ForBio course: Introduction to GPS and GIS

Time: Monday 13th and Tuesday 14th October 2014, 10 to 16 each day (CET).
Location: Botanical Museum (Lids building), Natural History Museum at the University of Oslo, Sars gate 1, 0318 Oslo, (59.91801 N, 10.77230 E).
People: Dag Endresen, Oddvar Pedersen, Sabrina Mazzoni, Christian Svindseth & Heidi Solstad.
Information: http://www.forbio.uio.no/events/courses/2014/gis_intro.html
Details: http://www.forbio.uio.no/events/courses/2014/gis_info.pdf
Agenda: http://goo.gl/Shp3Uo
DropBox: http://goo.gl/rjnves

Monday 13th October

10:00 Introduction to the course
Overview course content and practical information.
Round-table presentation of your background and experience with GPS and GIS (maximum 2 minutes each).

10:45 Introduction coordinate systems, projections and data formats (Dag Endresen)

11:15 Introduction to GPS (Oddvar Pedersen)
Global Positioning System, GPS configuration, waypoints.

12:15 Lunch break

13:00 Hardware checks (Sabrina Mazzoni)

13:15 Practical exercise: using the GPS inside the Botanical garden
Navigation and collecting GPS coordinates.
Extracting GPS data to your laptop.
http://docs.qgis.org/2.2/en/docs/user_manual/working_with_gps/plugins_gps.html
Report results here: http://goo.gl/tBzKoi (Google Spreadsheet)

15:00 Introduction to making maps using QGIS (Dag Endresen)
Plotting points from the exercise using QGIS (all students).

16:00 End of day 1

Tuesday 14th October

10:00 Access to species occurrence data from GBIF and Artskart (Dag Endresen)

GBIF and Artskart contributes to making species occurrence data freely available online. GBIF can also assist you with uploading and publishing your own species occurrence data from your own fieldwork. You may also use citizen science tools such as Artsobservasjoner or iNaturalist.

11:00 Making maps using QGIS (Dag Endresen)

Adding point data, basic layers and other GIS data to your own map.

11:45 Introduction to GIS analysis (Sabrina Mazzoni)

12:15 Lunch

13:00 Practical exercise, plotting point data using QGIS

Plot species occurrence data downloaded from GBIF or Artskart (all students).
GBIF: http://www.gbif.org
Artskart: http://www.artsdatabanken.no/artskart
Plot your own occurrence data from your own fieldwork.

14:00 Practical exercise, adding layers to your species map

Gazetteer place names, roads, rivers, lakes, admin borders.
GeoNames: http://www.geonames.org/
DIVA-GIS data: http://www.diva-gis.org/gdata
“Kartverket” in Norway: http://www.geonorge.no/geonetwork/srv/nor/main.home
Topographical: http://www.geonorge.no/geonetwork/srv/nor/metadata.show?id=21495
Norway map: http://www.geonorge.no/geonetwork/srv/nor/metadata.show?id=21506
Gray-shades: http://www.geonorge.no/geonetwork/srv/nor/metadata.show?id=21507
Maritime map: http://www.geonorge.no/geonetwork/srv/nor/metadata.show?id=76461
Adminstrative borders: http://www.geonorge.no/geonetwork/srv/nor/metadata.show?id=231&currTab=simple

15:00 Practical exercise, GIS analysis

Proximity analysis, distance to roads, rivers.
Extracting values from environment layers.

16:00 End of day 2 (and course)

Suggested reading list (further reading)

Chapman, A.D., 2005, Uses of Primary Species-Occurrence Data, version 1.0. Report for the Global Biodiversity Information Facility, Copenhagen. 100 pp. Available online at http://www.gbif.org/orc/?doc_id=1300

Scheldeman, X. & van Zonneveld, M., 2010. Training Manual on Spatial Analysis of Plant Diversity and Distribution. Bioversity International, Rome, Italy. ISBN 978-92-9043-880-9. Available online at http://www.gbif.org/resources/2656

Biodiversity Informatics Training Curriculum: http://biodiversity-informatics-training.org/

GPS: http://en.wikipedia.org/wiki/GPS
Mapsource: http://www8.garmin.com/support/download_details.jsp?id=209 (Windows)
BaseCamp: http://www.garmin.com/en-US/shop/downloads/basecamp (Win & Mac)
QGIS plugin: http://docs.qgis.org/2.0/en/docs/user_manual/working_with_gps/plugins_gps.html

Coordinate system WGS84: http://en.wikipedia.org/wiki/WGS84
Convert srs: http://dagendresen.wordpress.com/2013/11/22/convert-coordinate-srs/
Projections: http://en.wikipedia.org/wiki/Map_projection

