Extracting field plot image data in QGIS

General concepts and PlotCut 3 status

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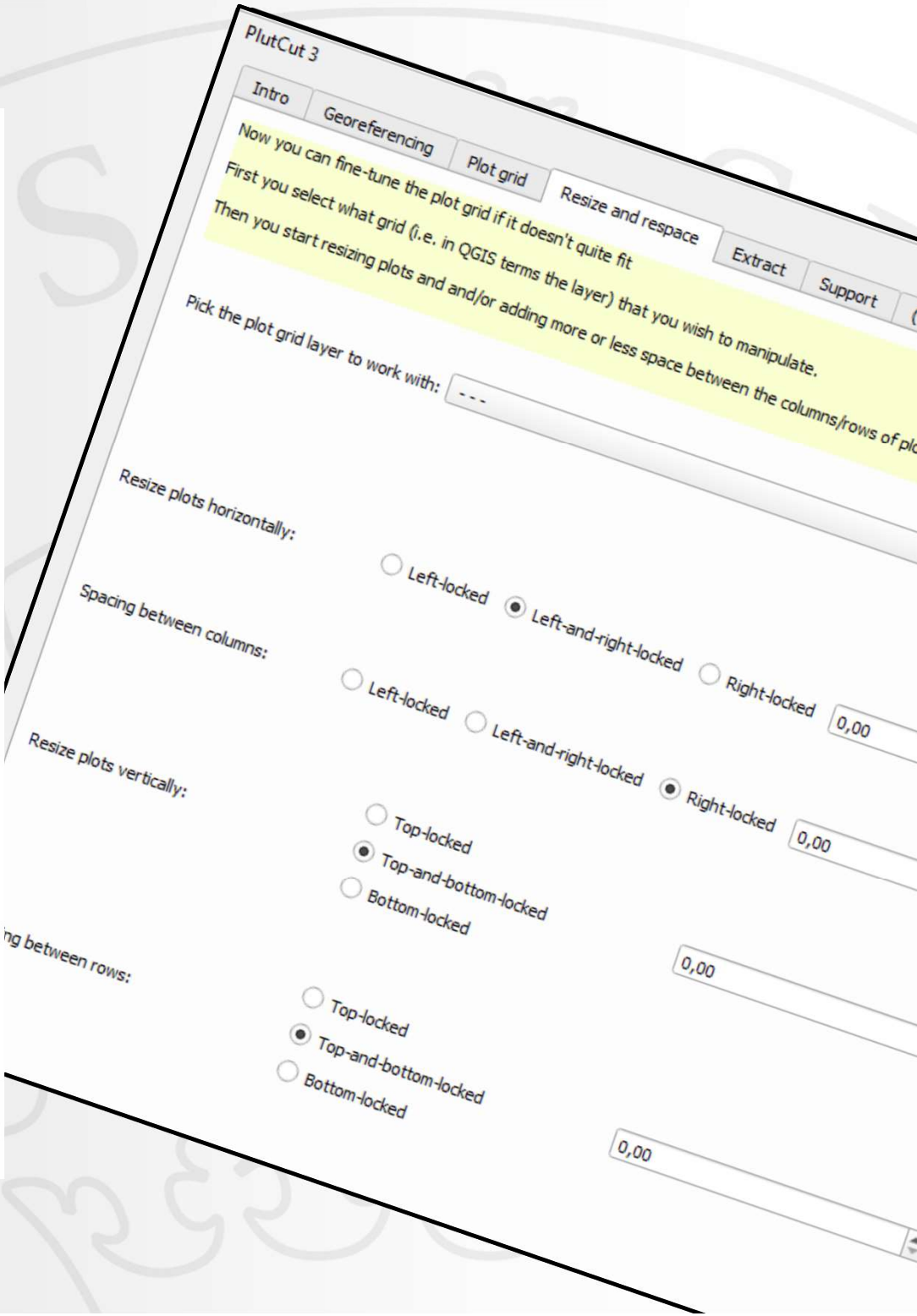
UNIVERSITY OF COPENHAGEN



