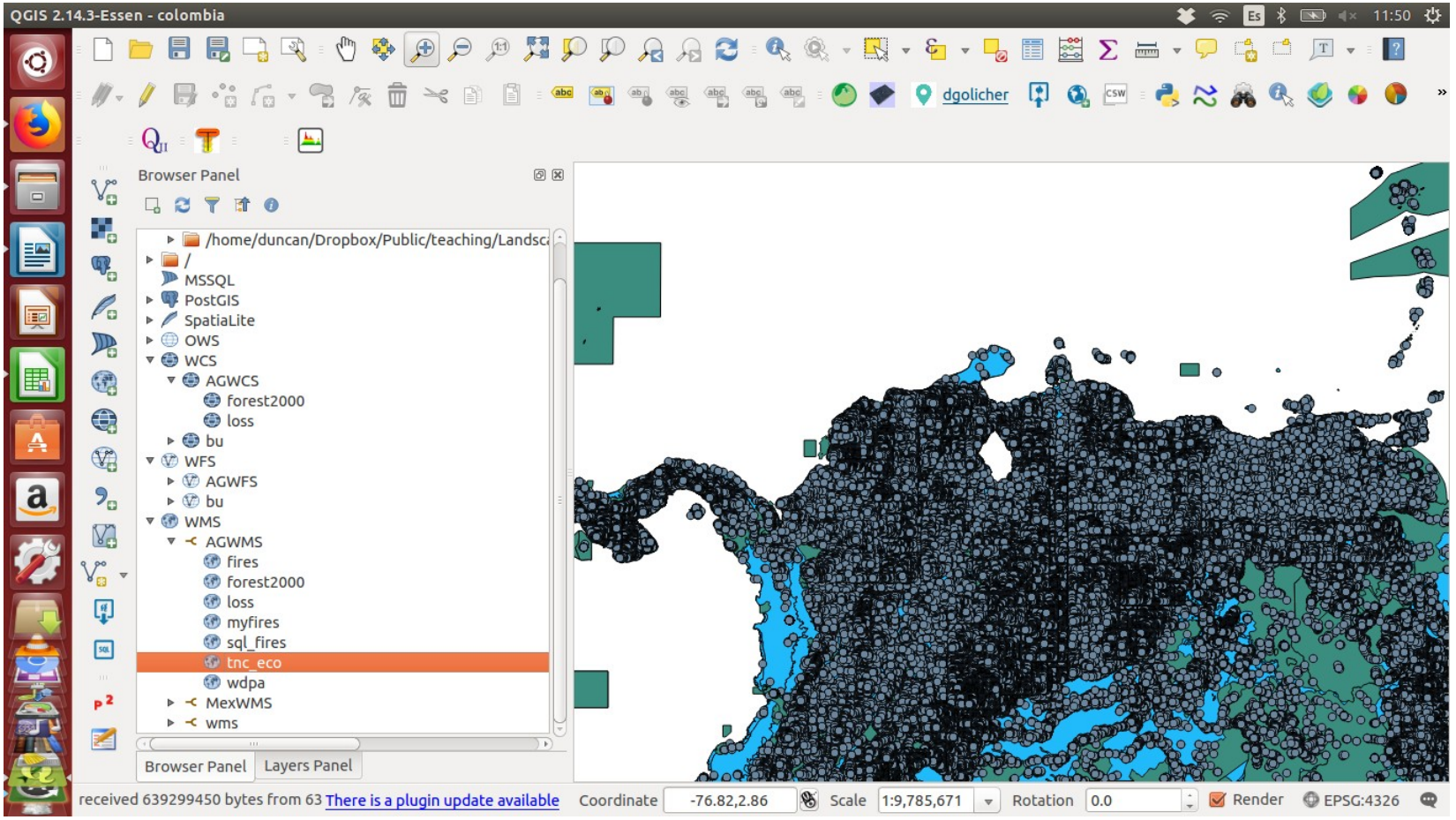
Select the layers to download



