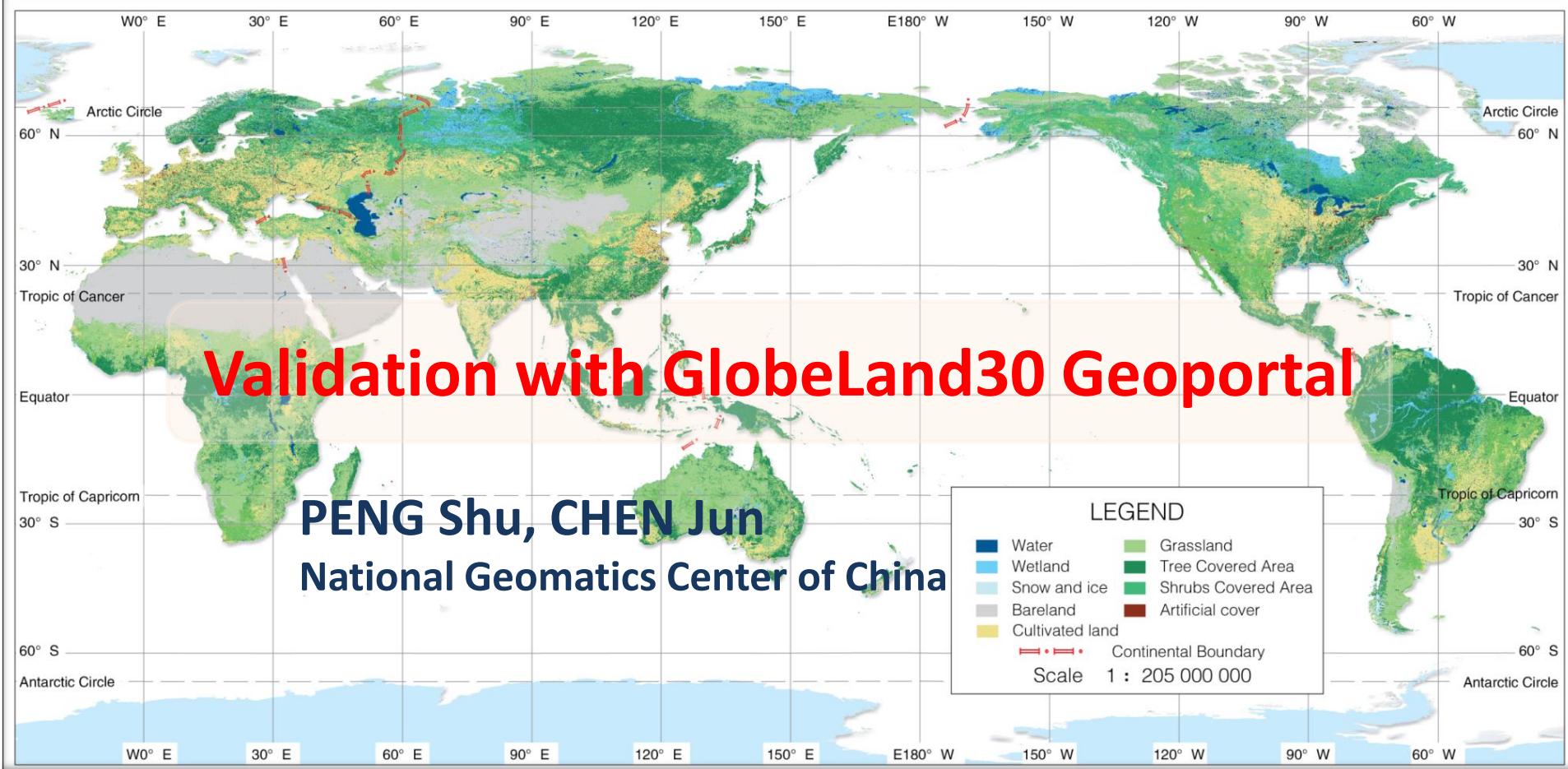
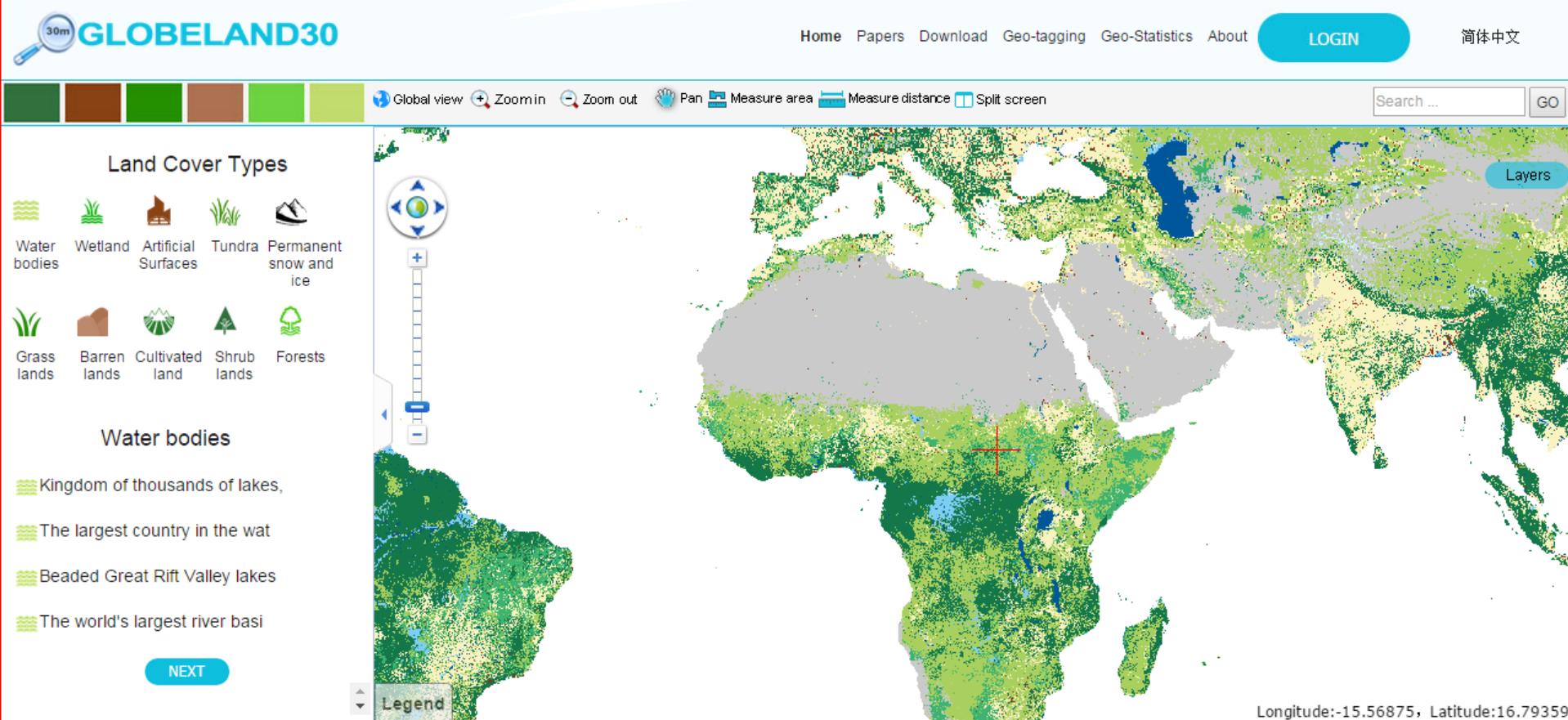


CAPACITY BUILDING FOR HIGH-RESOLUTION LAND COVER INTERCOMPARISON AND VALIDATION

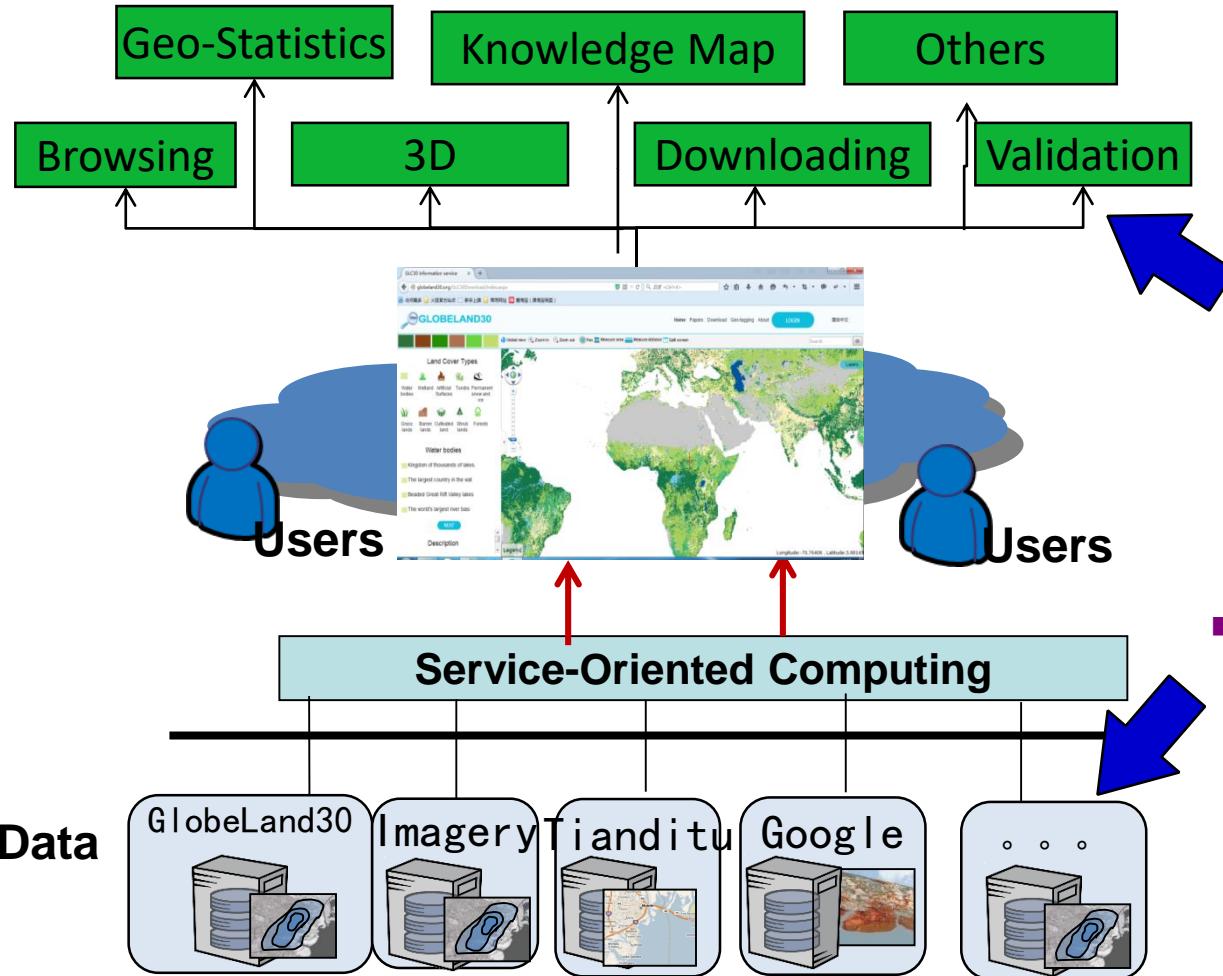


Open Data Access

www.globeLand30.org



Conceptual Architecture of Globeland30 Platform



- Design a series of services to provide on-line browsing, downloading, Geo-statistics, validation and knowledge map
- Connect Globeland30 , multiple source data and services