Overview of this presentation

- What is a GIS and projections/coordinate systems
- Image files and geographic information
- File handling in QGIS
- Feature usage in QGIS
- Extracting plot information in QGIS
- What is a plugin in QGIS
- Building a plugin in QGIS
- PlotCut3 status
- Questions / discussion

What is a GIS and projections/coordinate systems

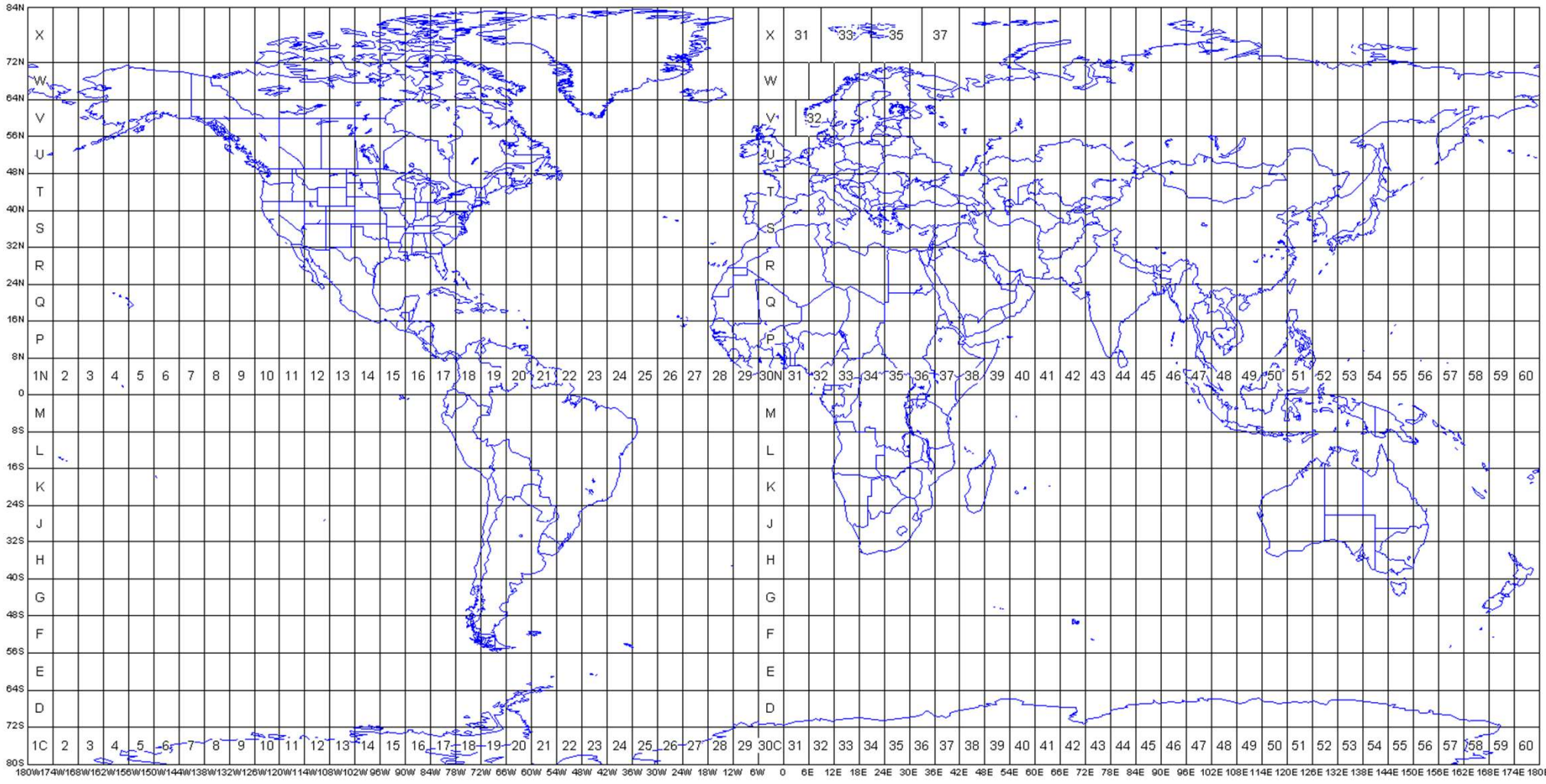
- From a sphere to projected map
  - => From something painted on a ball to a flat surface