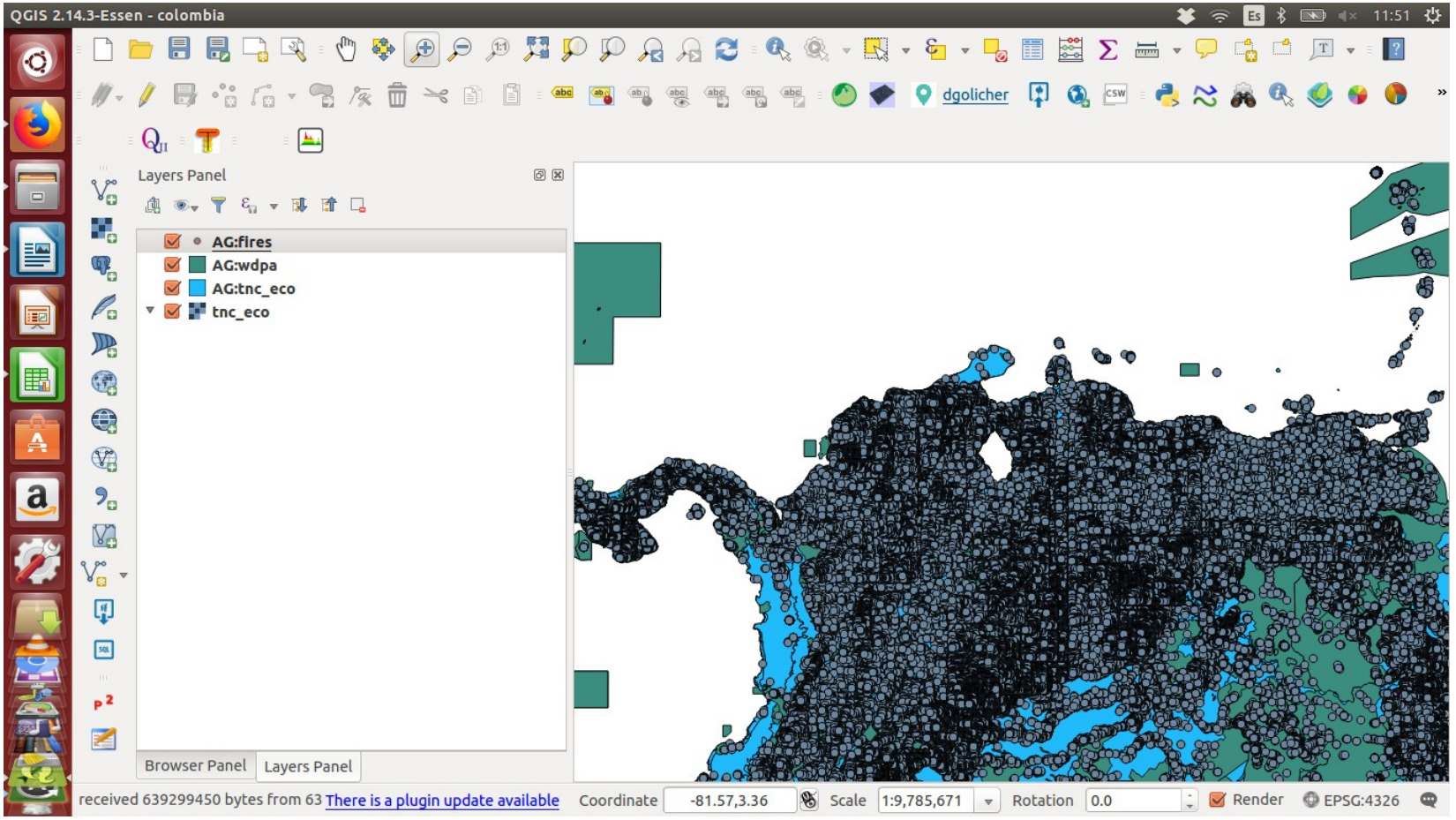
This will add the fires. Be prepared to wait