Outlines

1

Data Browsing

2

Data Downloading

3

Data Specification

4

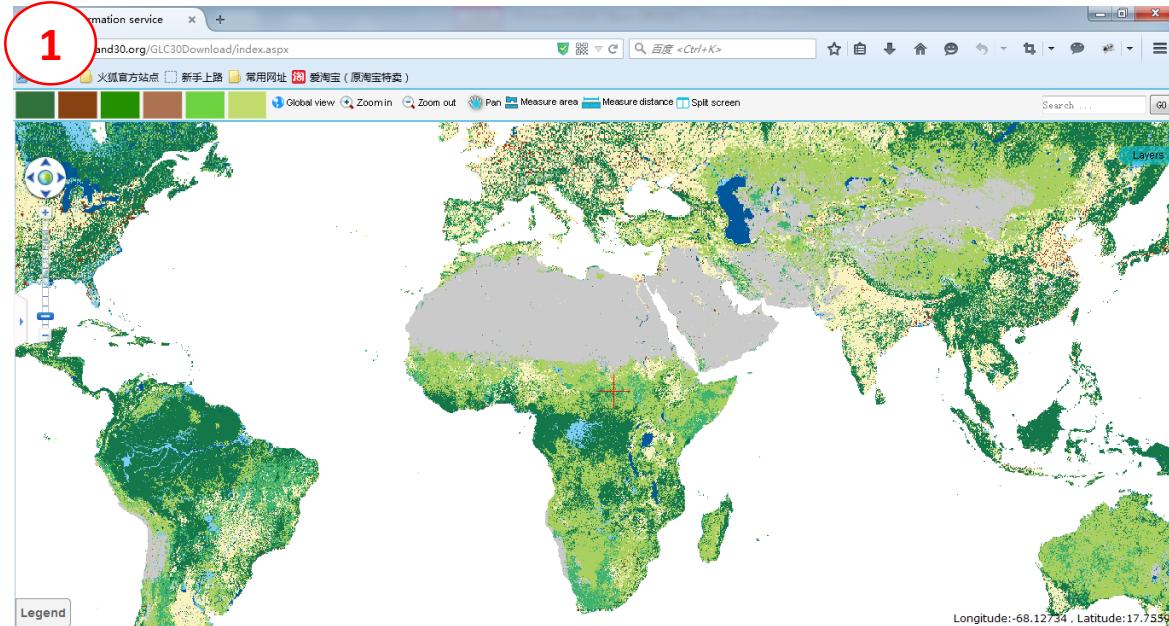
Data Statistics

5

Data Validation



Data Browsing

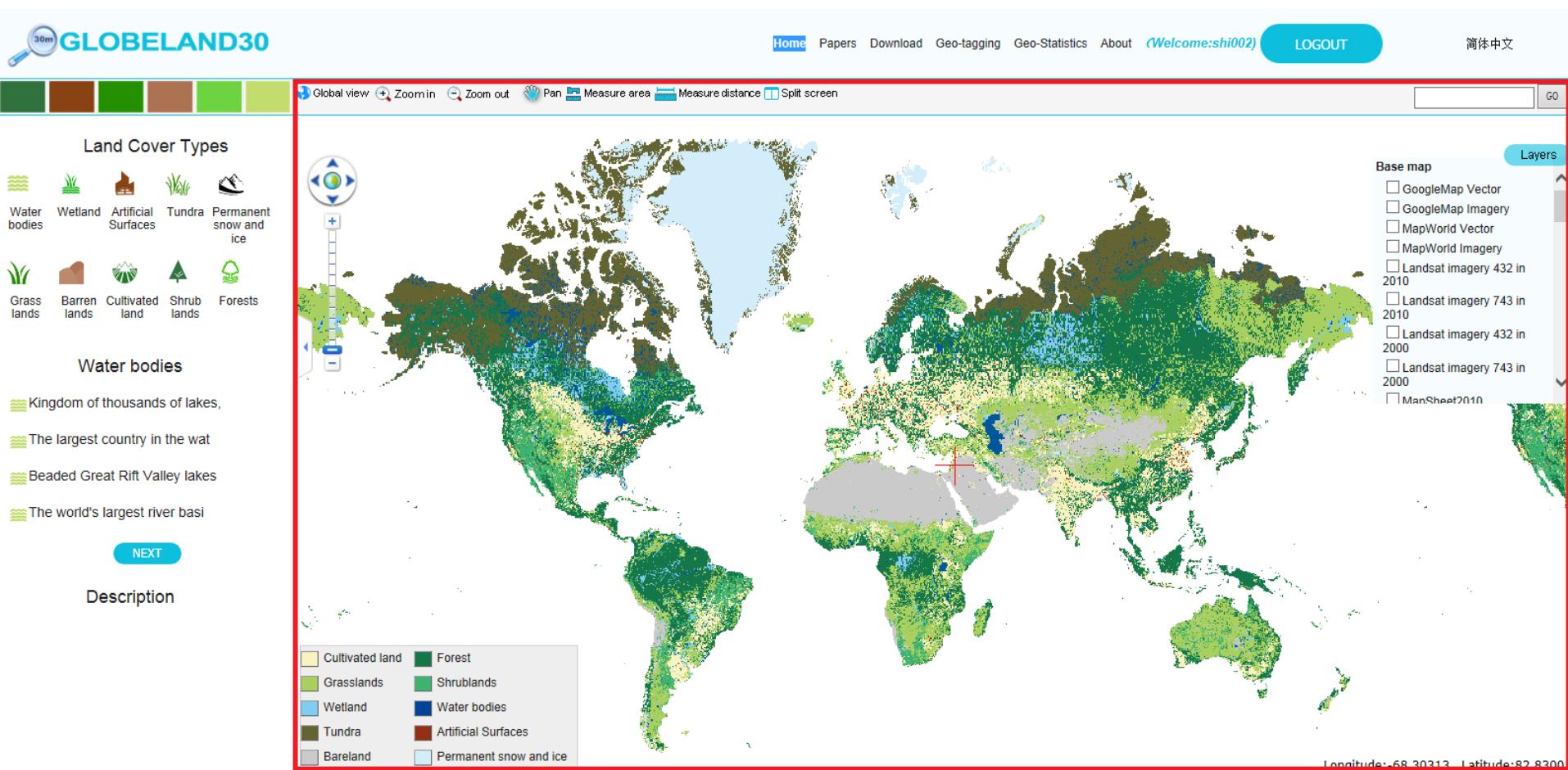


Browse GlobelLand30
and source imagery



Compare Globeland30
in different years or
with other reference datasets

Browsing GlobeLand30



Typical Landscape Types

GLOBELAND30

Home Papers Download Geo-tagging Geo-Statistics About Welcome:shi002 LOGOUT 简体中文

1 Land Cover Types

- Water bodies
- Wetland
- Artificial Surfaces
- Tundra
- Permanent snow and ice
- Grass lands
- Barren lands
- Cultivated land
- Shrub lands
- Forests

2 Wetland

- The world's largest wetland -
- The world's largest inland del
- The world's largest delta comp
- Asia's most unique wetlands -

3 Description

Pantana M Marsh (Pantanal) is the world's largest wetland, flat and slightly sloping, with meandering river. In South America, Brazil and Mato Grosso and Mato Grosso do Sul, Bolivia and Paraguay Province in the wetland part, a total area of 242000 square kilometers. Pantana M will be flooded during the rainy season, more than 80% area will be under water, is the world's most abundant aquatic plants concentrated. Pantana M is considered the world's most intensive dynamic ecosystem plant.

30m Global view Zoom in Zoom out Pan Measure area Measure distance Split screen Layers GO

Longitude: -57.03308, Latitude: -21.21828

Comparison with Original 30m Imagery

30m GLOBELAND30

Split screen

Home Papers Download Geo-tagging Geo-Statistics About Welcome:shi002 LOGOUT 简体中文

Global view Zoom in Zoom out Pan Measure area Measure distance Split screen

Land Cover Types

- Water bodies
- Wetland
- Artificial Surfaces
- Tundra
- Permanent snow and ice
- Grass lands
- Barren lands
- Cultivated land
- Shrub lands
- Forests

Layers

Water bodies

- Kingdom of thousands of lakes,
- The largest country in the wat
- Beaded Great Rift Valley lakes
- The world's largest river basi