- This is done with rules/definitions defined in:
  - CRS = Coordinate Reference System
  - or
  - SRS = Spatial Reference System

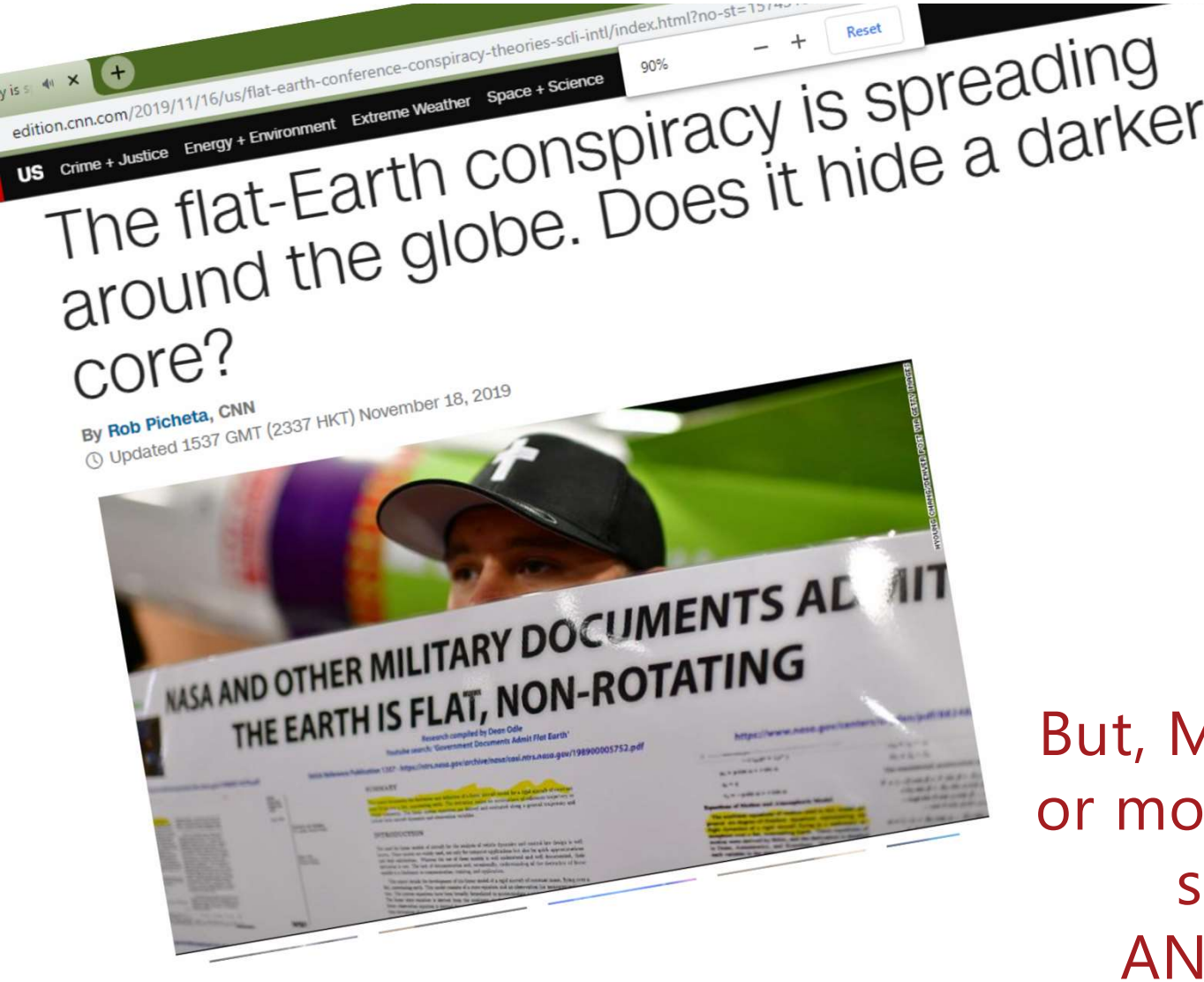
- But how do we get something round flat?