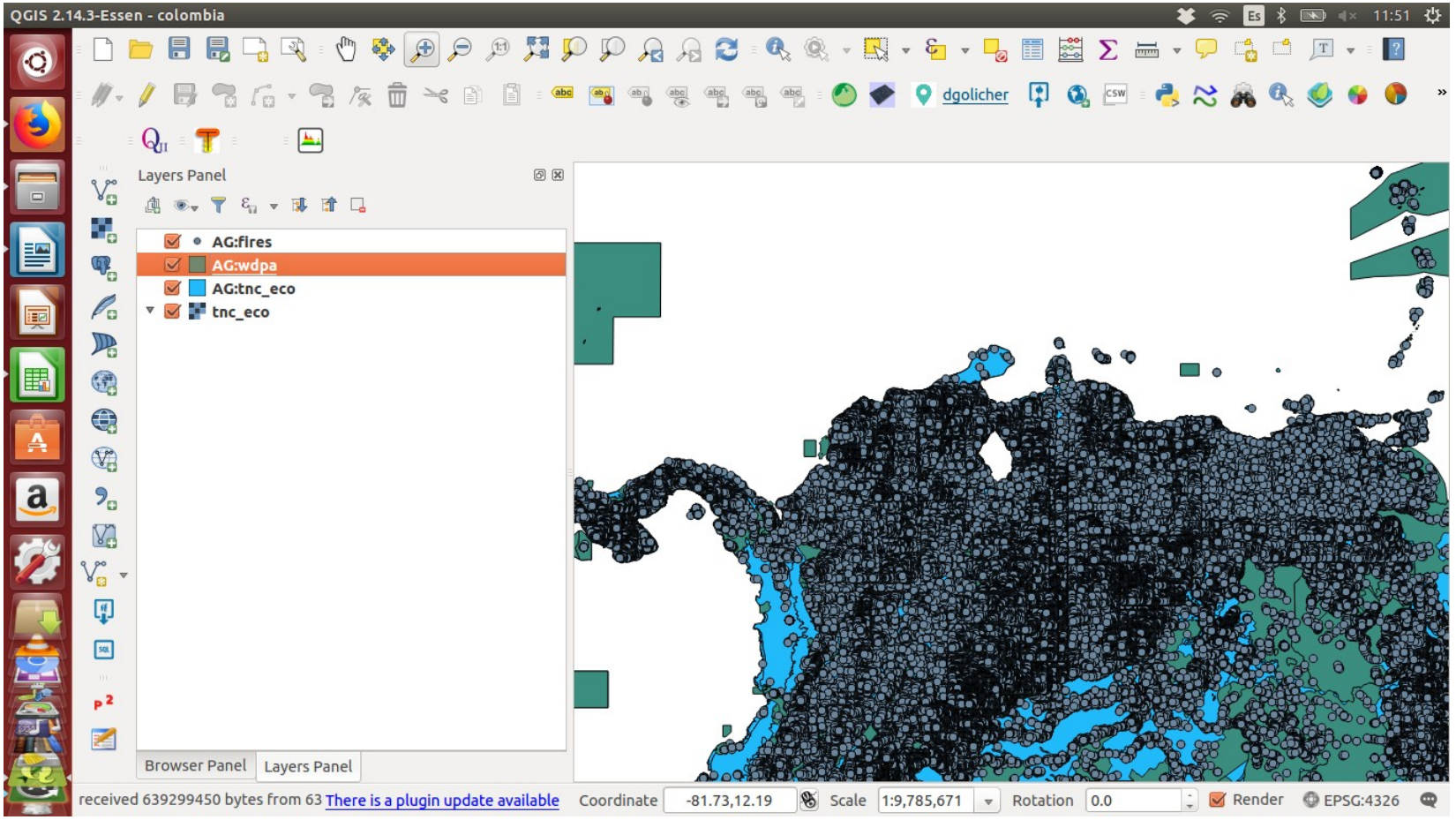
Data loaded


QGIS 2.14.3-Essen - colombia
11:50
dgolicher
Browser Panel
/home/duncan/Dropbox/Public/teaching/Landsc
/
MSSQL
PostGIS
SpatiaLite
OWS
WCS
AGWCS
forest2000
loss
bu
WFS
AGWFS
bu
WMS
AGWMS
fires
forest2000
loss
myfires
sql_fires
tnc_eco
wdpa
MexWMS
wms
Browser Panel
Layers Panel
received 639299450 bytes from 63 There is a plugin update available
Coordinate
-76.82,2.86
Scale
1:9,785,671
Rotation
0.0
Render
EPSG:4326

