

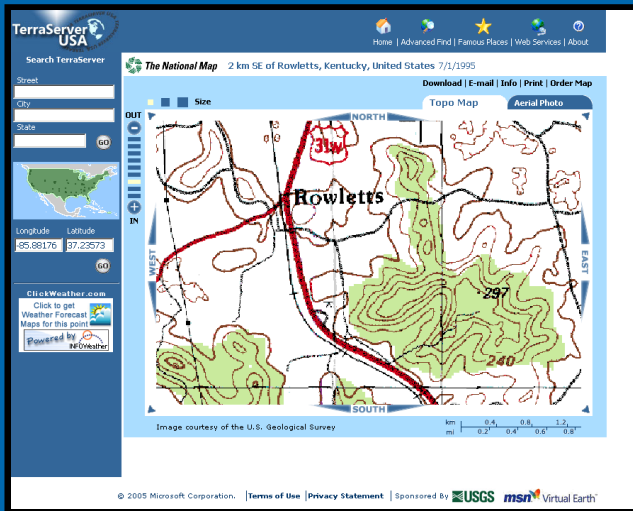
ORNL DAAC WebGIS Demonstration

Suresh Santhana Vannan, Robert Cook, Tammy W. Beaty and Yaxing Wei

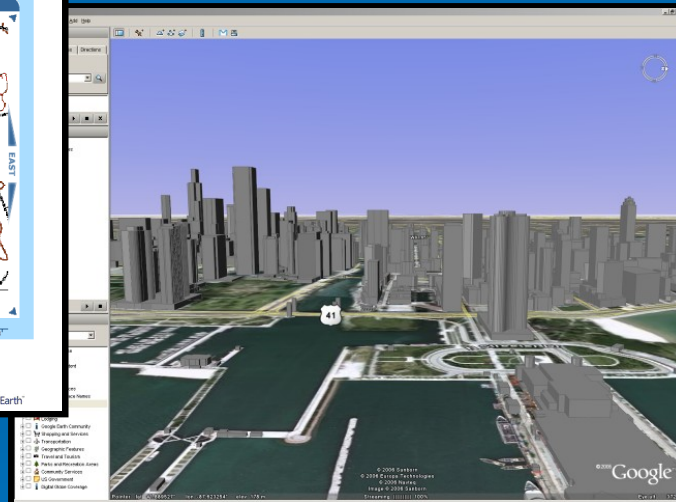
**ORNL DAAC
Oak Ridge National Laboratory
Distributed Active Archive Center
Oak Ridge, Tennessee, USA**

WebGIS

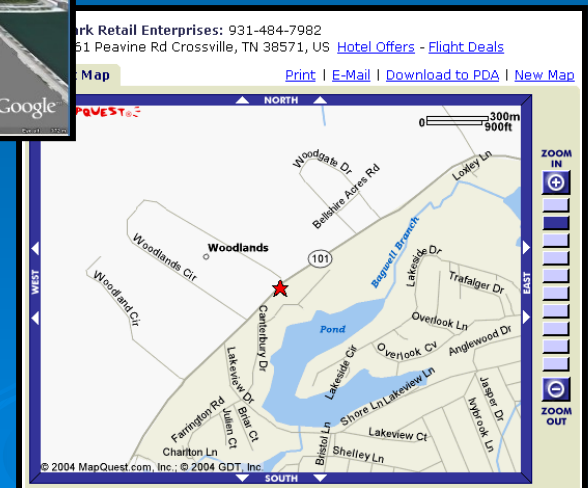
“WebGIS or Web-GIS describes a set of software that can be used to operate GIS functionality throughout a web infrastructure.” - MapServer <http://mapserver.gis.umn.edu/>