UTM coordinate system

Universal Transverse Mercator ….. Making the countries far away from the equator appear a lot bigger than they are



Now, it would all be so much easier if only these people where right…

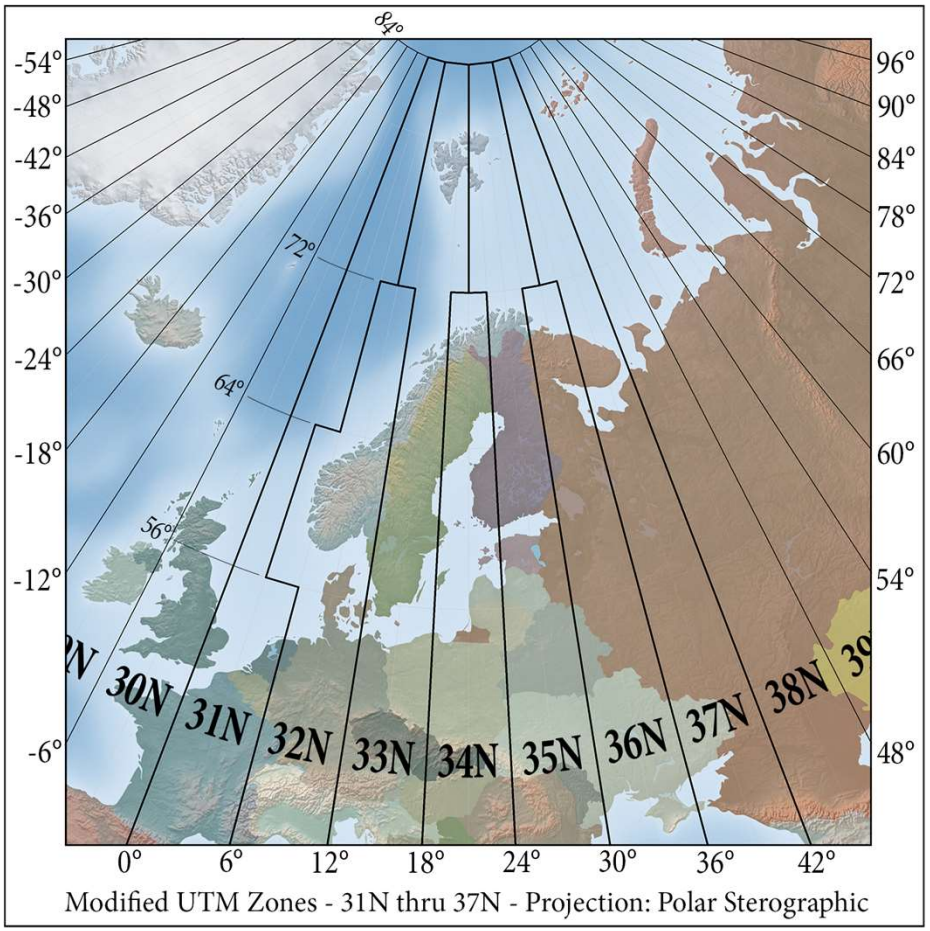


☺

But, Mother Earth IS round,
or more correctly, a sphere,
so back to reality,
AND map projections

Drone flights

- Here in the Nordic Countries seem to mostly be processed in the UTM
- So, what does it mean for our drone image processing?
- In the QGIS projects with drone mosaics we will recommend one project per UTM zone flown
  - Secobra: Sweden and Chile
  - DLF: Sjælland, Oregon, New Zealand
  - Graminor: Hamar …. Svalbard? ☺
- But, we don't always "stay nicely within" the boundaries
  - In Denmark
    - Sjælland => extending the UTM 32



Norway
Sweden
Oslo
Stockholm
Finland
Denmark
København
United Kingdom
Amsterdam
Berlin
Germany
Poland
Netherlands
London