NEXT

Description

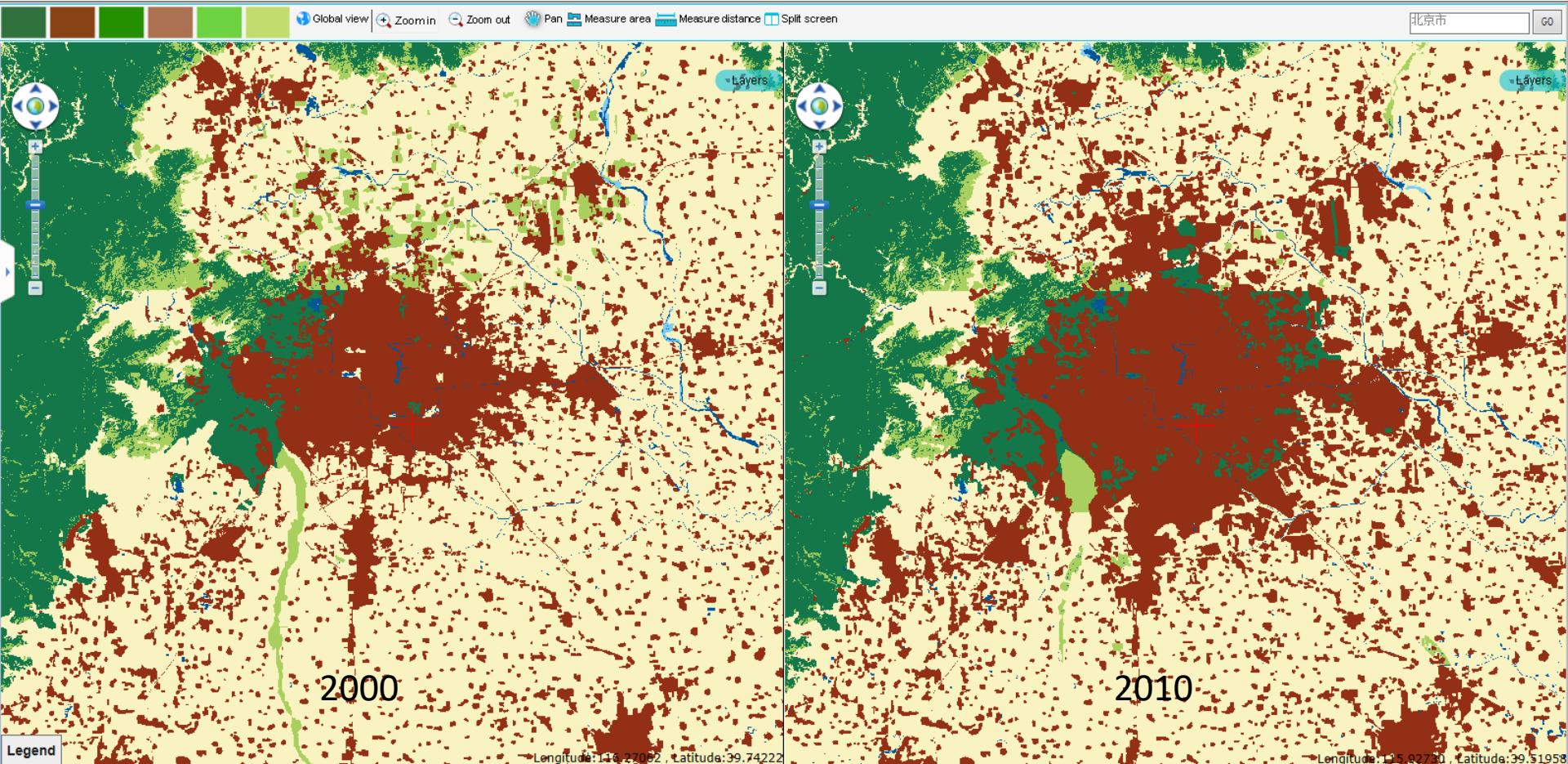
Legend

Longitude:127.80833 , Latitude:72.45687

Longitude:125.69895 , Latitude:71.9944

8

Comparison of two Snapshots



3D

- 2000\2010



Outlines

1

Data Browsing

2

Data Downloading



3

Data Specification

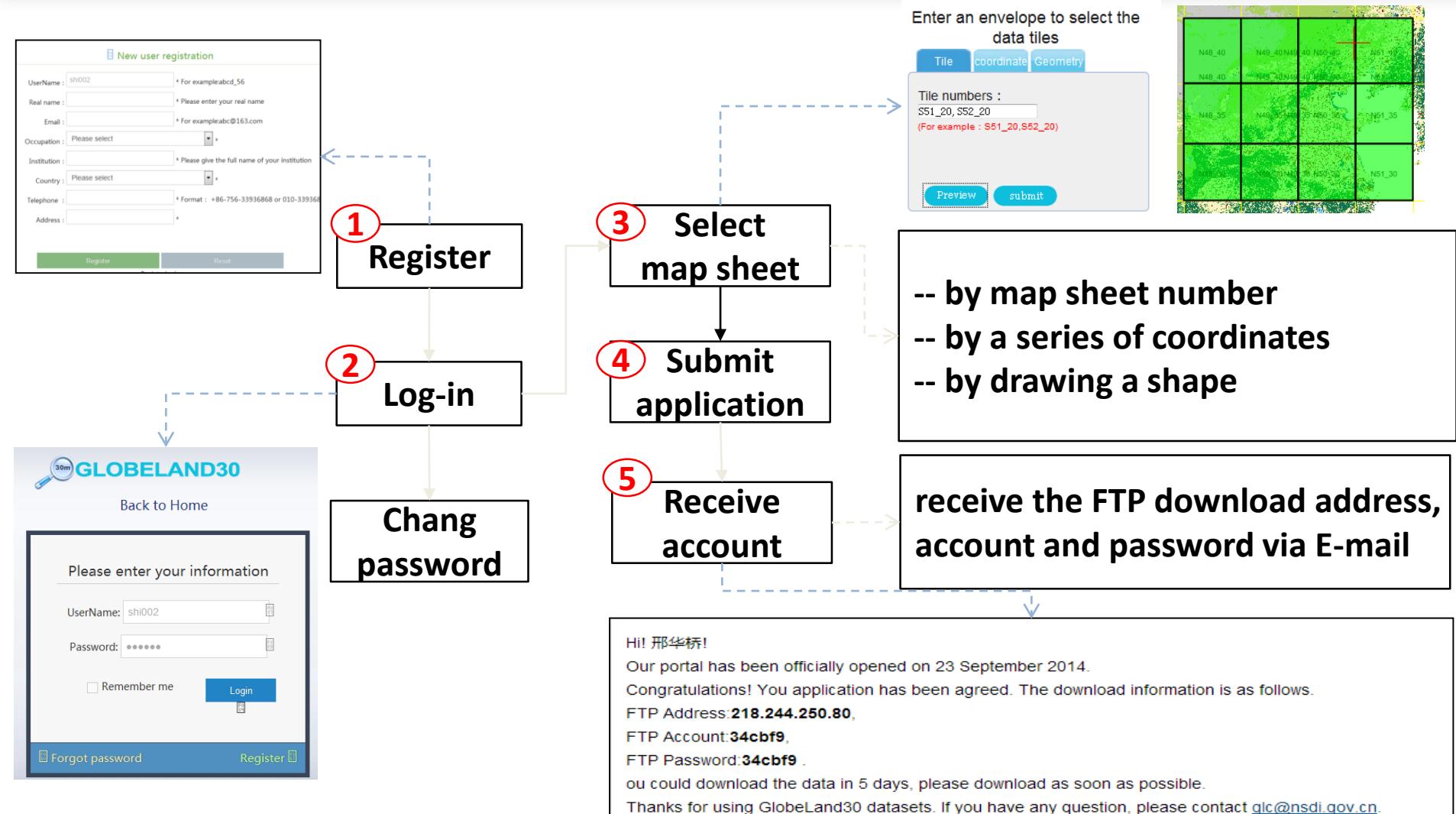
4

Data Statistics

5

Data Validation

Data Downloading



Register

New user registration

User Name: * For example:abcd_56

Real name: * Please enter your real name

Email: * For example:abc@163.com

Occupation: Please select *

Institution: * Please give the full name of your institution

Country: Please select *

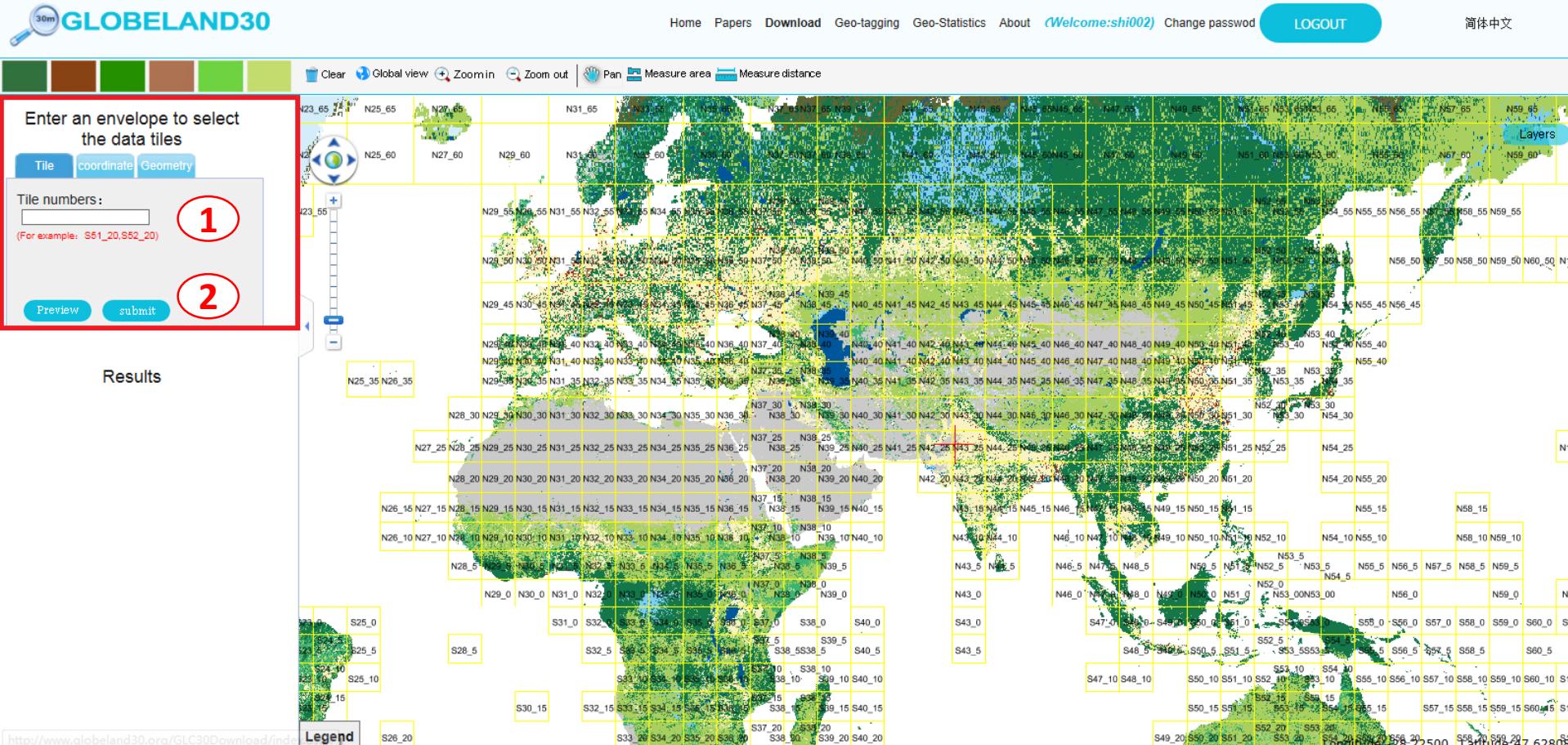
Telephone : * Format: +86-756-33936868 or 010-3393686 or 13912345678

Address: *

[Back to login](#)