Microsoft Terra Server

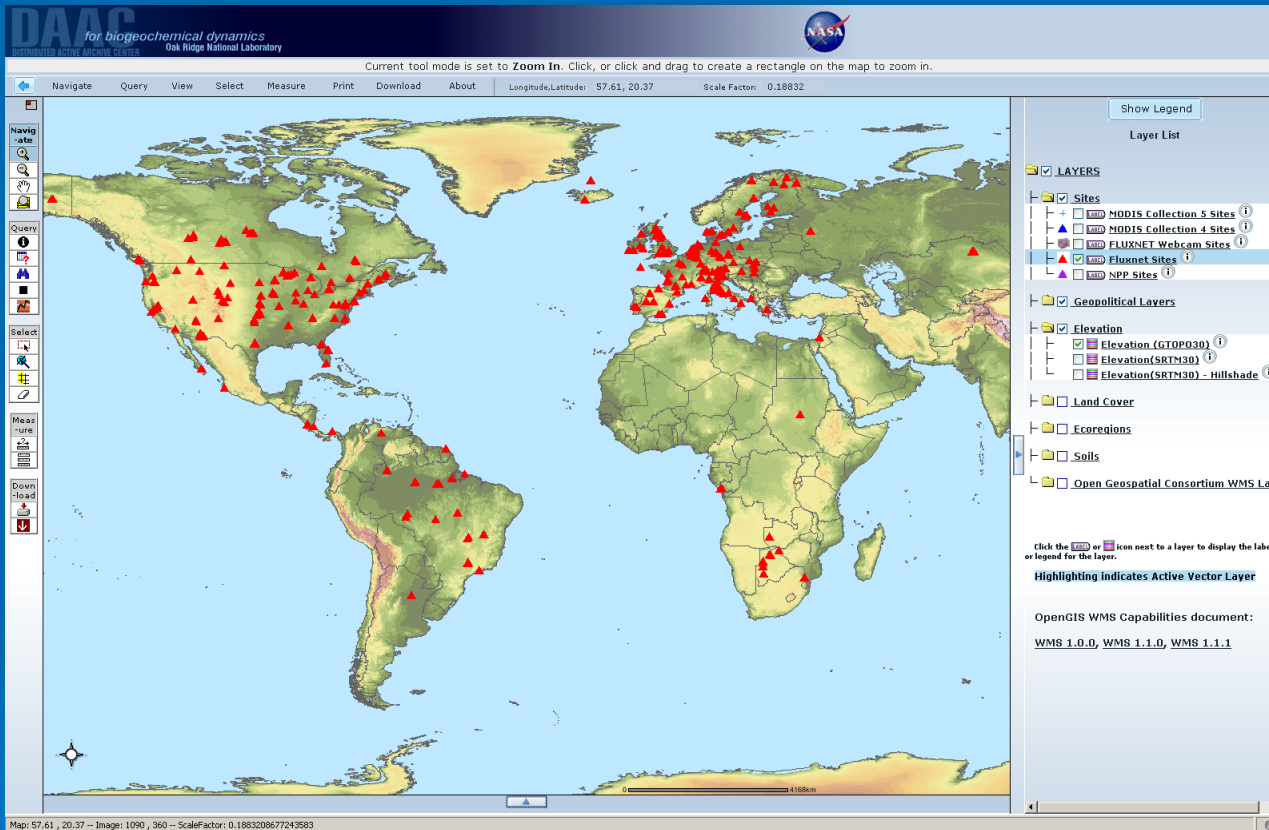


Google Earth



Mapquest

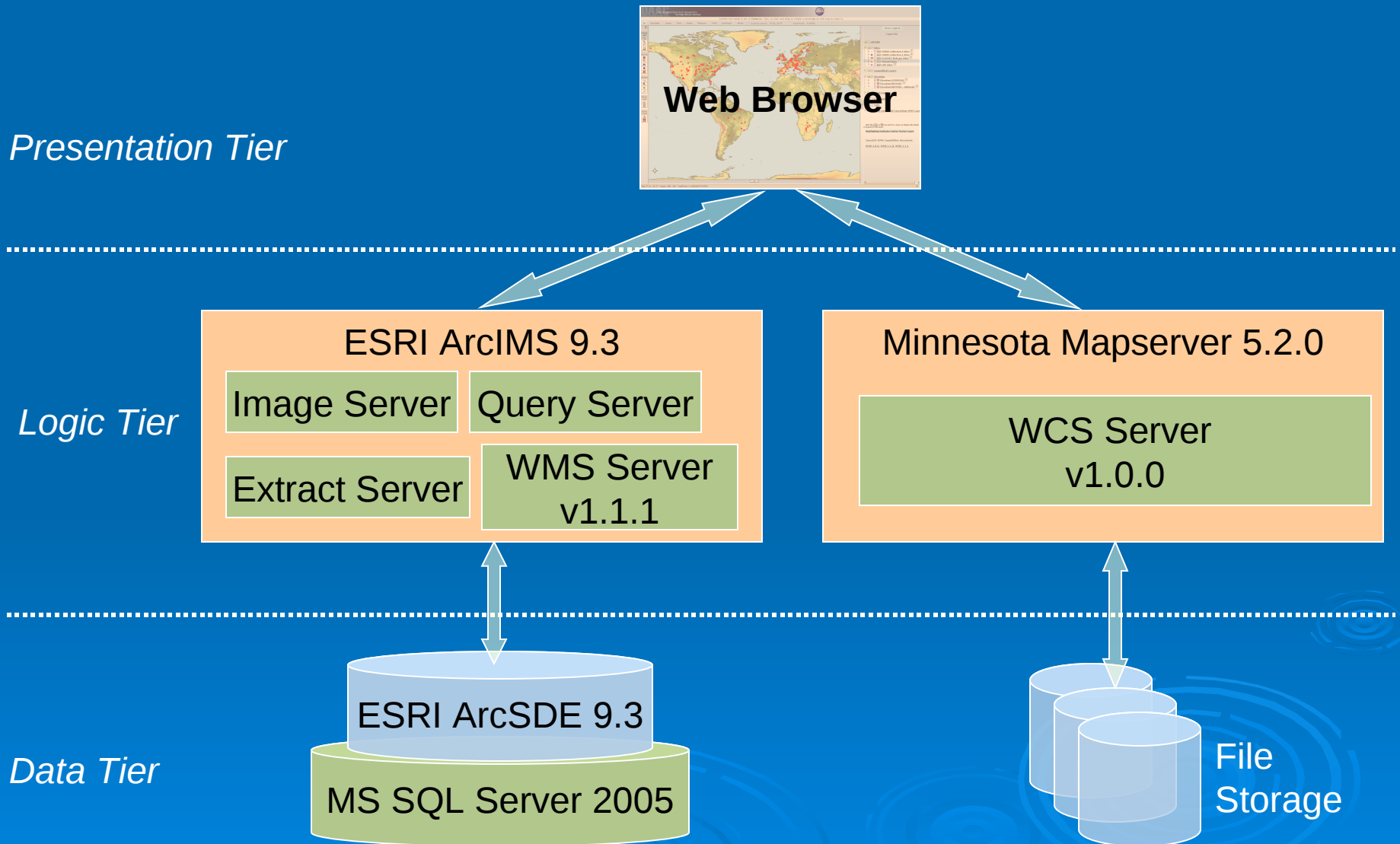
ORNL DAAC WebGIS



System Architecture:

