Importance of Establishing Mineral Resource Database

—Case Study: China Mineral Resources Potential Assessment Project

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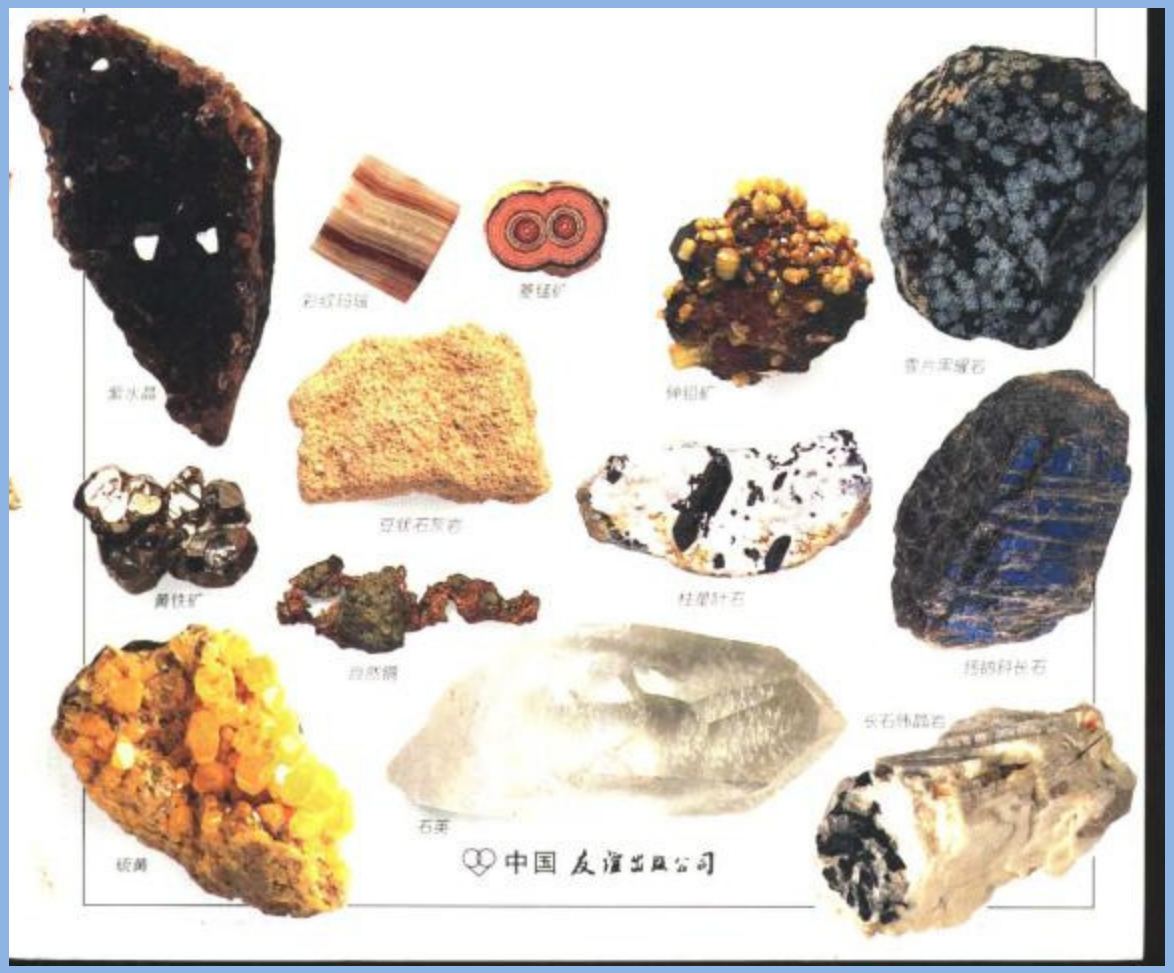
Mineral resource is the important natural resource which is formed through thousands or hundreds of millions of years' changes. It is the primary substance foundation for social production and development and a must necessity of our production and life.