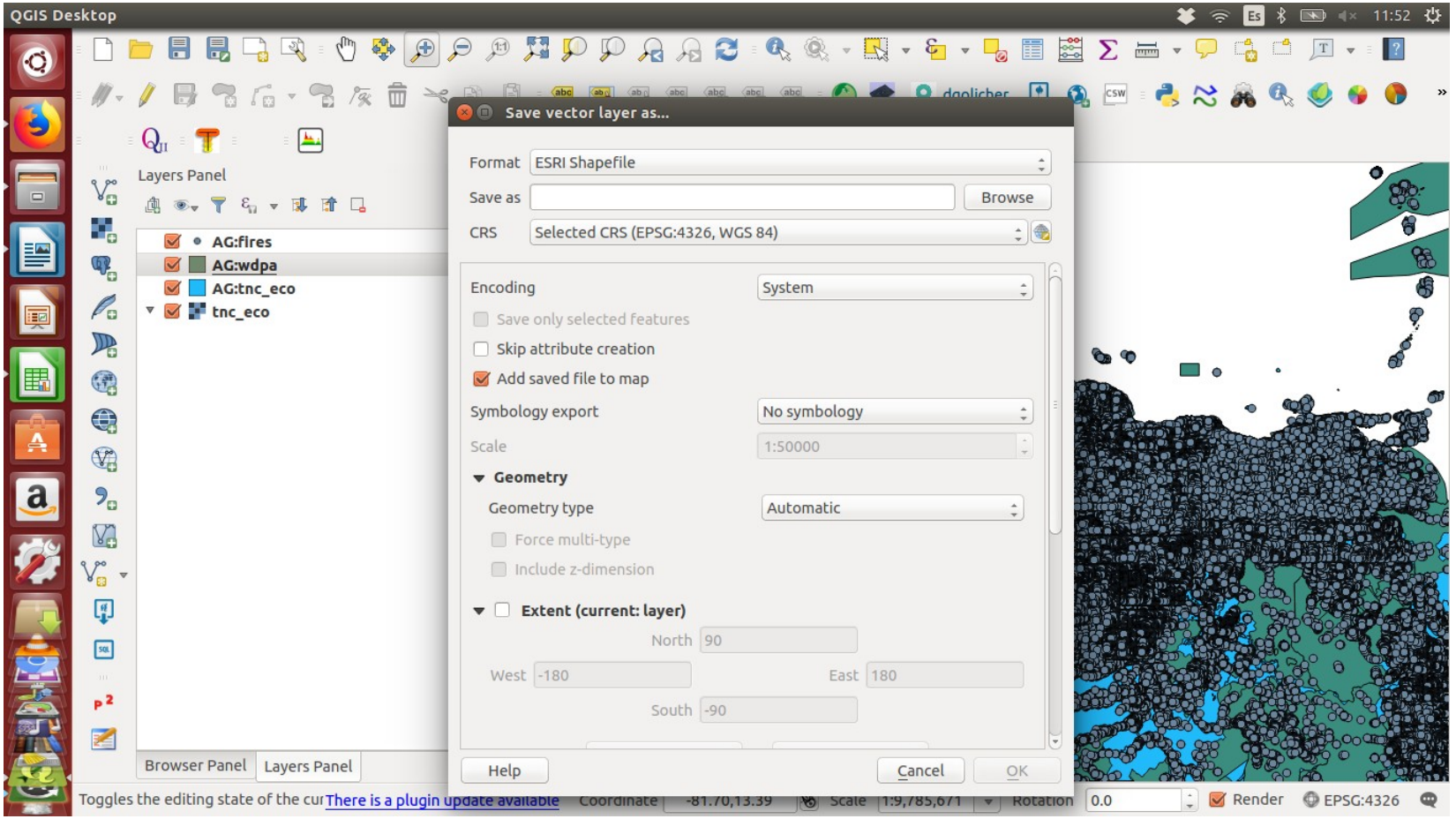
Go to layers panel



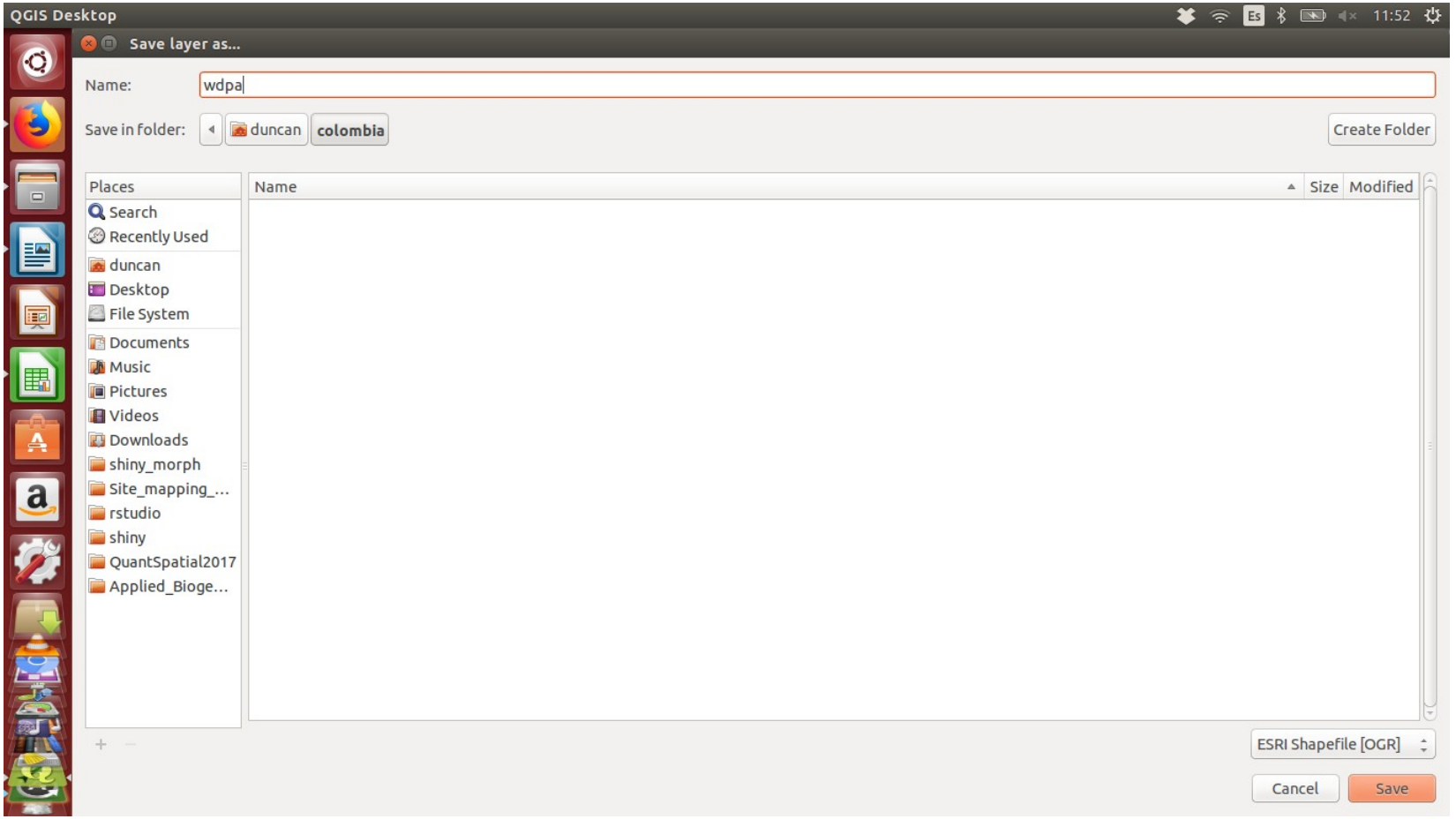
Right click a layer to save locally



Save as shapefile locally



Add file name



Reminder of WFS steps

- Zoom to the area you are interested in
- Connect to WFS using menu at the top of the window.
- Select the layers, making sure to only request data for the visible area
- Save the results locally as shapefiles for your project
- You can now open the files in ArcGIS if you want to process them using Arc