- ESRI ArcIMS 9.3
- ESRI ArcSDE 9.3
- Minnesota Mapserver 5.2.0
- Microsoft SQL Server 2005 database back end

WebGIS System Architecture:



Data Layers offered

- Land cover
- Biophysical
- Elevation
- Geopolitical layers
- Field Sites (MODIS, FLUXNET, NPP)
- OGC data sets from USGS and Microsoft

(OGC) Standards supported in ORNL-DAAC WebGIS

- The Open Geospatial Consortium, Inc.® (OGC)
- WMS 1.1.1 – Get me a picture of a data set from someplace and I define what area I want, what projection I want , what format I want.....
- WCS 1.0.0 – Get me the actual data set from someplace and I define what area I want, what projection I want , what format I want.....

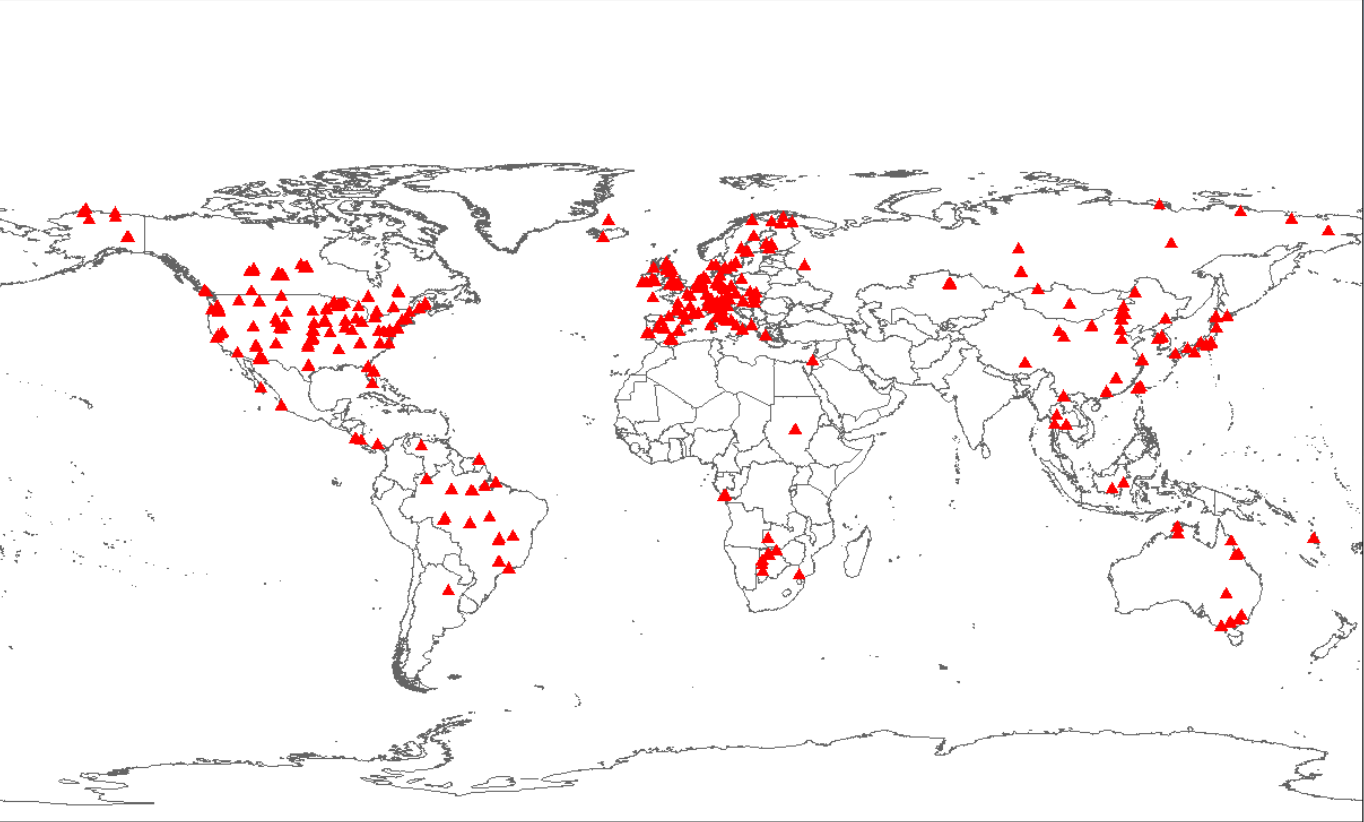
WebGIS DAAC ORNL

DAAC for biogeochemical dynamics
DISTRIBUTED ACTIVE ARCHIVE CENTER Oak Ridge National Laboratory

NASA

Current tool mode is set to **Zoom Out**. Click at any point on the map to zoom out.