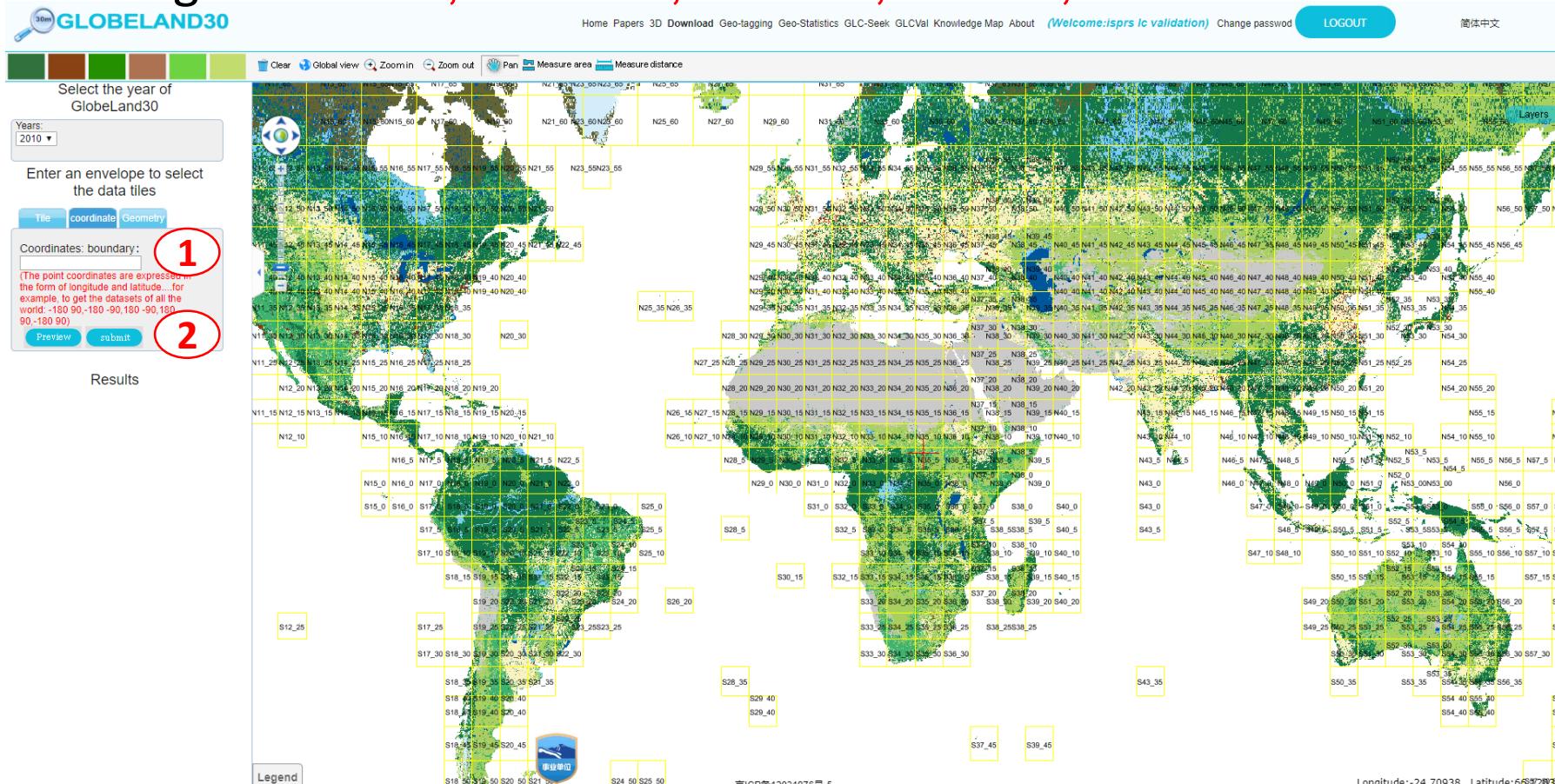
Select interested area – by tiles

- Tile Name format: N32_20,N32_19



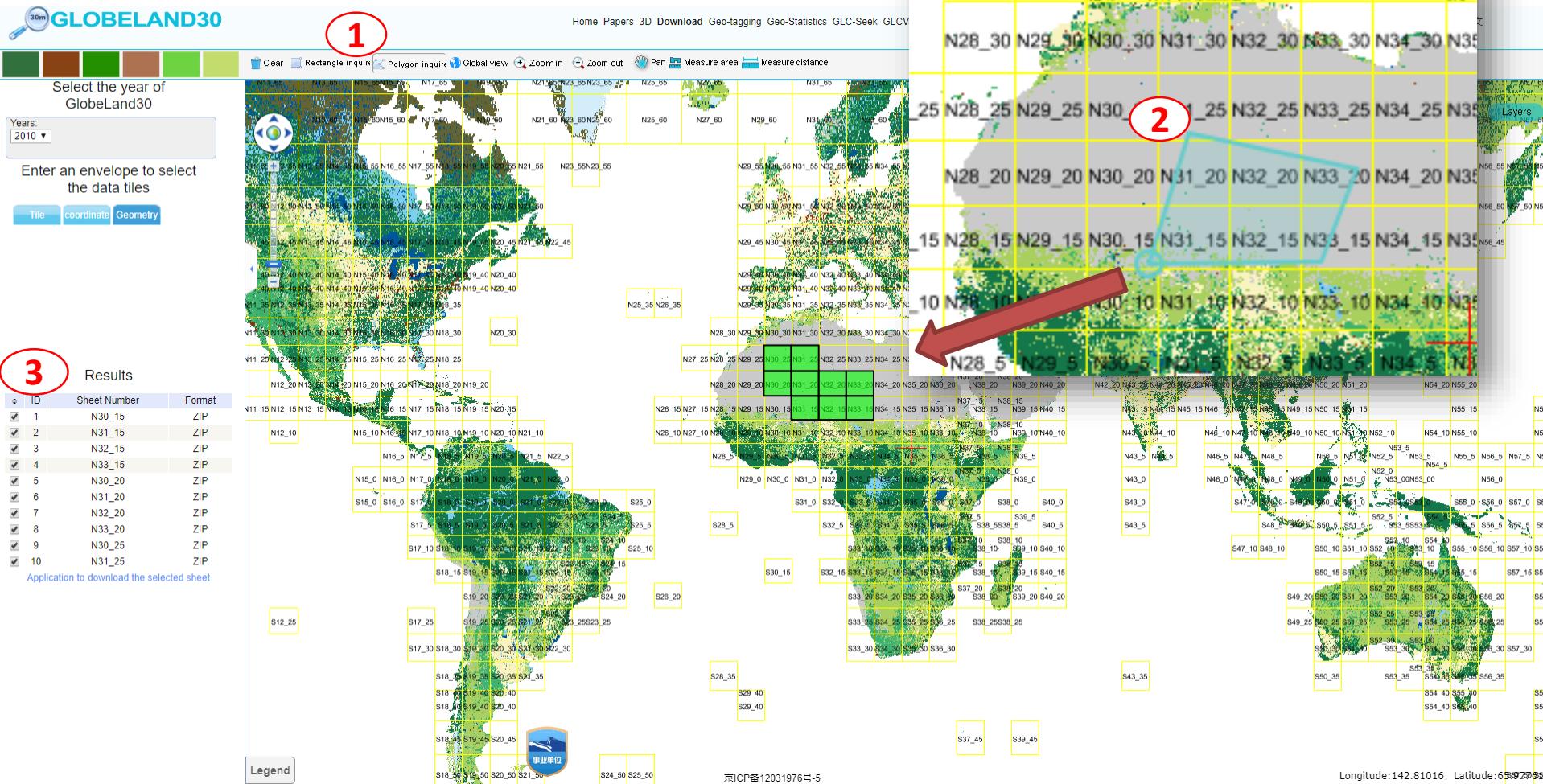
Select interested area – by coordinate

- Coordinates format: longitude and latitude pair
- E.g. : -180 90,-180 -90,180 -90,180 90,-180 90



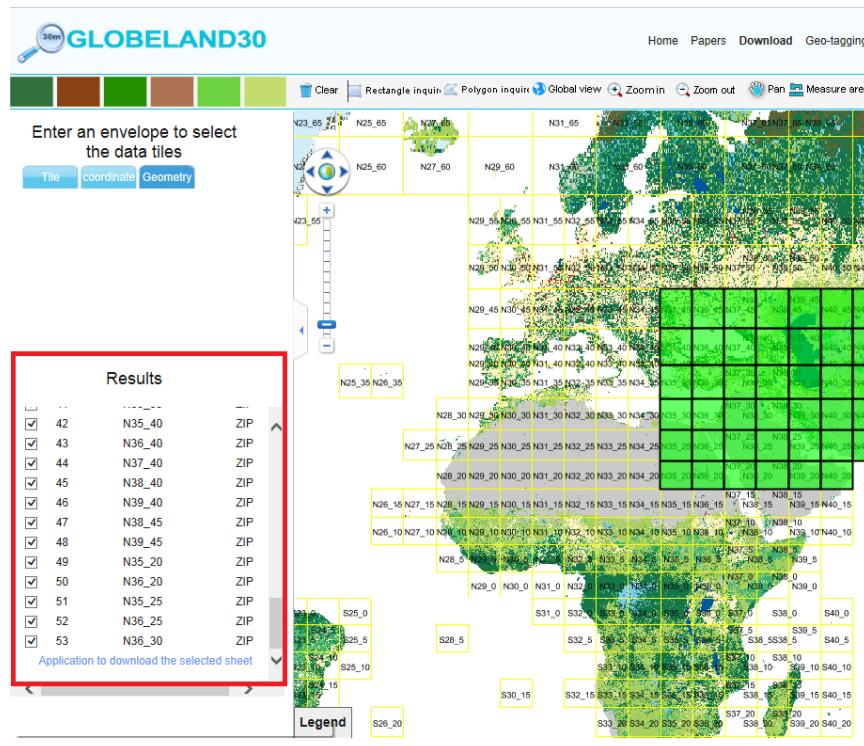
Select interested area – by geometry

- Draw polygon



Submit Application

- Pop-up window to submit



Hint: Thanks for your application! We will send the results to your registered email as soon as possible.

- Theoretical thesis;
 - Graduation thesis;
 - Thematic images/photos, etc.

Article IV Right Requirements

8. NGCC may exercise the following rights over the users:

 - (1) Pay a visit to the users to know about the use situation, research result and application status of GlobeLand30 products; the user shall make an active cooperation;
 - (2) Own the right to make the statistical analysis and release it based on the information filled by users or obtained from the return visits.
 - (3) Own the right not to inform the users about the amendments or update of the GlobeLand30 products.

Article V Disclaimer

9. NGCC does not accept the liability to any consequence or loss caused by acquiring or using GlobeLand30 products (including properly or improperly obtained).
 10. NGCC does not accept the liability to any consequence or loss to a third party caused by acquiring or using GlobeLand30 products (including properly or improperly obtained).

1 Contents:

Total: 53

2 Purpose:

3 Details:

I have read and accepted the above agreement



Outlines

1

Data Browsing

2

Data Downloading

3

Data Specification



4

Data Statistics

5

Data Validation

GlobeLand30 Tile: Content and Format

Classification result file refers to the file storing the classification information of land covers, with its Coordinate information (TFW).

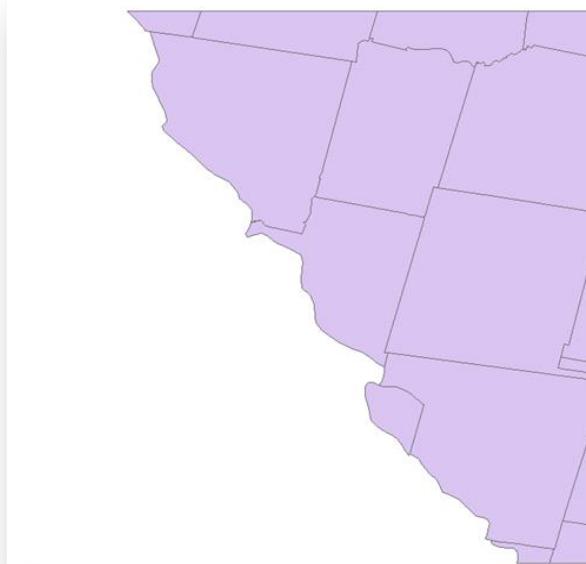
N10_35_2010LC030

N10_35_2010LC030.tif

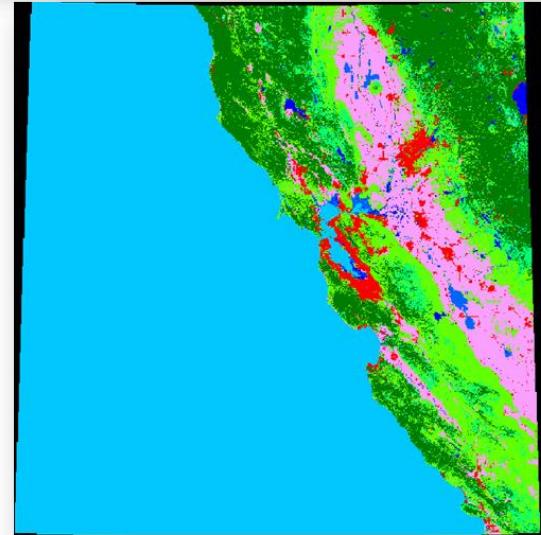
N10_35_2010LC030.tfw

N10_35_2010LC030_IMG.shp

N10_35_2010LC030_MAT.xml



Index map file of
classification image



Classification result file

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<?xml version="1.0" encoding="GB2312"?>
- <Metadata Description="中国遥感的全球地表覆盖逐级分类数据产品">
  - <MapSheetInformation Description="地图基本信息">
    <ProductName Description="产品名称">Global Land Cover Data by China</ProductName>
    <MapSheetName Description="地图名">N10_35</MapSheetName>
    <ReferenceCoordinateSystem Description="参考坐标系">WGS84</ReferenceCoordinateSystem>
    <ElevationSystem Description="高程系统">EGM96</ElevationSystem>
    <MapProject Description="地图投影">UTM</MapProject>
    <LongitudeRange Description="图幅经度范围">W1260000-1200000</LongitudeRange>
    <LatitudeRange Description="图幅纬度范围">N350000-400000</LatitudeRange>
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    <CoordinateUnit Description="坐标单位">度分米秒</CoordinateUnit>
    <CoordinateConstant Description="交叉坐标常数">500000 Meter</CoordinateConstant>
  </MapSheetInformation>
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    <ProduceDate Description="产品制作时间">2013</ProduceDate>
    <ImageSource Description="分类影像数据源">TM</ImageSource>
    <BriefDescriptionOfTheProduction Description="生产情况简要描述"></BriefDescriptionOfTheProduction>
  </ClassificationSystem>
  + <TheAccuracyOfSelfEvaluationInformation Description="精度自评价信息">
  + <CopyrightInformation Description="版权信息">
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Metadata file

GlobeLand30 Tile: Content and Format

Index map file of classification image refers to the vector layer file recording the range and acquisition time of each scene of classification images.