Purposes for Establishing Mineral Resources Database

- 1. predict mineral resources, and establish the solid mineral regional prediction and assessment system which can satisfy the national or regional dynamic resources assessment.
- 2. predict the prospecting trend, developing energy growth trend, and the strategic deployment of developing base of future important mineral resources.
- 3. provide scientific basis for researching and making national mineral resource strategy and social economy medium-long term growth plan.
- 4. identify the advantageous minerals of one region to instruct the reasonable development and utilization of mineral resources, perfect the resources allocation and achieve the optimal exhaust of resources.
- 5. restrain the unreasonable destructive mining and extraction, and prevent the loss, waste or destruction of mineral resources.
- 6. control all procedures of development and utilization for mineral resources to reduce the environment destruction and protect the eco-environment.

China Mineral Resources Potential Assessment Data Base Establishment

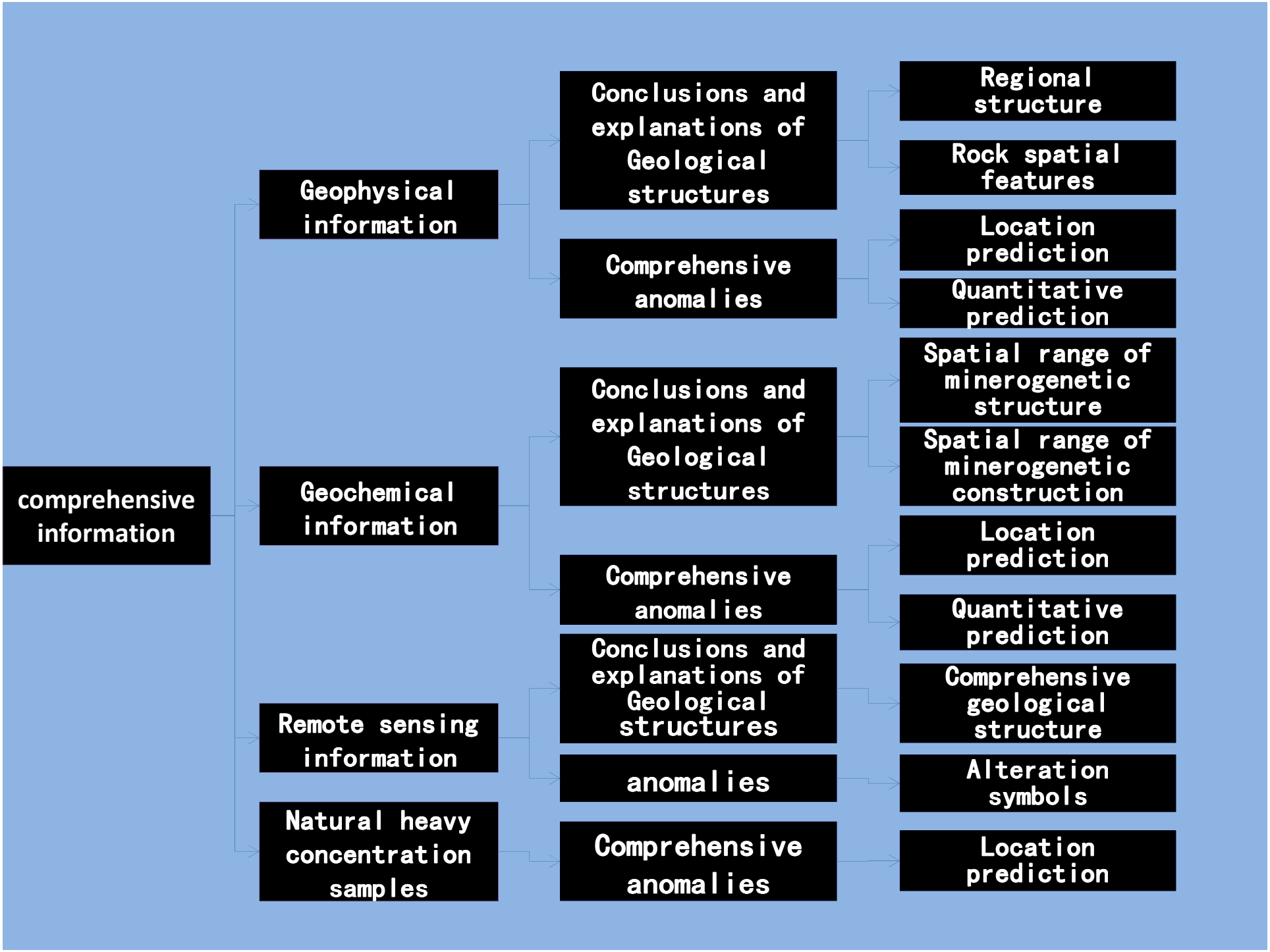
- From 2007 to 2012, led by Ministry of Land and Resources of China, mineral resources potential prediction and assessment have been undertaken throughout the country. The uniformed geological, mineral, geophysical, geochemical, and remote sensing data bases have been established in China. Based on these, prediction and assessment of China unproven mineral resources has been made through the comprehensive analysis of geological, mineral, geophysical, geochemical and remote sensing data. Nationwide prospecting and exploration have been implemented reasonably according to the prediction and assessment results.