Navigate Query View Select Measure Print Download About Longitude, Latitude: 31.61, 11.03 Scale Factor: 0.29801





Navigation tools: Home, Back, Forward, Home, Full Screen, Print, Measure, Select, Query, Download, Home, Back, Forward, Home, Full Screen, Print, Measure, Select, Query, Download

Layer List

Show Legend

- LAYERS
 - Sites
 - MODIS Collection 5 Sites
 - MODIS Collection 4 Sites
 - Fluxnet Webcam Sites
 - Fluxnet Sites
 - NPP Sites
 - Geopolitical Layers
 - Elevation
 - Elevation (GTOPO30)
 - Elevation (SRTM30)
 - Elevation (SRTM30) - Hillshade
 - Land Cover
 - Ecoregions
 - Soils
 - Open Geospatial Consortium WMS Layers

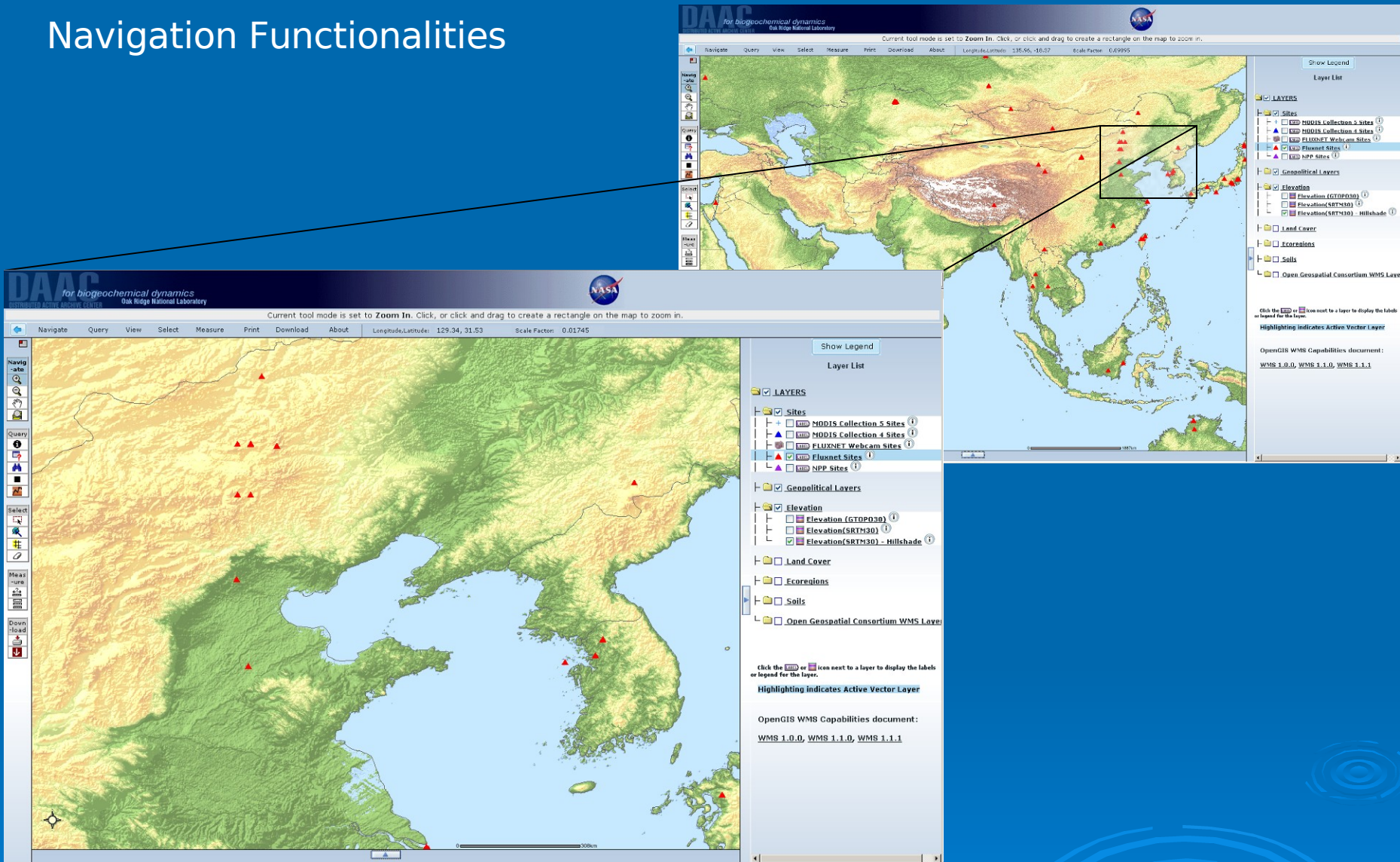
Click the  or  icon next to a layer to display the labels or legend for the layer.