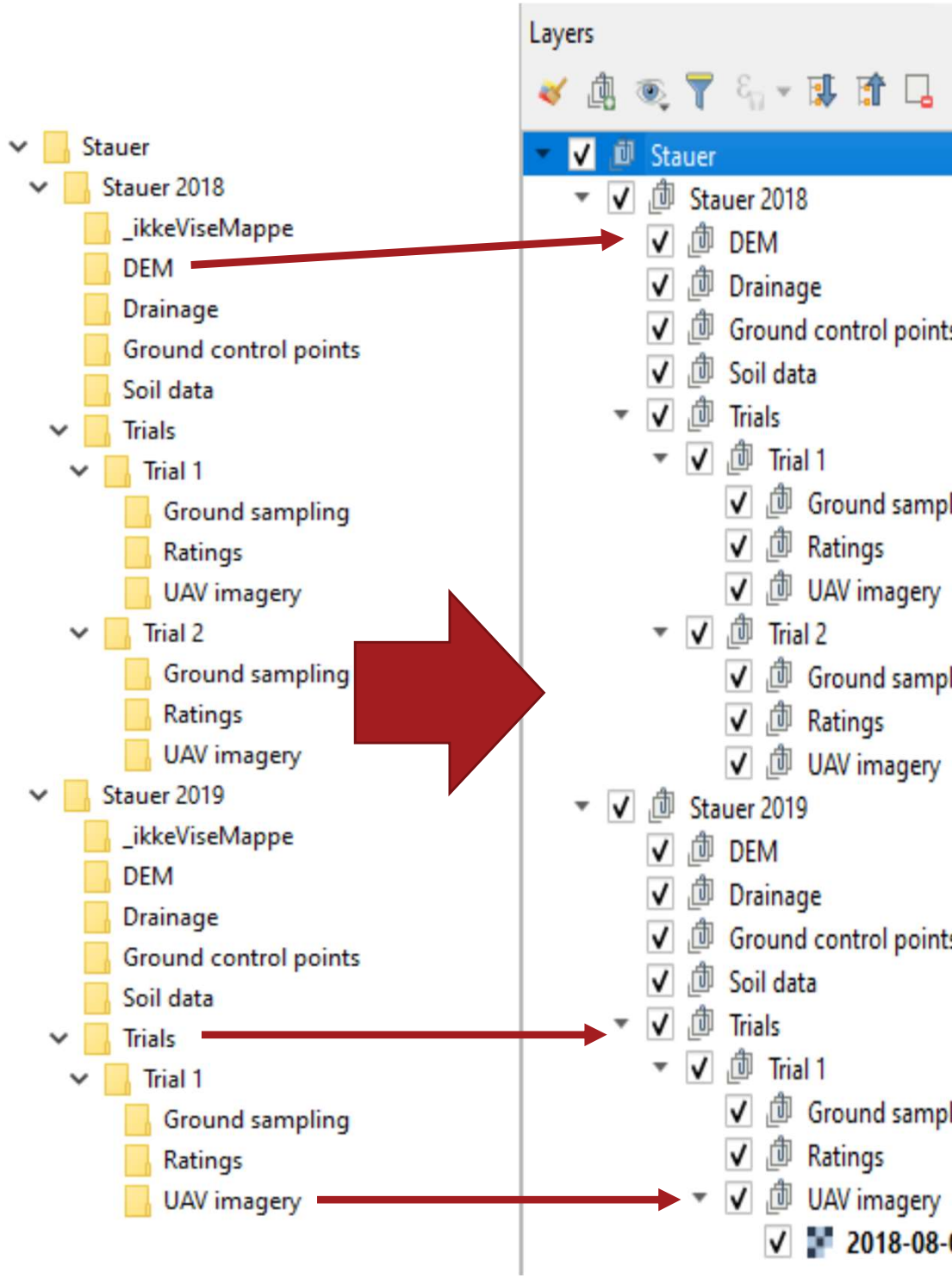
Image files and geographic information

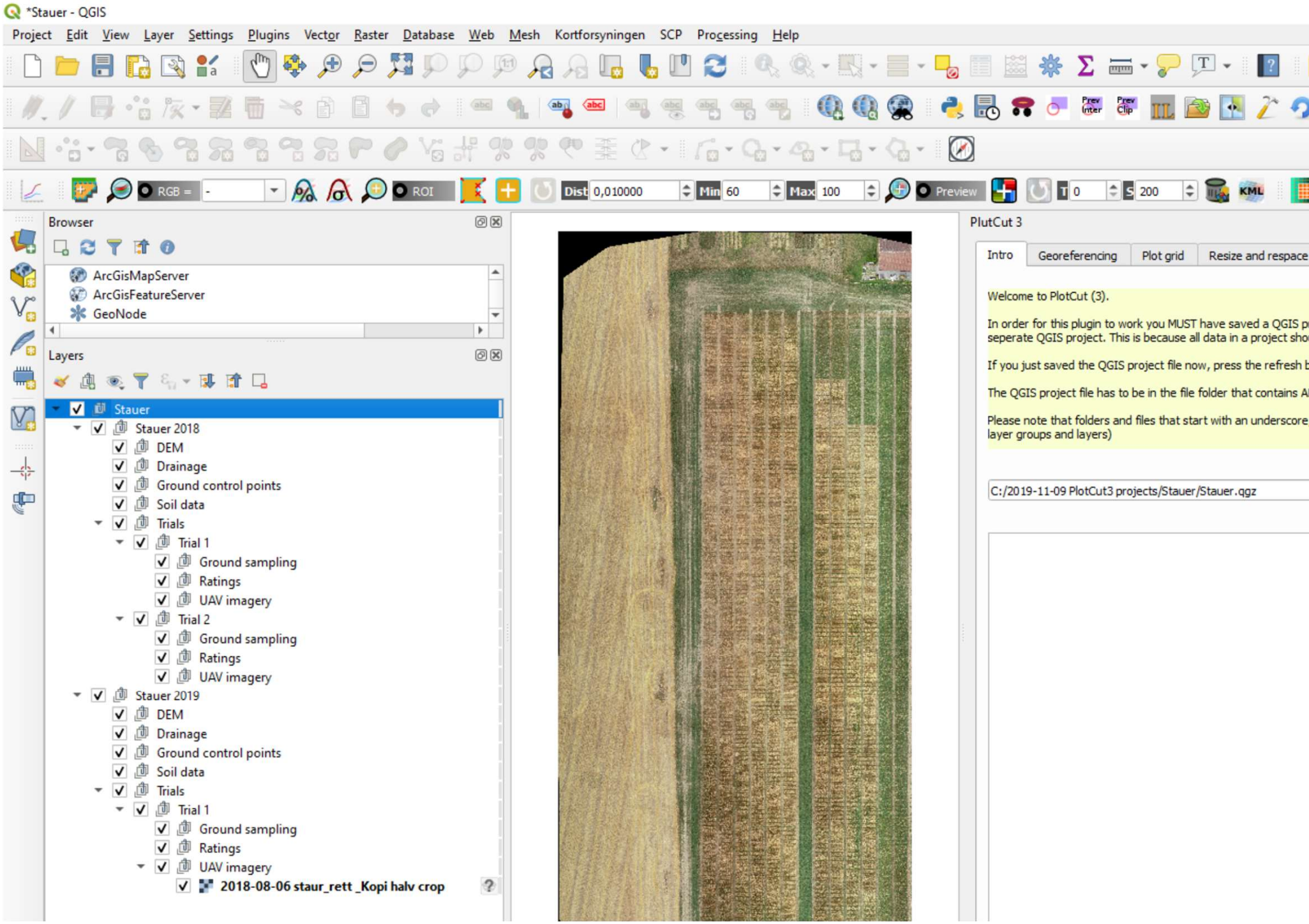
- The information in the image that makes of easily pull it into e.g. a GIS program and add more data/layers.