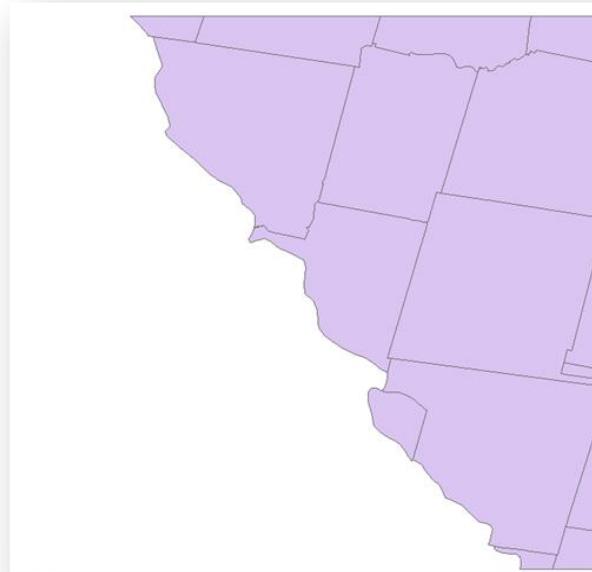
N10_35_2010LC030

N10_35_2010LC030.tif

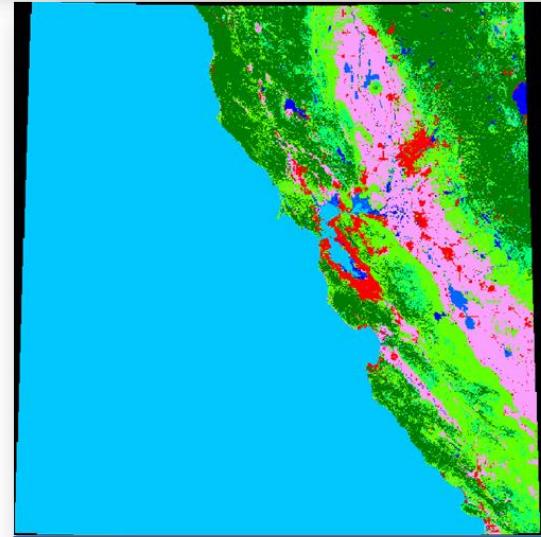
N10_35_2010LC030.tfw

N10_35_2010LC030_IMG.shp

N10_35_2010LC030_MAT.xml



Index map file of classification image



Classification result file

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- <Metadata Description="中国研制的全球土地覆盖遥感分类数据产品">
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    <LatitudeRange Description="图幅纬度范围">N350000-400000</LatitudeRange>
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    <CentralMeridian Description="中央经线">W123</CentralMeridian>
    <CoordinateUnit Description="坐标单位">米</CoordinateUnit>
    <CoordinateConstant Description="X坐标常数">500000 Meters</CoordinateConstant>
  </ProductSheetInformation>
  - <ProductInformation Description="产品基本信息">
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    <LandCoverImageMode Description="地类遥感影像模式">IndexColor</LandCoverImageMode>
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    <NorthEastOrd Description="图幅东北角点坐标">4432069.06</NorthEastOrd>
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    <SouthEastOrd Description="图幅东南角点坐标">3877156.69</SouthEastOrd>
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      <ProductionDate Description="产品制作时间">2013</ProductionDate>
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      <BriefDescriptionOfTheProduction Description="生产情况简要描述"> </BriefDescriptionOfTheProduction>
    </ProductionInformation>
    + <AccuracyOfTheEvaluationInformation Description="精度自评信息">
    + <CopyrightInformation Description="版权信息">

```

Metadata file

GlobeLand30 Tile: Content and Format

Metadata file refers to the file recording the metadata information of classification result.

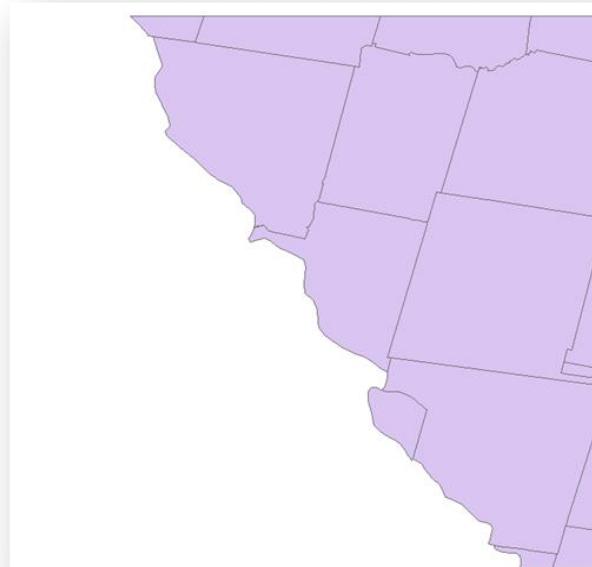
N10_35_2010LC030

N10_35_2010LC030.tif

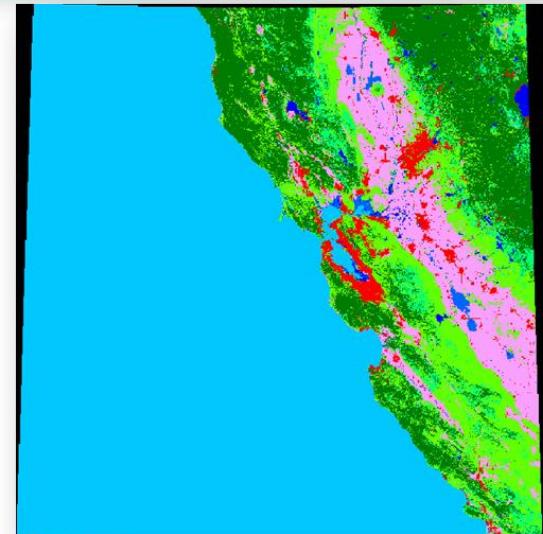
N10_35_2010LC030.tfw

N10_35_2010LC030_IMG.shp

N10_35_2010LC030_MAT.xml



Index map file of classification image



Classification result file

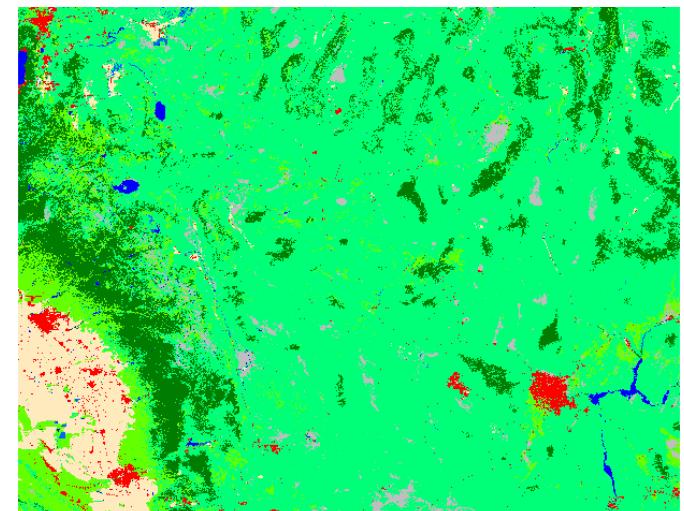
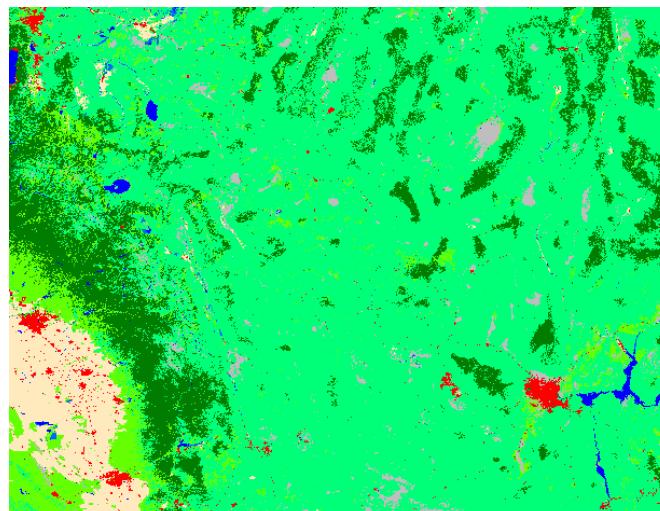
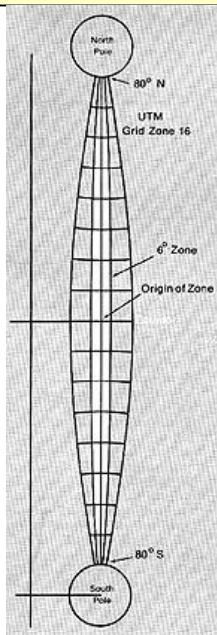
```
<?xml version="1.0" encoding="GB2312"?>
- <Metadata Description="中国研制的全球土地利用分类数据产品">
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    <ElevationSystem Description="高程系统">EGM96</ElevationSystem>
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    <LatitudeRange Description="图幅纬度范围">N350000-400000</LatitudeRange>
    <SixDegreeZoneNumber Description="6°分带号">10</SixDegreeZoneNumber>
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    <CoordinateUnit Description="坐标单位">米</CoordinateUnit>
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    <SouthEastOrd Description="图幅东南角点坐标">3877156.69</SouthEastOrd>
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      <ProductionDate Description="产品制作时间">2013</ProductionDate>
      <ImageSource Description="分类数据数据源">TM</ImageSource>
