General

- **Natural Earth - Vector**: Includes coastline, land, oceans, islands, rivers, lakes, glaciated areas and bathymetry. Available at multiple levels of detail.
- **Global Map data archives**: A set of consistent GIS layers covering the whole globe at 1km resolution including: transportation, elevation, drainage, vegetation, administrative boundaries, land cover, land use and population centres. Produced by the International Steering Committee on Global Mapping.
- **USGS Earth Explorer**: Access to one of the largest databases of satellite and aerial imagery.
- **OpenStreetMap (OSM)** as a means to crowdsource data from multiple users. Highly detailed free GIS data with different levels of accuracy and completeness.
- **DIVA-GIS Country Data**: A collection of data collected from a number of the sources below - includes administrative areas, inland water, roads and railways, elevation, land cover, population and climate. Probably the easiest place to get a simple set of data for a specific country.
- **UNEP GEOdata**: A wide range of data from the United Nations Environment Programme including Global Forest Cover, Global Potential Evapotranspiration, Global Average Monthly Temperatures, Dams, Watershed Boundaries and much more. To get data, choose Advanced Search and select Geospatial Data Sets from the top drop-down link.
- **Koordinates**: GIS data aggregation site including data in a number of categories such as elevation, environment, climate etc. Some global datasets, some based on continents, some for specific countries. Mostly vector, but some raster.
- **GeoNetwork**: GIS aggregation site including a wide range of data under various categories (both human and physical).
- **ETOPO1 Global Relief Model**: ETOPO1 is a 1-arc-minute global relief model of Earth’s surface that integrates land topography and ocean bathymetry. It was built from numerous global and regional data sets, and is available in "Ice Surface" (top of Antarctic and Greenland ice sheets) and "Bedrock" (base of the ice sheets) versions.
- **NASA's Socioeconomic Data and Applications Center (SEDAC)** provides valuable geographic information to learn about human interactions in the environment.
- **Open Topography** provides a portal to high spatial resolution topographic data and tools.

Population

- **Gridded Population of the World**: Includes raw population, population density, both historic, current and predicted.
- **Global Rural-Urban Mapping Project**: Based on the above, but includes information on rural and urban population balances.
Buildings, Roads and Points of Interest

- OpenStreetMap: Crowd-sourced data for the whole world consisting of most things you’d find on a standard local paper map: points of interest, buildings, roads and road names, ferry routes etc. Openstreetmap data and shapefiles or in Geofabrik

United States of America (USA)

- General
  - US National Atlas: All raw data contained in the National Atlas is available for downloading including everything from agricultural census data, presidential election results, airports, railways, glaciers, arsenic content in groundwater, and much more.
  - USGS National Geospatial Program (NGP).

- Boundaries and Shorelines
  - US Cartographic Boundaries: Cartographic boundaries, including city boundaries, counties, school districts, voting districts, zip code areas and congressional districts. Mainly from the 2000 census, but some later data.

- Census
  - TIGER: US-wide census data.

- State-specific
  - Maryland Department of Planning
  - Baltimore Neighborhood Indicators Alliance, The Jacob France Institute

Metadata

- Standards
  - [http://www.fgdc.gov/metadata](http://www.fgdc.gov/metadata)
  - [https://committee.iso.org/home/tc211](https://committee.iso.org/home/tc211)
  - [https://marinemetadata.org/references/iso19139](https://marinemetadata.org/references/iso19139)

- GIS Inventory is a free web-based tool that provides a very simple interface to create geospatial metadata. Participants create a profile and document their data layers through a survey-style interface. The GIS Inventory produces metadata that is compliant with the Federal Content Standard for Digital Geospatial Metadata (CSDGM). The GIS Inventory is also capably of ingesting already completed metadata through document upload and web server connectivity. Through the GIS Inventory web services, metadata are automatically shared with US Federal agencies.
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- **GeoNetwork opensource** is a comprehensive Free and Open Source Software solution to manage and publish geospatial metadata and services based on international metadata and catalog standards. The software is part of the Open Source Geospatial Foundation's software stack.

- **GeoCat Bridge** allows users to edit, validate and directly publish metadata from ArcGIS Desktop to GeoNetwork (and generic CSW catalogs) and publishes data as map services on GeoServer. Several metadata profiles are supported.

- **pycsw** is an OGC CSW server implementation written in Python. pycsw fully implements the OpenGIS Catalogue Service Implementation Specification (Catalogue Service for the Web). The project is certified OGC Compliant, and is an OGC Reference Implementation.

- **CATMDEdit** terraCatalog ArcCatalog ArcGIS Server Portal GeoNetwork opensource IME M3CAT MetaD MetaGenie Parcs Canada Metadata Editor Mapit/CADit NOKIS Editor

- **GIS Inventory** – National GIS Inventory System which is maintained by the US-based National States Geographic Information Council (NSGIC) as a tool for the entire US GIS Community. Its primary purpose is to track data availability and the status of geographic information system (GIS) implementation in state and local governments to aid the planning and building of statewide spatial data infrastructures (SSDI). The Random Access Metadata for Online Nationwide Assessment (RAMONA) database is a critical component of the GIS Inventory. RAMONA moves its FGDC-compliant metadata (CSDGM Standard) for each data layer to a web folder and a Catalog Service for the Web (CSW) that can be harvested by Federal programs and others. This provides far greater opportunities for discovery of user information. The GIS Inventory website was originally created in 2006 by NSGIC under award NA04NOS4730011 from the Coastal Services Center, National Oceanic and Atmospheric Administration, U.S. Department of Commerce. The Department of Homeland Security has been the principal funding source since 2008 and they supported the development of the Version 5 during 2011/2012 under Order Number HSHQDC-11-P-00177. The Federal Emergency Management Agency and National Oceanic and Atmospheric Administration have provided additional resources to maintain and improve the GIS Inventory. Some US Federal programs require submission of CSDGM-Compliant Metadata for data created under grants and contracts that they issue. The GIS Inventory provides a very simple interface to create the required Metadata.

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- **GCMD** - Global Change Master Directory's goal is to enable users to locate and obtain access to Earth science data sets and services relevant to global change and Earth science research. The GCMD database holds more than 20,000 descriptions of Earth science data sets and services covering all aspects of Earth and environmental sciences.

- **ECHO** - The EOS Clearing House (ECHO) is a spatial and temporal metadata registry, service registry, and order broker. It allows users to more efficiently search and access data and services through the Reverb Client or Application Programmer Interfaces (APIs). ECHO stores metadata from a variety of science disciplines and domains, totalling over 3400 Earth science data sets and over 118 million granule records.

- **EDINA** (University of Edinburgh)

### QGIS and Spatial Analysis

#### Books

- **Modern Spatial Econometrics in Practice: A Guide to GeoDa, GeoDaSpace and PySAL.** Luc Anselin & Sergio J. Rey. GeoDa Press LLC 2014
- **Bayesian Disease Mapping: Hierarchical Modeling in Spatial Epidemiology.** Lawson, Andrew B. Taylor & Francis. 2008

#### Tools and Sites

- **GeoDa Center** [https://geodacenter.asu.edu](https://geodacenter.asu.edu)
- **GeoDa Software** [https://geodacenter.asu.edu/software/downloads](https://geodacenter.asu.edu/software/downloads)