Highlighting indicates Active Vector Layer

OpenGIS WMS Capabilities document:
[WMS 1.0.0](#), [WMS 1.1.0](#), [WMS 1.1.1](#)

0 6624km

Navigation Functionalities



- Zoom in
- Zoom out
- Pan (East, West, North, South, Any)

Selection Tools

Draw a Rectangle and Select everything inside

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Oak Ridge National Laboratory

Current tool mode is set to **Select Rectangle**. Click and drag to create rectangle around the features of interest from active layer

Longitude, Latitude: 112.52, 60.82
Scale Factor: 0.04638

Navigation Tools: Home, Back, Forward, Refresh, Full Screen, Print, Measure, Download

Query: Query, Select, Measure, Print, Download, About

Select: Select (highlighted with a red circle)

Show Legend

Layer List

- LAYERS
- Sites
 - MODIS Collection 5 Sites
 - MODIS Collection 4 Sites
 - Fluxnet Sites
 - NPP Sites
- Geopolitical Layers
- Elevation
 - Elevation (GTOPO30)
 - Elevation (SRTM30)
- Land Cover
- Ecoregions
- Soils
- Open Geospatial Consortium WMS Layer

Click the or icon next to a layer to display the labels or legend for the layer.

Highlighting indicates Active Vector Layer

OpenGIS WMS Capabilities document:
[WMS 1.0.0](#), [WMS 1.1.0](#), [WMS 1.1.1](#)

Fluxnet Sites																	
Rec	Site Name	DATA Link	MODIS site	Country	State	Landunit	Lat	Long	Cluster	Contact	Network	Site Type	Status	Flux Began	Landcover	Air Temperature, Minimum (LOCCIM estimate)	Temp. Ave. (LOCCIM estimate)
1	Beijing Daxing	MODIS Site Info		China	Asia		39.530556	116.251944		Zha, Tonggang	Unaffiliated	Flux Tower	Active	2004	Evergreen broadleaf forest	6.9	12.46
2	Dongwu_grassland	MODIS Site Info		China	Asia		45.560139	117.000278		Chen, Shiping	Unaffiliated	Flux Tower	Intermittent	2005	Grasslands	-5.27	0.55
3	Duolun_cropland	MODIS Site Info		China	Asia		42.045556	116.871389		Chen, Shiping	Unaffiliated	Flux Tower	Active	2005	Croplands	-3.98	2.13
4	Duolun_grassland	MODIS Site Info		China	Asia		42.046667	116.283611		Chen, Shiping	Unaffiliated	Flux Tower	Active	2005	Grasslands	-4.17	2.01

Information
from
Database

Get Detailed Site Information: Select an Active Layer



Current tool mode is set to **Select Rectangle**. Click and drag to create rectangle around the features of interest from active layer

[Home](#) | [Navigate](#) | [Query](#) | [View](#) | [Select](#) | [Measure](#) | [Print](#) | [Download](#) | [About](#)

Longitude, Latitude: 59.9, 14.25 Scale Factor: 0.29801

Show Legend

Layer List

LAYERS

- Sites
 - MODIS Collection 5 Sites
 - MODIS Collection 4 Sites
 - Fluxnet Sites
 - NPP Sites
- Geopolitical Layers
- Elevation
 - Elevation (GTOP030)
 - Elevation (SRTM30)
- Land Cover
- Ecoregions

MODIS Collection 5 Sites

Rec	Site Name	Modis Site	Modis Data	Country	State	Landunit	Cluster	Contact	Primary Network	Site Type
1	Anhui poplar plantation	Site Info	MODIS Data							
2	COMPLET 150 (32.5242 N 117.8992 E)	Site Info	MODIS Data	China	Asia			Baret, Fred	MODIS Subsets	
3	Dinghushan	Site Info	MODIS Data	China	Asia			Guoyi, Zhou	ChinaFLUX	Flux Tower
4	Dongtan 1	Site Info	MODIS Data	China	Asia			Zhao, Bin	Unaffiliated	Flux Tower

Visualize **Qianyanzhou** location in:

[Google Map](#) | [Google Earth](#) | [MODIS-WebGIS](#) | [Tile Mapper](#)

MODIS Product for Qianyanzhou	Visualization				Data Download	
	Grid Visualization for individual composite period Basic Version (Default QC setting)	Grid Visualization for individual composite period Advanced Version (User defined QC setting)	Time Series Basic Version (Default QC setting)	Time Series Advanced Version (User defined QC setting)	ASCII Help	GeoTIFF Help
					ASCII Download	GeoTIFF Download

Corner coordinates and site details

Site	China-Qianyanzhou
Latitude, Longitude	26.73333333, 115.0666667
Center Latitude, Longitude	26.729167, 115.066552
Northeast Corner Latitude, Longitude	26.758333, 115.128737
Northwest Corner Latitude, Longitude	26.758333, 115.063408
Southeast Corner Latitude, Longitude	26.700000, 115.069725
Southwest Corner Latitude, Longitude	26.700000, 115.004429

The four corners of the 7x7 km subset (blue cross), center pixel (blue cross) and the field site (yellow cross) are displayed on a Landsat image from [JPL Global Imagery WAS Service](#). The source dataset for the Landsat background image is part of the NASA Scientific Data Purchase, and contains scenes acquired in 1999-2003. This layer provides orthorectified pan-sharpened images, where the p band is used for the image brightness regardless of the color combination requested. Please Note: The boundary (cyan polygon) may appear skewed since the coordinates are represented in geographic coordinates, while the MODIS subsets are available in native sinusoidal projection.