      <BriefDescriptionOfTheProduction Description="产品简介或概述"></BriefDescriptionOfTheProduction>
    </ProductionInformation>
    + <AccuracyOfEvaluationInformation Description="精度评价信息">
    + <CopyrightInformation Description="版权信息">

```

Metadata file

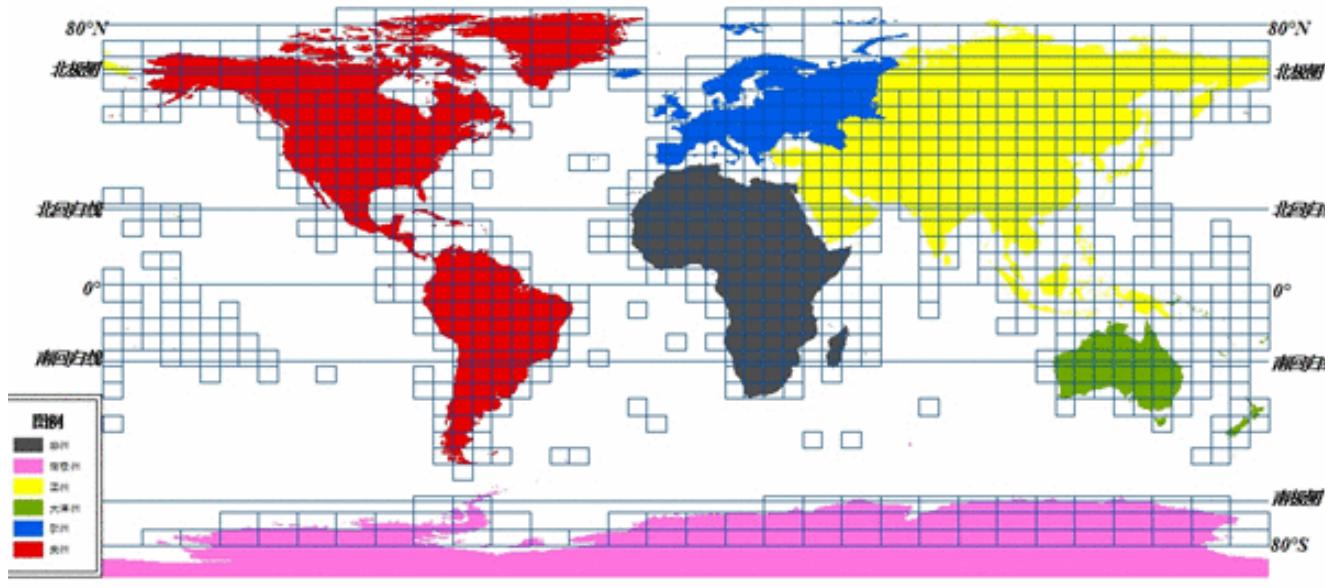
GlobeLand30 Coordinate System

- Coordinate System: WGS84
- Reference Ellipsoid: WGS 84 Ellipsoid
- Projection: UTM Projection
- Zoning: 6°



GlobeLand30 Data Tile

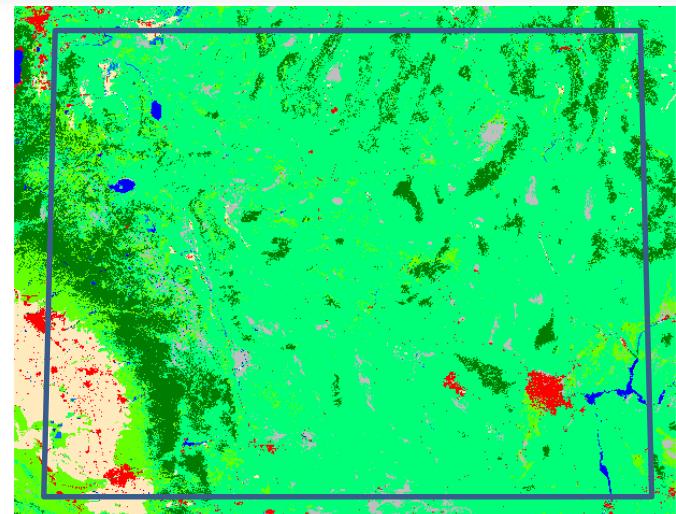
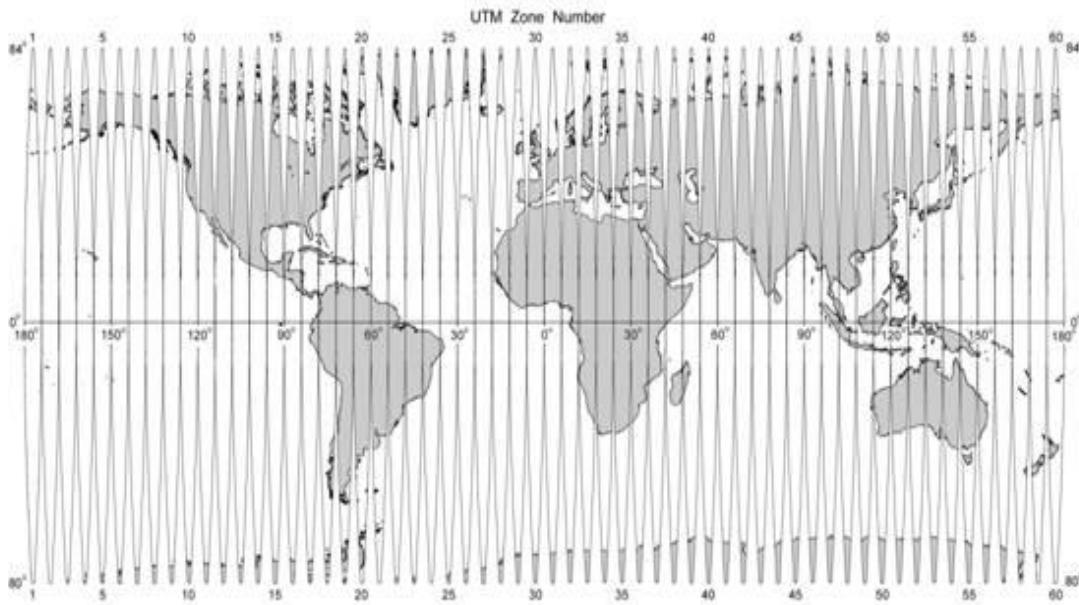
- between 60°N and 60°S: the size of the tile is 6° (longitude) *5° (latitude)
- between 60°N and 80°N and between 60°S and 80°S: the size of the tile is 12° (longitude)* 5° (latitude), and project according to the central meridian of every odd 6° zone



■ Total Number

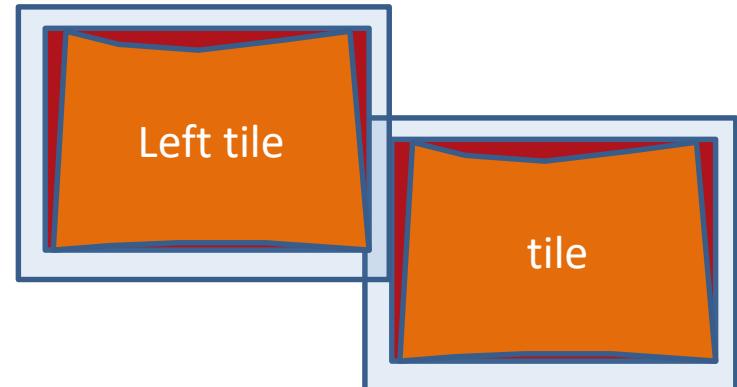
- 2000:853
- 2010:853

GlobeLand30 Tile Overlap



N11-35 2010

- The cutting range of the tile is a rectangular area
- First get the minimum bounding rectangle, then extend out 7500 meters of each vertex of rectangle.
- the red rectangle is the minimum bounding rectangle, the green rectangle is the actual area of the single tile.



GlobeLand30 Classification

Type	Definition	Type	Color		
			R	G	B
Cultivated land	Lands used for agriculture, horticulture and gardens, including paddy fields, irrigated and dry farmland, vegetation and fruit gardens, etc.	10	250	160	255
Forest	Lands covered with trees, with vegetation cover over 30%, including deciduous and coniferous forests, and sparse woodland with cover 10 - 30%, etc.	20	0	100	0
Grassland	Lands covered by natural grass with cover over 10%, etc.	30	100	255	0
Shrubland	Lands covered with shrubs with cover over 30%, including deciduous and evergreen shrubs, and desert steppe with cover over 10%, etc.	40	0	255	120
Wetland	Lands covered with wetland plants and water bodies, including inland marsh, lake marsh, river floodplain wetland, forest/shrub wetland, peat bogs, mangrove and salt marsh, etc.	50	0	100	255
Water bodies	Water bodies in the land area, including river, lake, reservoir, fish pond, etc.	60	0	0	255
Tundra	Lands covered by lichen, moss, hardy perennial herb and shrubs in the polar regions, including shrub tundra, herbaceous tundra, wet tundra and barren tundra, etc.	70	100	100	50
Artificial Surface	Lands modified by human activities, including all kinds of habitation, industrial and mining area, transportation facilities, and interior urban green zones and water bodies, etc.	80	255	0	0
Bareland	Lands with vegetation cover lower than 10%, including desert, sandy fields, Gobi, bare rocks, saline and alkaline lands, etc.	90	190	190	190
Perennial snow or ice	Lands covered by permanent snow, glacier and icecap.	100	200	240	255
Sea Area		255	0	200	255
Area Without Data		0	0	0	0

2017 Data Africa

- not available for downloading

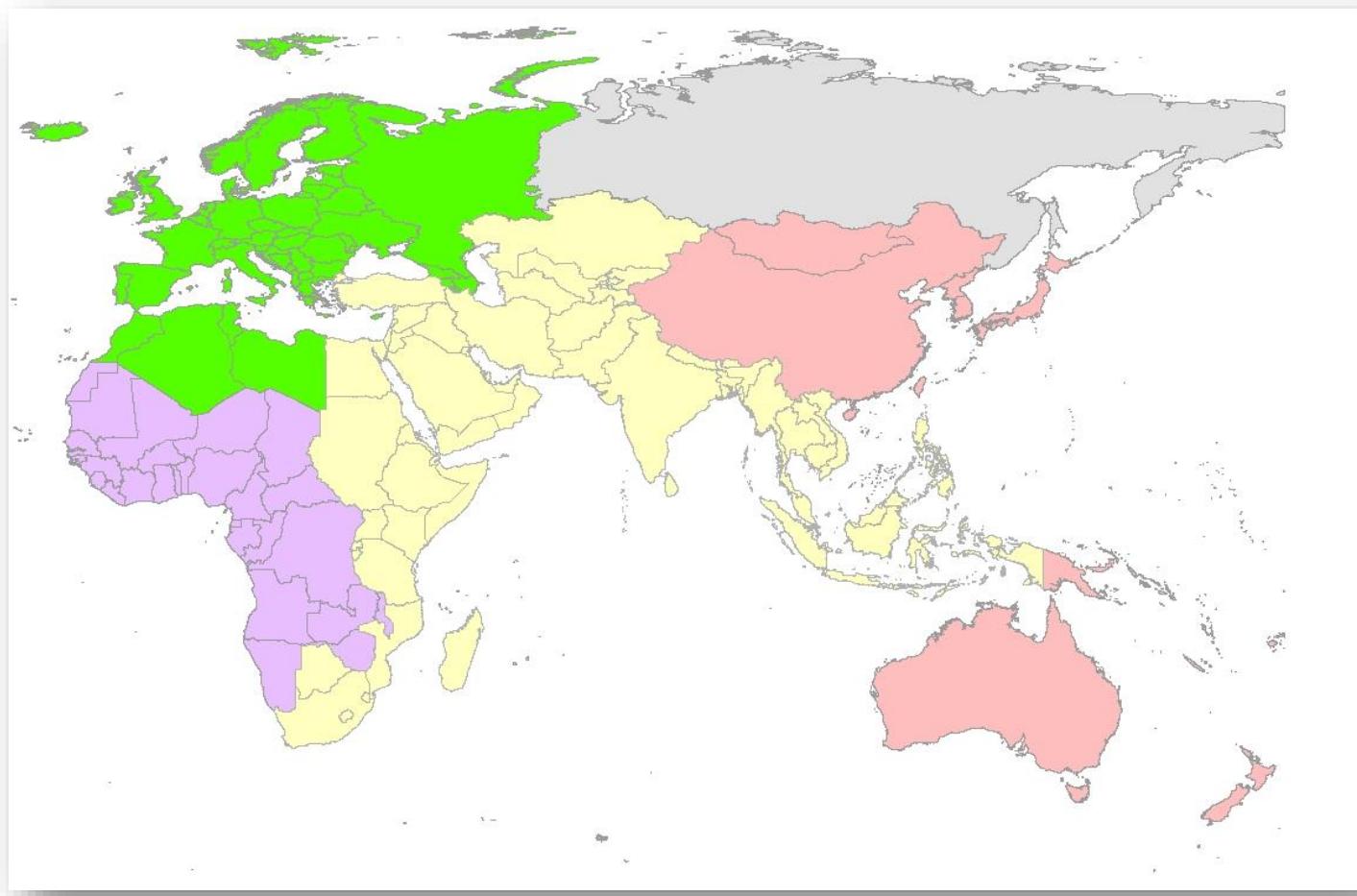