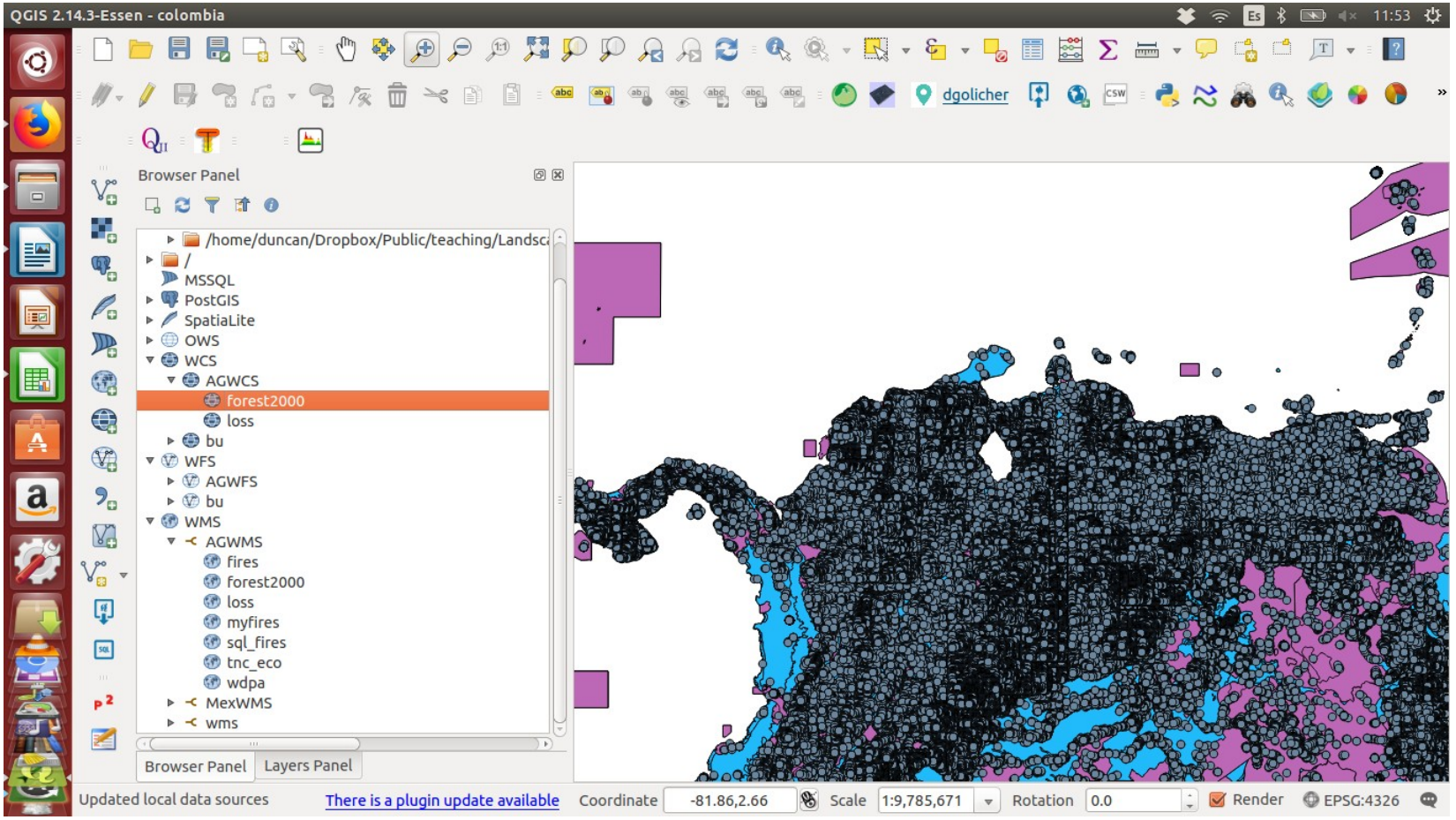
Downloading Hansen's data

- There are two WCS coverages
- Forest2000 and Loss
- I have not included gain, as this layer is difficult to interpret and not relevant to the assignment
- These are large files at this resolution
- The WCS connection will only download the visible area by default, so this is easy