Background: Landsat Image from JPL (if available)
ELEVATION of Center Pixel derived from [GTOP030](#)

x: 115.06251
y: 26.729172

Elevation(meter): 79

Query

All FLUXNET sites that started operating before 2003

Field: Flux Began Operator: < Value: 2003

Buttons: And Or Not () Get Samples

Add to Query String: UPPER(SDE.SDE.FLUXNETSITES.YEARBEGAN) <

Buttons: Execute Undo Clear

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Current tool mode is set to **Zoom In**. Click, or click and drag to create a rectangle on the map to zoom in.

Longitude, Latitude: -11.01, -35.79 Scale Factor: 0.26053

Layers List:

- LAYERS
 - Sites
 - MODIS Collection 5 Sites
 - MODIS Collection 4 Sites
 - FLUXNET Webcam Sites
 - Fluxnet Sites**
 - NPP Sites
 - Geopolitical Layers
 - Elevation
 - Elevation (GTOP030)
 - Elevation (SRTM30)
 - Elevation (SRTM30) - Hillshade
 - Land Cover
 - Ecoregions
 - Soils
 - Open Geospatial Consortium WMS Layers

Click the or icon next to a layer to display the labels or legend for the layer.

Highlighting indicates Active Vector Layer

OpenGIS WMS Capabilities document:
WMS 1.0.0, WMS 1.1.0, WMS 1.1.1

Rec	Site Name	DATA Link	MODIS site	Country	State	Landunit	Lat	Long	Cluster	Contact	Network	Site Type	Status	Flux Began	Landcover	Temp. Min (LOI est)
1	Neustift/Stubai Valley	MODIS Site Info	Austria	Europe			47.1162	11.32036		Cemusca, Alexander	CarboEurope IP	Flux Tower	Active	2001	Deciduous broadleaf forest	2.06
2	Burdakin Delta	MODIS Site Info	Australia	Australia/Oceania			-19.569667	147.4		Charlesworth, Phillip	OzFlux	Flux Tower	Active	2001	Urban and built-up	18.58
3	Cape Tribulation	MODIS Site Info	Australia	Australia/Oceania			-16.10315	145.446883		Turton, Steve	OzFlux	Flux Tower	Active	2001	Evergreen broadleaf forest	21.54
4	Howard Springs	MODIS Site Info	Australia	Australia/Oceania			-12.46428	131.15231		Beringer, Jason	OzFlux	Flux Tower	Active	2001	Woody savannas	23.25

Find Tool

Current tool mode is set to **Search Attributes**. Enter search string in the Information frame below the map.

Find (Search is not Case sensitive)
 Enter String to Find in Fluxnet Sites:
 Find String

Find "Mongolia"

Current tool mode is set to **Zoom In**. Click, or click and drag to create a rectangle on the map to zoom in.

Fluxnet Sites

Rec	Site Name	Country	State	Landunit	Cluster	Contact	Network	Site Type	Status	Flux Began	Landcover	Elevation	Canopy Height(m)	Network Affiliations	DATA Link	MODIS site	Climate (Gridded estimate)	Vegtype
1	Anvaikheer	Mongolia	Asia			Ohno, Hiroyuki	Inactive	Flux Tower	Inactive	1998	Grasslands		.1	AsiaFlux, FLUXNET, BELMANIP, MODIS Subsets	MODIS Site Info		Dry BS	natural vegetatio
2	Inner Mongolia	Mongolia	Asia			Yanfen, Wang	ChinaFLUX	Flux Tower	Active	2003	Open shrublands			ChinaFLUX, BELMANIP, FLUXNET, MODIS Subsets	MODIS Site Info		Cold DW	

[Zoom to these records](#)

Fluxnet Sites																		
Rec	Site Name	Country	State	Landunit	Cluster	Contact	Network	Site Type	Status	Flux Began	Landcover	Elevation	Canopy Height(m)	Network Affiliations	DATA Link	MODIS site	Climate (Gridded estimate)	Vegtype
1	Anvaikheer	Mongolia	Asia			Ohno, Hiroyuki	Inactive	Flux Tower	Inactive	1998	Grasslands		.1	AsiaFlux, FLUXNET, BELMANIP, MODIS Subsets	MODIS Site Info		Dry BS	natural vegetatio
2	Inner Mongolia	Mongolia	Asia			Yanfen, Wang	ChinaFLUX	Flux Tower	Active	2003	Open shrublands			ChinaFLUX, BELMANIP, FLUXNET, MODIS Subsets	MODIS Site Info		Cold DW	

[Zoom to these records](#)