2017



2018

Rest of part
2019



Outlines

1

Data Browsing

2

Data Downloading

3

Data Specification

4

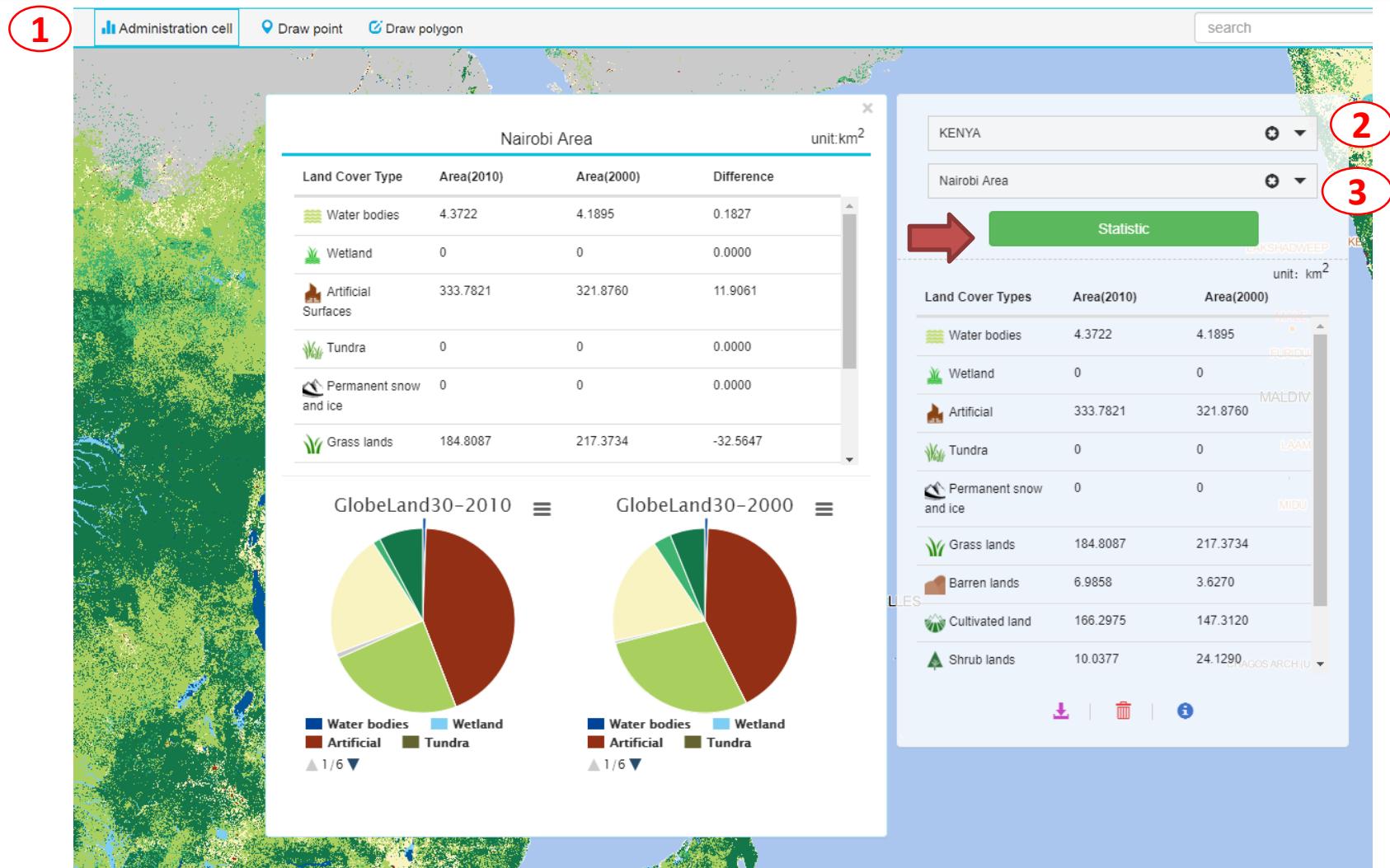
Data Statistics

5

Data Validation



Administration cell - Kenya



Draw point- Tanzania

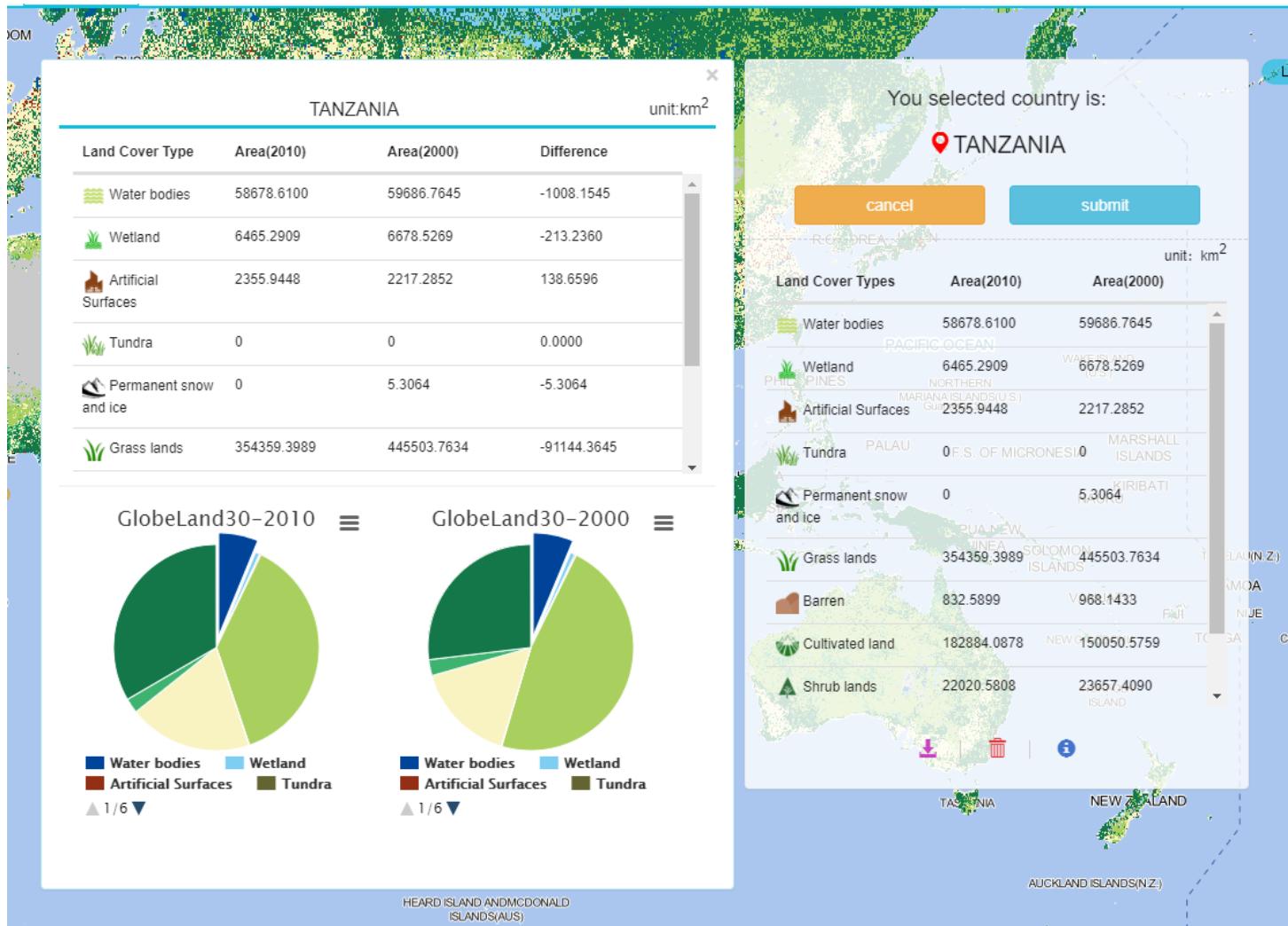


Polygon - typical area

The screenshot illustrates a web-based land cover analysis tool. It consists of three main panels:

- Top Left Panel:** A global map of the world with various land cover types color-coded. A blue button labeled "Draw polygon" is highlighted with a red circle labeled "1".
- Top Right Panel:** A modal dialog box with the text "please define area of interest by drawing a polygon on map" and a green "confirm" button. This panel is also circled with a red "2".
- Bottom Panel:** A zoomed-in view of a specific region in East Asia. A yellow polygon has been drawn over a coastal area. A red arrow points from the confirmation dialog to this polygon. To the right of the map are two side-by-side tables comparing land cover data between 2010 and 2000, and two pie charts showing the composition of land cover types. The entire bottom section is circled with a red "3".

Result - Tanzania



Outlines

1

Data Browsing

2

Data Downloading

3

Data Specification

4

Data Statistics

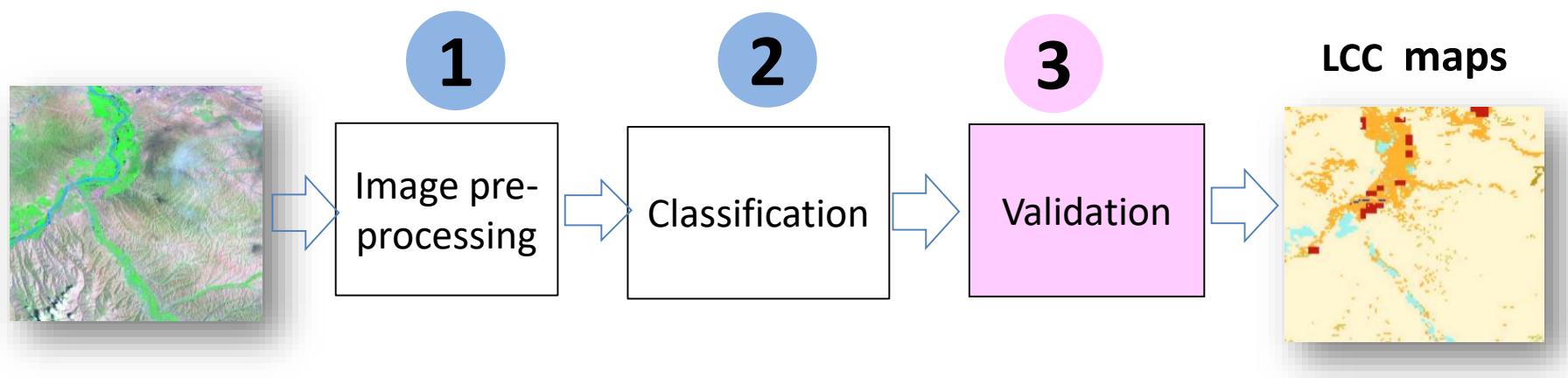
5

Data Validation



Validation of Land Cover Maps

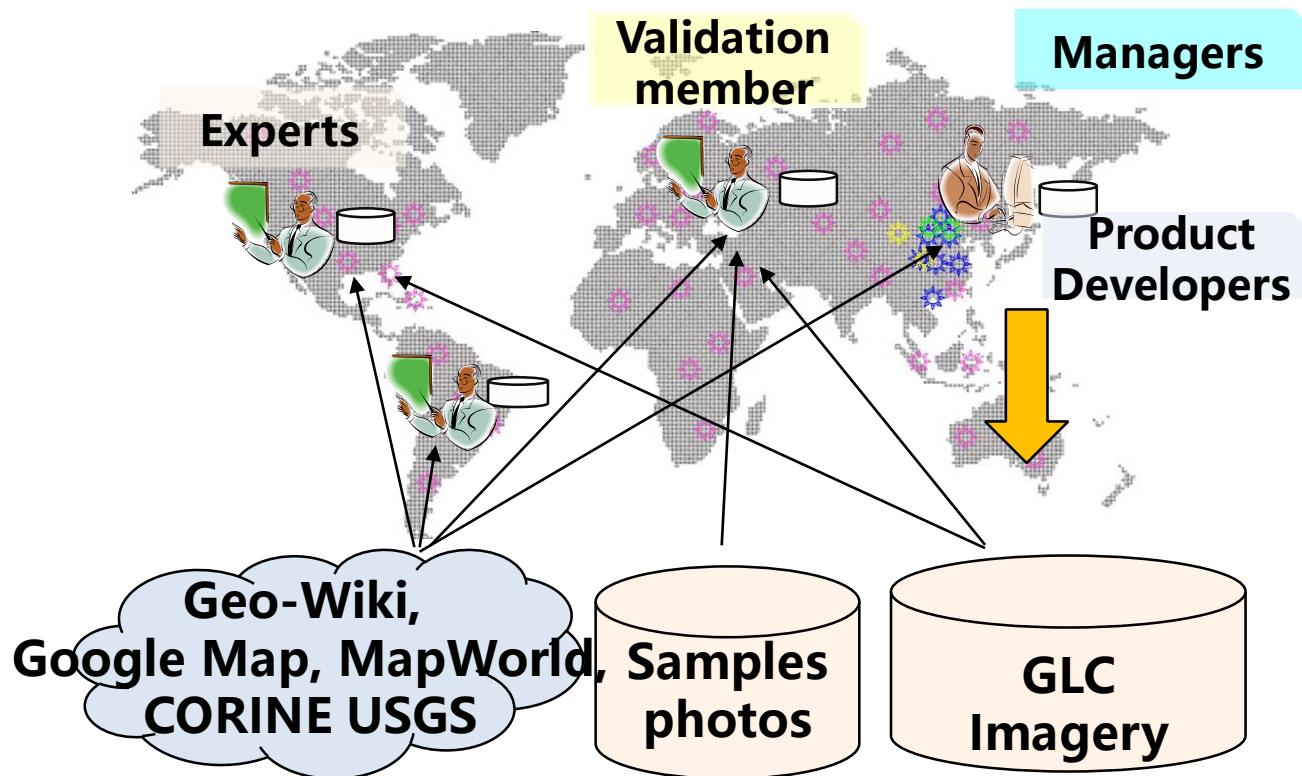
one of the critical steps in land cover mapping, aiming to
document the accuracy of land cover maps



allows users to evaluate the utility of these maps for their particular applications

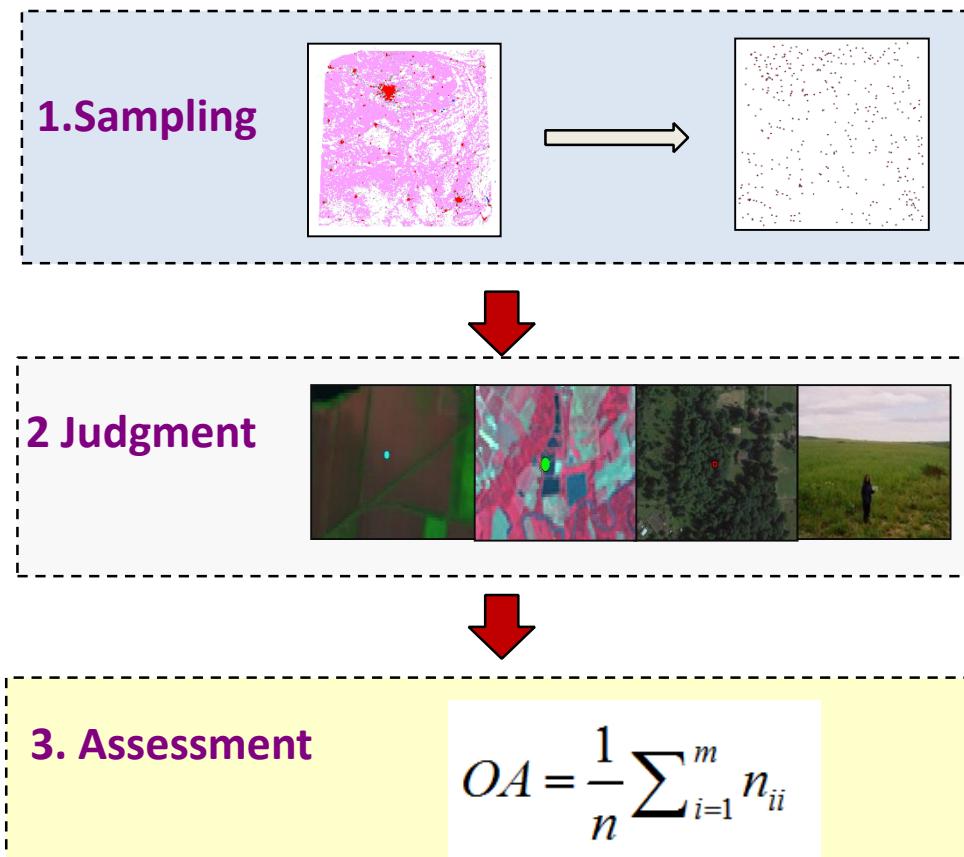
Collaborative validation

- Multi-heterogeneous Info. Services integration and publishing
- Organized work flow in collaboration
- Multi-Users



On-line Validation Tool- GLCVal

Selecting samples at which reference data will be collected and used to estimate the overall and class-specific accuracies in the target region(s).



Selecting samples

- Determine sample size for each region
- assign the sample size to each class
- Allocate samples into space

Collect reference data

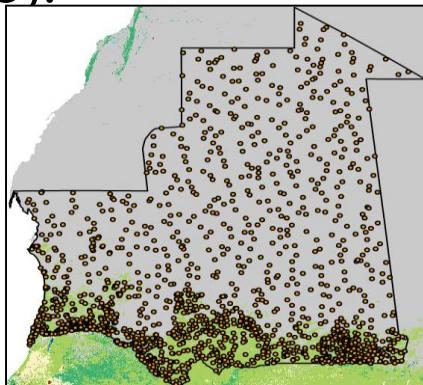
Calculate accuracies

- overall
- and class-specific

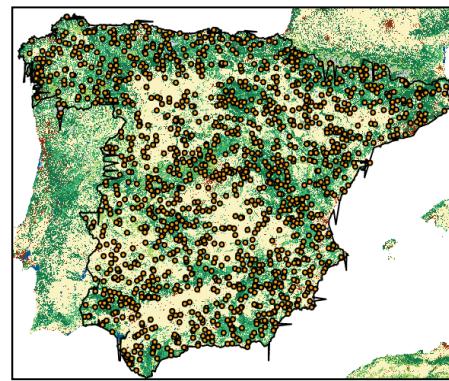
Sampling

Fundamental criteria

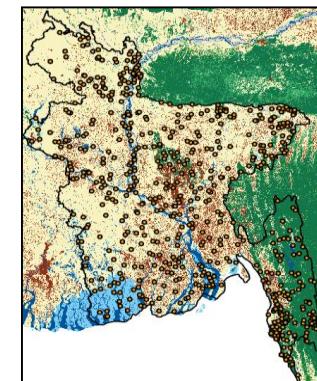
- **Probability** - Larger sample sizes or higher sample densities for more heterogeneous regions; sufficient sample numbers for rare class (Wickham, 2010) ;
- **Spatial balance** - Well spatial distribution, taking the spatial heterogeneity into consideration(Stehman, 2009);
- **Cost effectiveness**- Practical, cost effective sample size (Stehman, 2009).



Mauritania



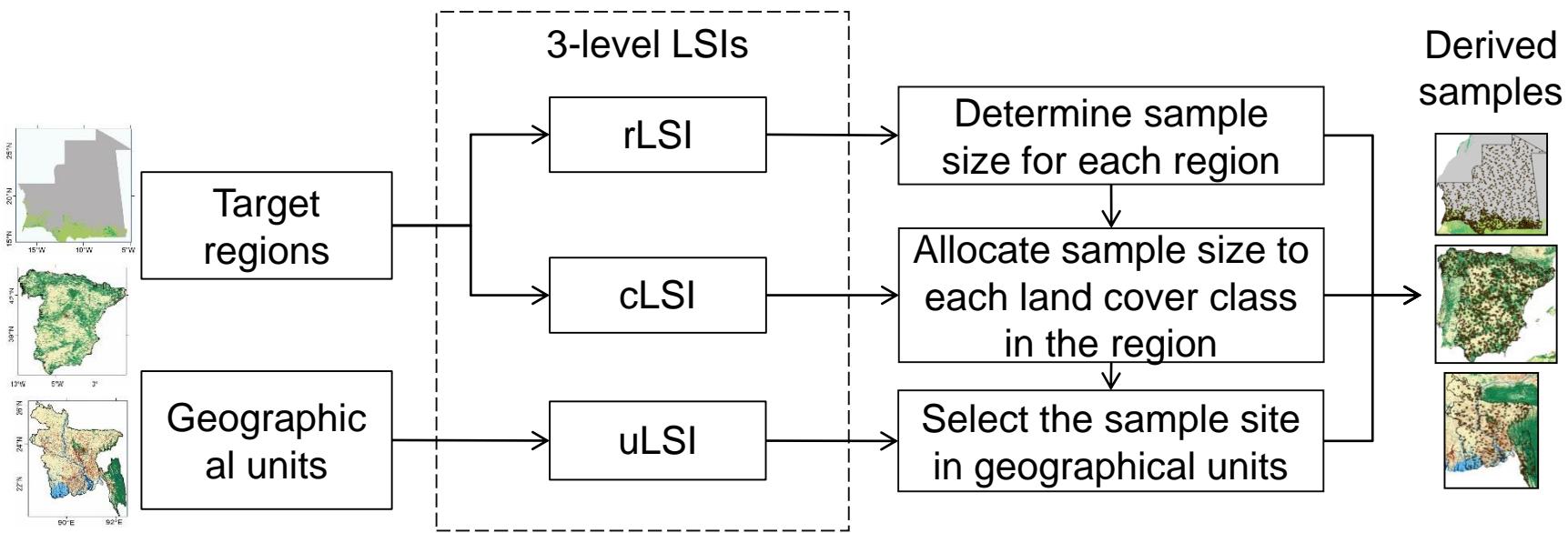
Spain



Bangladesh

A LSI-Based Sampling Approach

Calculate three-level LSIs(regional, class and units) and use them to derive the subsequent sample sizes and their spatial distributions.