QGIS: http://en.wikipedia.org/wiki/Qgis
QGIS documentation: http://www.qgis.org/en/docs/index.html
QGIS user guide: http://docs.qgis.org/2.2/en/docs/user_manual/
QGIS training: http://docs.qgis.org/2.2/en/docs/training_manual/index.html
QGIS GIS introduction: http://docs.qgis.org/testing/en/docs/gentle_gis_introduction/

GBIF: http://www.gbif.org/whatisgbif
GBIF data portal: http://www.gbif.org
Artskart: http://www.artsdatabanken.no/artskart
Artsobservasjoner: http://www.artsdatabanken.no/artsobservasjoner
iNaturalist: http://www.inaturalist.org/

Norwegian geodata: http://www.geonorge.no/geonetwork/srv/eng/help
“Kartverket” in Norway: http://www.kartverket.no/geonorge/

RStudio training: http://www.rstudio.com/resources/training/online-learning/
Making maps with R: http://www.molecularecologist.com/2012/09/making-maps-with-r/
Raster data (R): http://cran.r-project.org/web/packages/raster/vignettes/Raster.pdf
Distribution modeling (R): http://cran.r-project.org/web/packages/dismo/vignettes/sdm.pdf

GIS data sources

Some examples of relevant data sources for the QGIS mapping exercise.

DIVA-GIS data

http://www.diva-gis.org/gdata (choose Norway)

Norwegian Mapping Agency ("Kartverket"):

http://www.kartverket.no/Kart/Gratis-kartdata/
http://www.geonorge.no/geonetwork/srv/nor/main.home

Topographical:
http://www.geonorge.no/geonetwork/srv/nor/metadata.show?id=21495
WMS: http://wms.geonorge.no/skwms1/wms.toporaster2

Norway map:
http://www.geonorge.no/geonetwork/srv/nor/metadata.show?id=21506
WMS: http://wms.geonorge.no/skwms1/wms.topo2?

Gray-shades:
http://www.geonorge.no/geonetwork/srv/nor/metadata.show?id=21507
WMS: http://wms.geonorge.no/skwms1/wms.topo2.graatone?

Maritime map:
http://www.geonorge.no/geonetwork/srv/nor/metadata.show?id=76461
WMS: http://wms.geonorge.no/skwms1/wms.sjo_hovedkart2?

Administrative borders:
http://www.geonorge.no/geonetwork/srv/nor/metadata.show?id=231&currTab=simple
Note: No WMS/WCS is available!
http://data.kartverket.no/download/content/geodataprodukter?korttype=3594

Forest types in Norway
http://www.geonorge.no/geonetwork/srv/nor/metadata.show?id=462
WMS: http://wms.skogoglandskap.no/cgi-bin/satskog

TEST DEM WCS Norway:
http://www.geonorge.no/geonetwork/srv/nor/metadata.show?id=21258
WCS: http://wcs.geonorge.no/skwms1/wcs.dtm?

Artskart WMS:
http://www.geonorge.no/geonetwork/srv/nor/metadata.show?id=35113
WMS: http://kart.artsdatabanken.no/WMS/artskart.aspx?

GeoNames:

http://www.geonames.org/

Natural Earth:

http://www.naturalearthdata.com/downloads/10m-physical-vectors/
http://www.naturalearthdata.com/downloads/10m-physical-vectors/10m-ocean/ [ZIP]
http://www.naturalearthdata.com/downloads/10m-physical-vectors/10m-bathymetry/

The Blue Marble (satellite image):

http://en.wikipedia.org/wiki/The_Blue_Marble
Land surface: http://visibleearth.nasa.gov/view.php?id=57752 (2002)
Topography (radar): http://visibleearth.nasa.gov/view.php?id=73934 (2005)
Land surface (July): http://visibleearth.nasa.gov/view.php?id=74092 (2004)

NASA satellite data:

http://earthobservatory.nasa.gov/GlobalMaps/?eocn=topnav&eoci=globalmaps
http://neo.sci.gsfc.nasa.gov/view.php?datasetId=MOD13A2_M_NDVI (vegetation idx)
http://neo.sci.gsfc.nasa.gov/view.php?datasetId=MOD17A2_M_PSN (photosynthesis)
http://neo.sci.gsfc.nasa.gov/view.php?datasetId=MCD12C1_T1 (landcover)

NOAA National Geophysical Data Center (NDGC)

http://www.ngdc.noaa.gov/ngdc.html
http://www.ngdc.noaa.gov/mgg/topo/globe.html (1 km topography)
http://www.ngdc.noaa.gov/mgg/topo/globega2.html (with bathymetry)

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