Basic Content of Mineral Resource Database Establishment

- Mineral deposits and proven resource deserves
- Regional geological survey documents
- Geophysical results
- Geochemical results
- Remote sensing documents
- Heavy concentrated sample documents
- Predicted mineral resource reserves

China Mineral Resources Potential Assessment

- China mineral resources prediction: fully utilizes data information from geological survey, mineral, geophysics, geochemistry, remote sensing and heavy concentrated samples. Make analogy prediction for mineral resources from unknown regions based on the typical deposit characters and regional metallogenic rules research of some kind or type of minerals or deposits to identify metallogenic prospective blocks and make prediction and assessment for the mineral resources reserves.


comprehensive information
Geophysical information
Geochemical information
Remote sensing information
Natural heavy concentration samples
Conclusions and explanations of Geological structures
Comprehensive anomalies
Conclusions and explanations of Geological structures
Comprehensive anomalies
Conclusions and explanations of Geological structures
anomalies
Comprehensive anomalies
Regional structure
Rock spatial features
Location prediction
Quantitative prediction
Spatial range of minerogenetic structure
Spatial range of minerogenetic construction
Location prediction
Quantitative prediction
Comprehensive geological structure
Alteration symbols
Location prediction

China Mineral Resources Potential Assessment

- Processing Technology of Comprehensive Information and Data
- 1. Comprehensive Information and Data Processing：
  - Process geological, geophysical, geochemical, remote sensing and natural heavy concentration sample data.
- 2. Comprehensive Information Utilization:
- Comprehensive Information Analysis
  - geological, geophysical, geochemical, remote sensing and natural heavy concentration sample documents analysis
- Documents' Function in Comprehensive Information Analysis
  - Utilize geological, geophysical, geochemical, remote sensing documents to infer the interpretation of geological structures: concealed rocks, concealed structures, hidden structures, ore-bearing geological bodies
  - Utilize geological, geophysical, geochemical, remote sensing and natural heavy concentration anomalies to identify metallogencal prospective areas
  - Evaluate the resource reserves of prospective areas by analogy

China Mineral Resources Potential Assessment

- Computer Technology Utilization
- 1. computer map making
  - Make computer maps with GIS figure data
- 2.database technology
  - Based on the established spatial databases, make the data processing and spatial analysis to achieve research results effectively, precisely and quickly.
- 3.application software development
  - Process geophysical, geochemical and remote sensing data
  - Process other basic data