- Satellite images have it
- From our drones we get it too
  - Single images
  - , and mosaics
    Difference of having a coordinate being fully georeferenced;
    - I.e. an image with a single geo point (but free/undefined rotation)
      VERSUS having exact coordinates AND a projection
- But… Also, from our smartphones
  - Yet – they are missing something
  - But there's a solution to that [[Show-in-QGIS]] = Plugin "ImportPhotos"
- Now what about cameras without geo-tagging
  (without GPS, Galileo, Glonass, Beidu etc)
  - [[Maybe Show-in-QGIS]] E.g.: A Sony camera with no geocoding of the images

File handling in QGIS

- Normally: Importing layers, creating groups
- Simplifying with PlotCut3
  - Automatic folder and file loading
  - Groups and layers are created automatically – thus letting you work with an existing information structure that you already know before you open QGIS




*Stauer - QGIS
Project Edit View Layer Settings Plugins Vector Raster Database Web Mesh Kortforsyningen SCP Processing Help
RGB =
ROI
Dist 0,010000
Min 60
Max 100
Preview
Browser
ArcGisMapServer
ArcGisFeatureServer
GeoNode
Layers
Stauer
Stauer 2018
DEM
Drainage
Ground control points
Soil data
Trials
Trial 1
Ground sampling
Ratings
UAV imagery
Trial 2
Ground sampling
Ratings
UAV imagery
Stauer 2019
DEM
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UAV imagery
2018-08-06 staur_rett _Kopi halv crop
PlutCut 3
Intro
Georeferencing
Plot grid
Resize and respace
Welcome to PlotCut (3).
In order for this plugin to work you MUST have saved a QGIS p
seperate QGIS project. This is because all data in a project sho
If you just saved the QGIS project file now, press the refresh b
The QGIS project file has to be in the file folder that contains Al
Please note that folders and files that start with an underscore
layer groups and layers)
C:/2019-11-09 PlotCut3 projects/Stauer/Stauer.qgz

Feature usage in QGIS

- Making a grid the old-fashioned way
  - Notice the full interface, toolbars;
  - toolbars that can go missing etc.
- Via PlotCut3: Calling needed function from the plugin – i.e. guiding you along in the extraction process
- Example: For when you will be setting your boundary rectangle for plot distribution
  - “Add rectangle from 3 points”

Extracting plot information in QGIS

- Without PLOTCUT3 (or similar solution)
  - You need these ingredients:
    - An image of the plots, e.g. an RGB mosaic
    - Polygons, e.g. Grid or individual polygons/rectangles
    - Raster extraction, e.g. zonal statistics
- Let's take a look in QGIS

What is a plugin in QGIS?

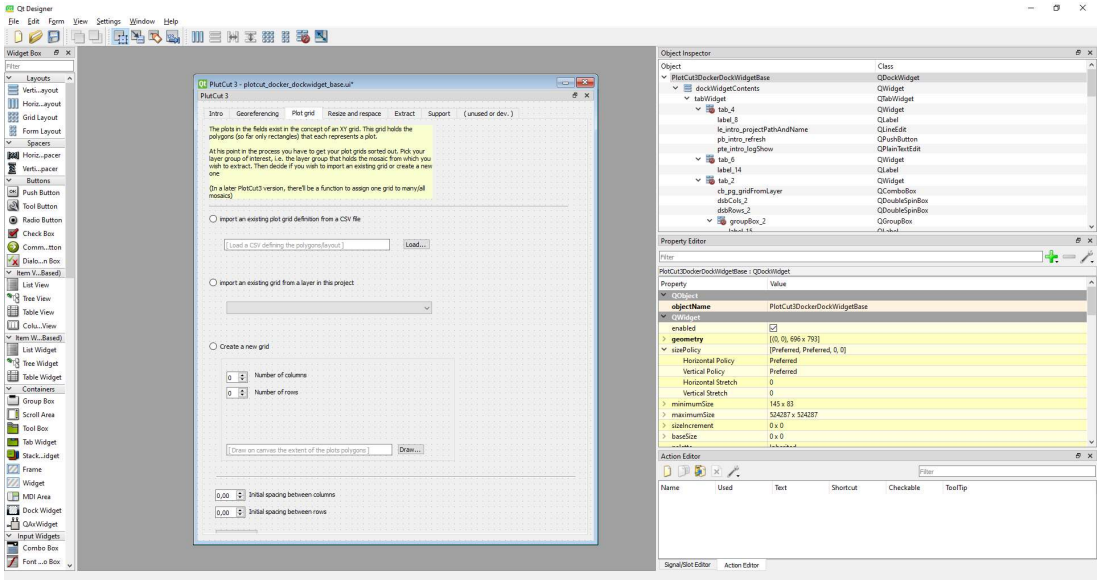
Do we have time?