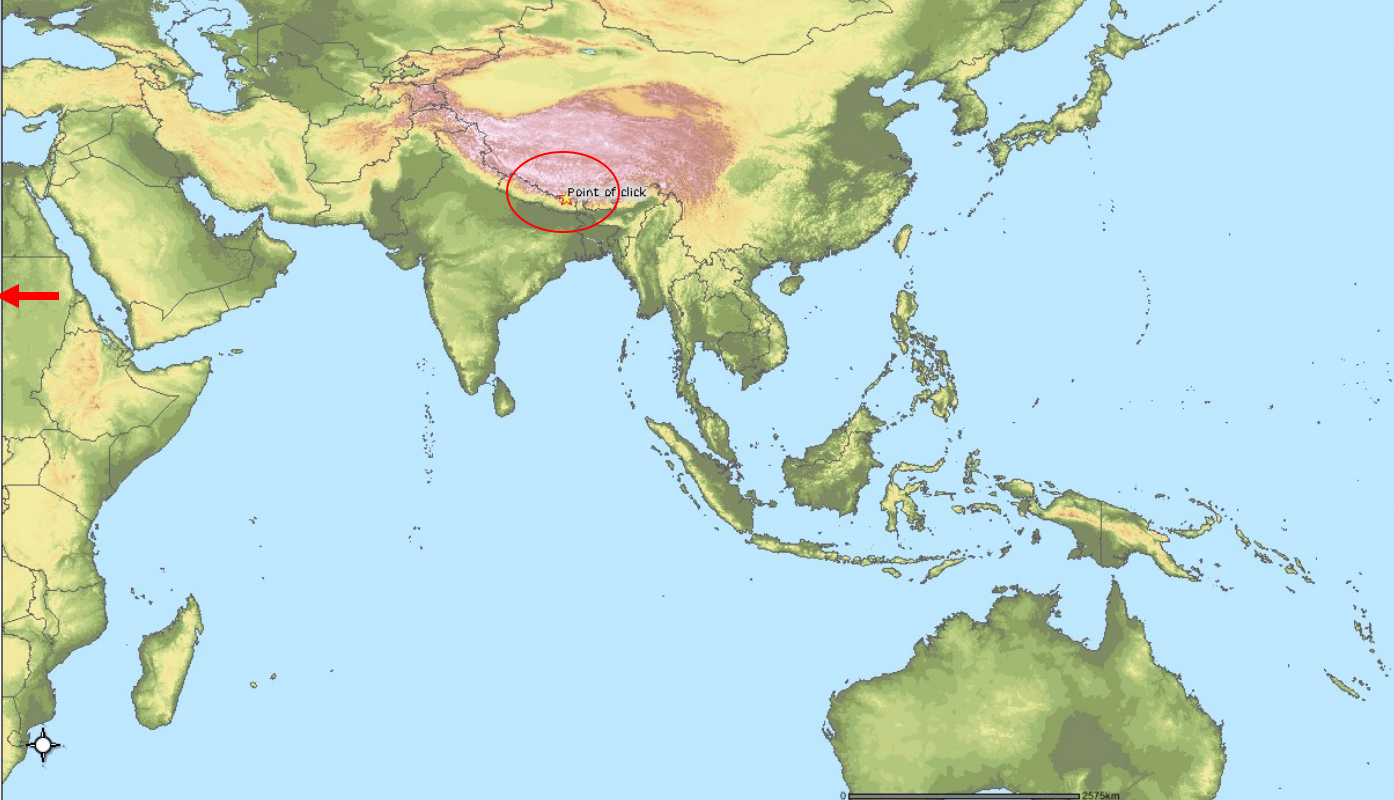
Get Elevation –Mt. Everest

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NASA

Current tool mode is set to **Zoom In**. Click, or click and drag to create a rectangle on the map to zoom in.

Navigate Query View Select Measure Print Download About Longitude, Latitude: 147.96, -22.28 Scale Factor: 0.11669



Point of click

0 2575km

NAVIGATE

Query

Select

Measure



Down-load

Show Legend

Layer List

LAYERS

- Sites
 - MODIS Collection 5 Sites
 - MODIS Collection 4 Sites
 - FLUXNET Webcam Sites
 - Fluxnet Sites
 - NPP Sites
- Geopolitical Layers
- Elevation
 - Elevation (GTOP030)
 - Elevation(SRTM30)
 - Elevation(SRTM30) - Hillshade
- Land Cover
- Ecoregions
- Soils
- Open Geospatial Consortium WMS Layers

Click the  or  icon next to a layer to display the labels or legend for the layer.

Highlighting indicates Active Vector Layer

OpenGIS WMS Capabilities document:
[WMS 1.0.0](#), [WMS 1.1.0](#), [WMS 1.1.1](#)

ELEVATION: GTOP030


Longitude : 87.10418
Latitude : 27.895839
Elevation(meter) : 8519

Obtain Pixel Values for Each Layer

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Current tool mode is set to **Raster Query**. Click at any point on the map


← Navigate Query View Select Measure Print Download About Longitude, Latitude: -69.9, 40.13 Scale Factor:



Layer : Elevation(SRTM30) -----Pixel Value is: 1052
Layer : MODIS Land/Water Mask -----Pixel Value is: 1
Layer : MODIS Landcover (IGBP) -----Pixel Value is: 5
Layer : MODIS Landcover (UMd) -----Pixel Value is: 5
Layer : MODIS Landcover (LAI/fPAR) -----Pixel Value is: 6
Layer : Global Landcover(2000) -----Pixel Value is: 2
Layer : AVHRR Landcover(UMd) -----Pixel Value is: 1
Layer : MODIS Vegetation Continuous Fields -----This dataset is not available for point of click
Layer : Matthews Landcover -----Pixel Value is: 10


Preparing a Map for Printing

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Current tool mode is set to **Zoom In**. Click, or click and drag to create a rectangle on the map to zoom in.