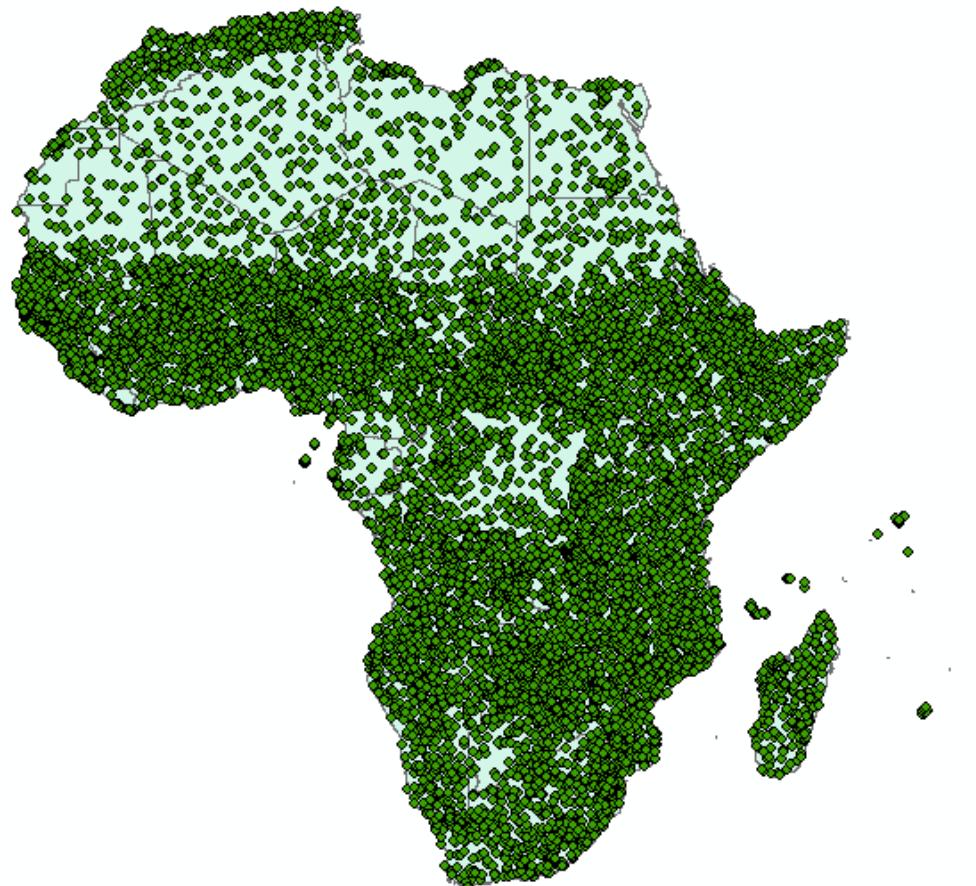
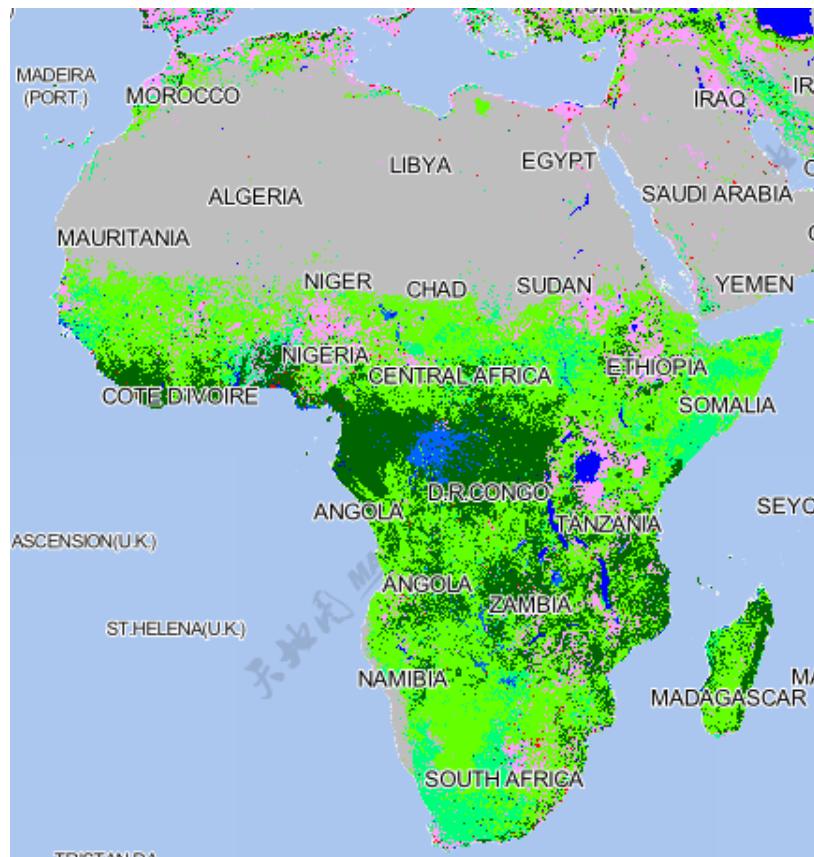


Chen et al. 2016. A landscape shape index-based sampling approach for land cover accuracy assessment. *Science China Earth Sciences*, 59: 1–12, doi: 10.1007/s11430-015-5280-5

As a quantitative measure of landscape complexity, LSI can characterize the spatial heterogeneity of land cover

Case in Africa (1)

Spatial distribution of samples



Case in Africa (2)

Sample size per country was derived and all countries have a good number of sample points.

ALGERIA	337	ETHIOPIA	493	NIGER	294
ANGOLA	509	GABON	43	NIGERIA	457
BENIN	60	GAMBIA	43	RWANDA	43
BOTSWANA	191	GHANA	119	SAO TOME AND PRINCIPE	43
BURKINA FASO	126	GUINEA	132	SENEGAL	95
BURUNDI	43	GUINEA-BISSAU	43	SEYCHELLES	43
CAMEROON	120	KENYA	186	SIERRA LEONE	43
CAPE VERDE	43	LESOTHO	43	SOMALIA	217
CENTRAL AFRICAN REPUBLIC	346	LIBERIA	43	SOUTH AFRICA	500
CHAD	225	LIBYA	185	SUDAN	707
COMOROS	43	MADAGASCAR	222	SWAZILAND	43
CONGO	63	MALAWI	58	TANZANIA	407
CONGO THE DEMOCRATIC REPUBLIC OF THE	699	MALI	297	TOGO	43
COTE DIVOIRE	134	MAURITANIA	154	TUNISIA	43
DJIBOUTI	43	MAURITIUS	43	UGANDA	73
EGYPT	110	MOROCCO	132	WESTERN SAHARA	43
EQUATORIAL GUINEA	43	MOZAMBIQUE	468	ZAMBIA	403
ERITREA	43	NAMIBIA	295	ZIMBABWE	221

Case in Africa (3)

sample number of each class for every country

country		number								
		crop	forest	glass	shrub	set	water	artificial	bare	
	country	number								
		crop	forest	glass	shrub	set	water	artificial	bare	
country		Number								
		crop	forest	glass	shrub	set	water	artificial	bare	
	NIGER	34	6	95	44	5	4	4	102	
	NIGERIA	75	90	126	95	14	12	13	32	
	RWANDA	7	10	10	7	3	3	3		
	SAO TOME AND PRINCIPE	8	20				4	10		
	SENEGAL	9	3	23	28	6	5	5	16	
	SEYCHELLES		9	3	6	7	4	8	6	
	SIERRA LEONE	5	6	7	7	4	5	4	5	
CO	SOMALIA	21	21	66	63	5	6	6	30	
	SOUTH AFRICA	53	71	134	118	3	9	17	44	
	SUDAN	64	104	199	169	17	12	10	132	
	SWAZILAND	4	7	7	12	4	4	4	2	
	TANZANIA	58	129	134	43	9	21	7	6	
	TOGO	5	10	9	11	3	3	3		
	TUNISIA	3	7	10	10	3	3	4	3	
	UGANDA	7	14	11	11	5	5	6	9	
	WESTERN SAHARA	4	5	3	12	4	3	5	7	
	ZAMBIA	46	128	138	58	17	11	5		
	ZIMBABWE	36	61	63	34	4	9	8	6	

Step by step on-line validation

GLCVal

glcval.geo-compass.com

90% Search

Welcome, glcval
Logout
Change password

简体中文

Global Land Cover Validation

Unfinished validation tasks	
Name	Progress

Continue New task

Finished validation tasks	
Name	Total
samples-lsi-85-0505-grc_val	157
samples_lsi_85_0505_mex_backup	500
samples_lsi_85_0505_ukr	310
samples_lsi_85_0505_zaf	501
africa_validation_v1	501
africa_validation_v2_lesotho	109
africa_validation_v3_malawi	237
africa_validation_v5_ethiopia2	499
africa_validation_zambia2	400
botswana_validation_task_2010	399
namibia_validation_task_2010_y2	400
rwanda_validation_task_2010	88
tanzania_validation_task_2010_y2	500
uganda_validation_2010	239

Thanks for Your Attention!

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