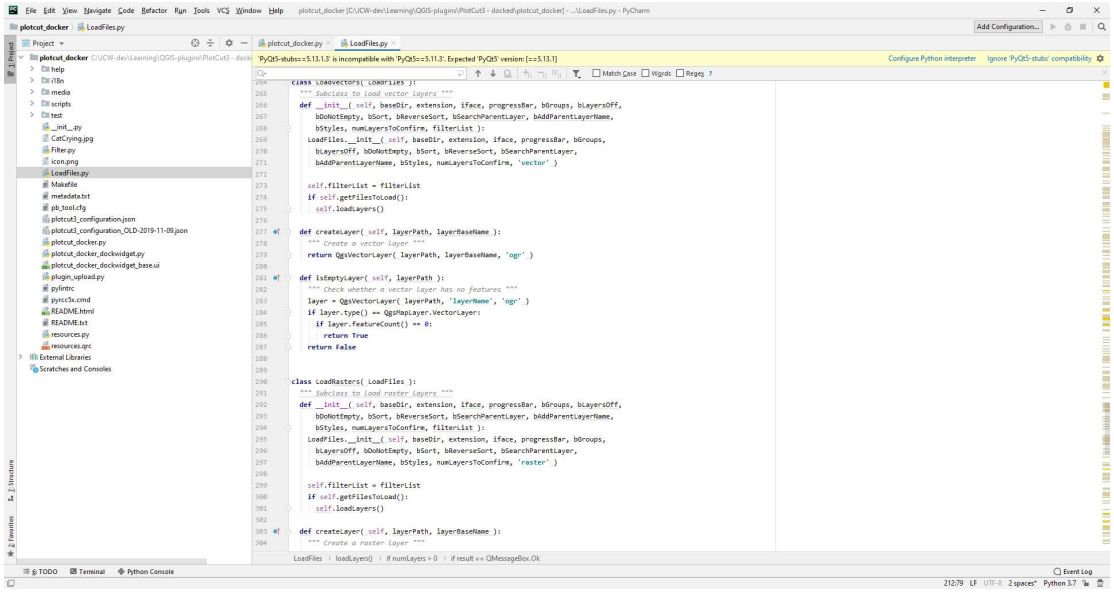
- In QGIS ➔ Jordklassificering.qgz

- From: https://dca.au.dk/forskning/den-danske-jordklassificering/
- Same might be available in other countries
  - The EU-generated map may be even more coarse

Building a plugin for QGIS

- User Interface is build in PyQT
- For coding I use PyCharm
- Synchronize from development folder to the plugin folder with pb_tool





PlotCut3 status

- First release
  - When?
    - For 6P3 R&I partner = 2020 February
    - For the rest of NPPN = later
    - An even later for everybody (via a publication) = Post-6P2
  - Features
    - Data structure load into QGIS from your PC filesystem
    - Walking the user through the needed functions and processing
    - Plot polygon grid distribution and manipulation (incl import from CSV)
    - On-the-fly plot grid definition
    - Extraction of relevant vegetative indices
    - Keeping the data (grids, extracted values and more) in GeoPackages
    - = Better speed
    - = Holds both raster and vector data
    - = Better querying (e.g. across layers) because it is a local database-in-a-file

PlotCut3 status (continued)

- Subsequent releases
  - Support of non-rectangular plot polygon creation/distribution
  - Database support
  - Single image import and placement for extraction (for proximal imaging, e.g. a handheld or stick-mounted camera imaging above each plot)
  - Annotations
  - Calibration walk-throughs (in app guidance) where possible

Questions / discussion