Longitude, Latitude: 90.55, 57.87
Scale Factor: 0.06884



Show Legend

Layer List

- LAYERS**
- Sites**
 - MODIS Collection 5 Sites
 - MODIS Collection 4 Sites
 - Fluxnet Sites
 - NPP Sites
- Geopolitical Layers**
 - Country Boundaries
- Elevation**
 - Elevation (GTOPO30)
 - Elevation (SRTM30)
- Land Cover**
 - MODIS Landcover (IGBP)
 - MODIS Landcover (UMd)
 - MODIS Landcover (LAI/fPAR)
 - Global Landcover(2000)
 - AVHRR Landcover(UMd)
 - SPOT Vegetation Global Mosaic
 - Matthews Landcover
 - Olson Vegetation
- Ecoregions**
- Soils**
- Open Geospatial Consortium WMS Lay**
 - USGS National Elevation Dataset
 - Terraserver-USGS topographic map
 - Terraserver Digital Ortho-Quadran
 - JPL Landsat Global Mosaic
 - Terraserver Urban Areas

Click the or icon next to a layer to display the labels or legend for the layer.

Highlighting indicates Active Vector Layer

Print Map

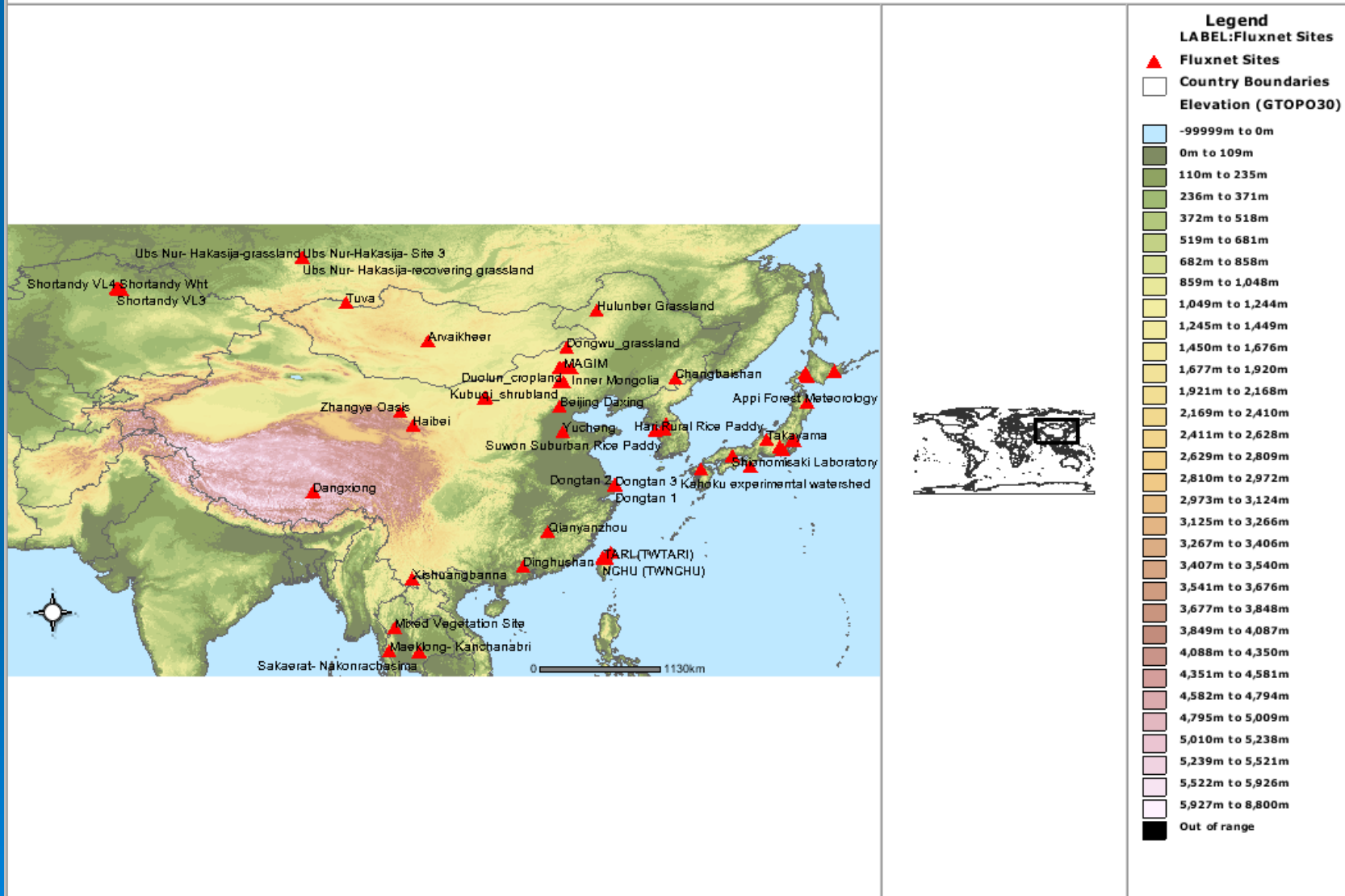
Title to display on Map:
Flux Towers in East Asia

Create Print Page

Click on "Create Print Page" to open a new Browser window with the Map Image, Overview Map Image, and Legend displayed. You can then use the File/Print menu item to send the display to your printer.

Map Suitable for Printing

Flux Towers in East Asia



Questions?

Phone: 1-865-241-3952

Email: uso@daac.ornl.gov

- <http://daac.ornl.gov/mapserver.shtml>
- <http://daac.ornl.gov/userserv.html>