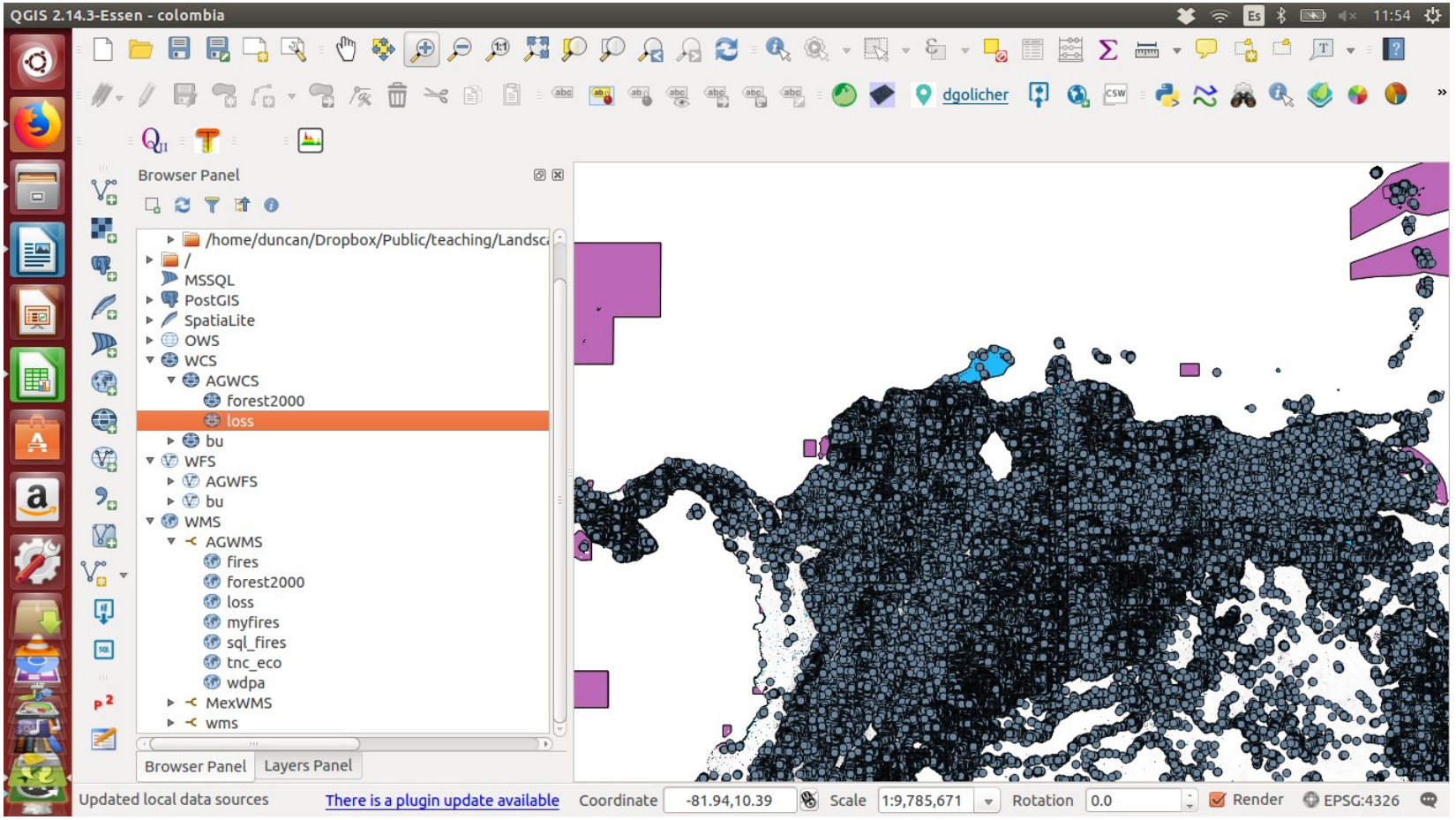
Downloading Hansen's data

- Connect to WCS
- http://r.bournemouth.ac.uk:8083/AG/wcs?

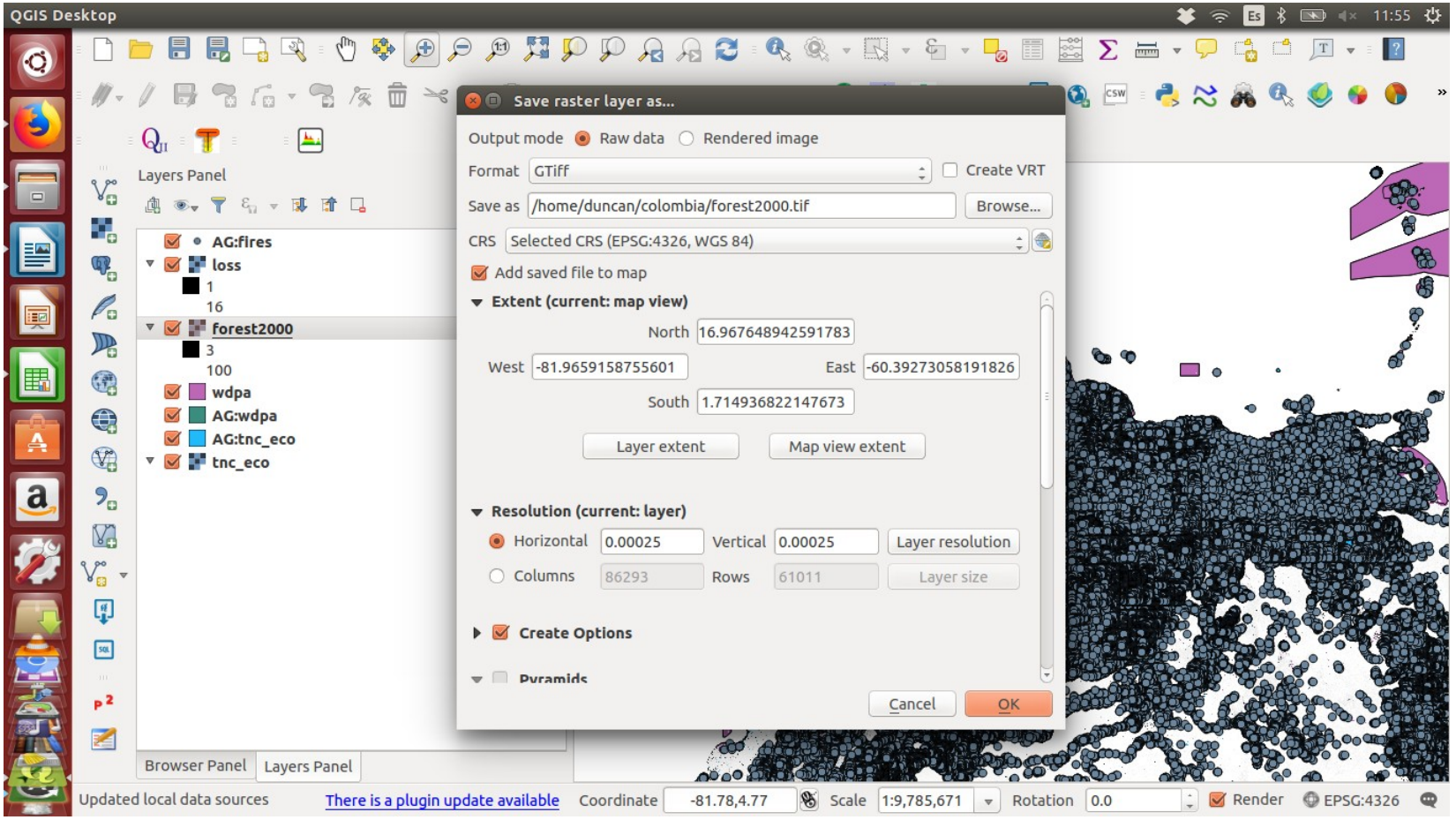
Click layer to load



Go to layers panel



Save as Geotiff locally
Use Map View Extent



Steps to save raster layers

- Connect to WCS service
- Download forest2000 and loss (may take some time)
- Right click layer to save locally
- Choose mapview extent
- Save to local folder
- Files will be large. We will see how to simplify processing next week

Summary

- You should have now compiled the raw data for your region locally
- If you already know some GIS techniques you may be ready to work with the data
- If not, additional help will be provided in the next practical sessions