China Mineral Resources Potential Assessment

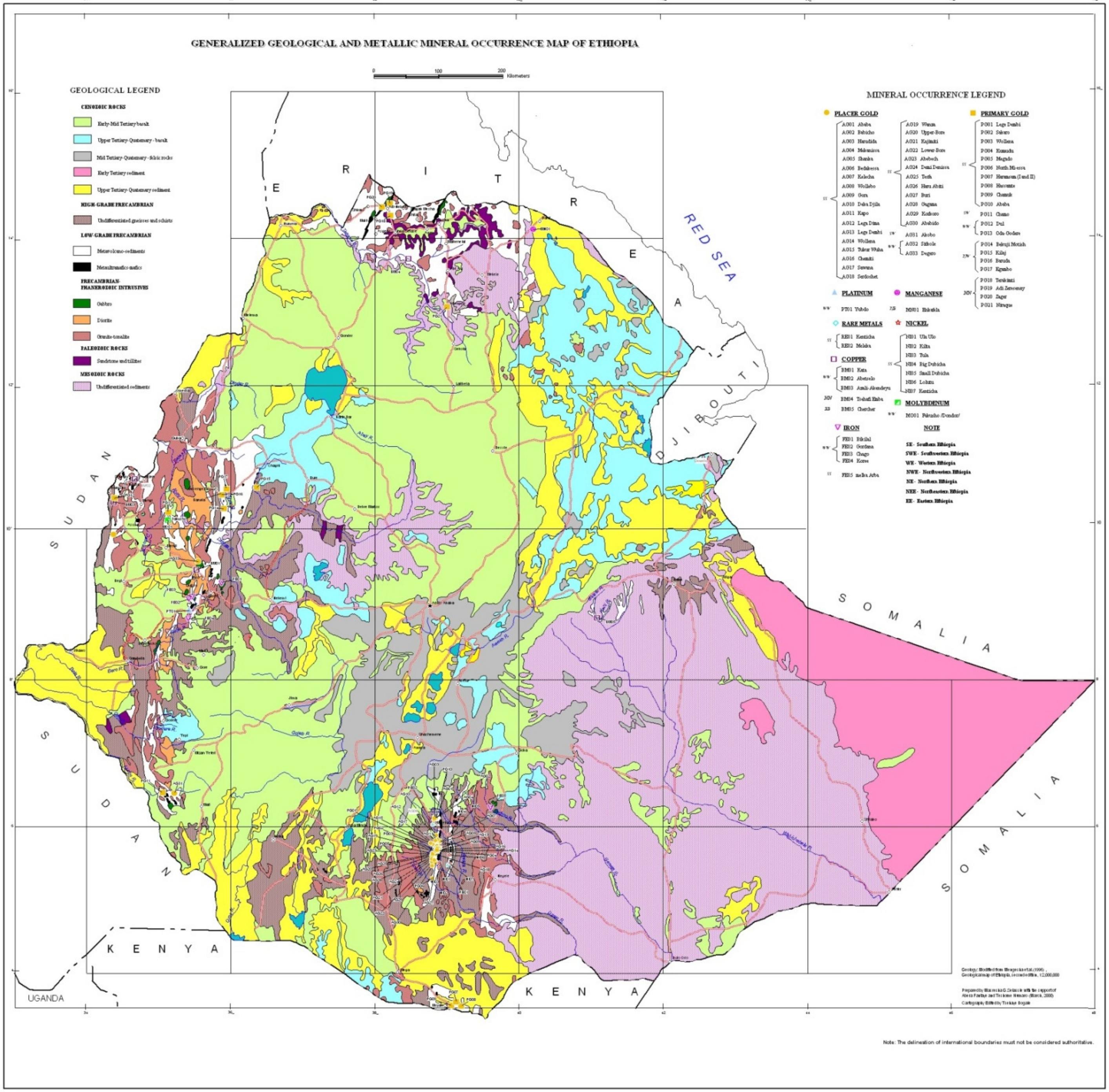
- The potential prediction and assessment of China important mineral resources has fully concluded the work results of basic geological survey, geophysics, geochemistry, remote sense, natural heavy concentration sample and mineral exploration based on the existing geological work. It has applied modern mineral resources prediction and assessment theories and methods, and fully utilized GIS assessment technology to make mineral resource potential prediction and assessment of coal, uranium, iron, cooper, aluminum, lead, zinc, manganese, nickel, wolfram, tin, sodium, gold, chrome, molybdenum, antimony, rare earth, silver, boron, lithium, phosphorus, sulfur, fluorite, magnesite, barite etc.

Significance of Establishing China Mineral Resources Potential Assessment Database

- Conducive to search and utilize information
- Conducive to government's deployment and decisions' making
- Conducive to scientific research
- Conducive to mineral exploration
- Conducive to develop mineral resources properly
- Conducive to protect the environment when developing minerals

Mineral Resources in Ethiopia

- there are relatively rich mineral resources in Ethiopia:
- minerals which are related to pre-cambrian meta-morphic-intrusive complexion mainly are following: gold, platium, niobium, tantalum, nickel, cooper, iron, chrome, maganese, molybdenum, lead, zinc, kaolin, feldspar, clay, asbestos, talc, marble, granite etc.
- minerals which are related to mesozoic sedimentary rocks mainly are following: limestone, sandstone, gypsum, clay, oil, gas etc.
- minerals which are related to cenozoic vocalnic or vocalnic-sedimentary rocks mainly are following: lignite, opal, oil shale, laterite iron ore, bentonite, clay, perlite, diatomite, potash, halite, oil, gas etc.
- minerals which are related to the rift valley mainly are following: geothermal resource, alkali, epithermal gold, diamite, bentonite, halite, sulphur, pumice etc.
- among the energy minerals, coals mainly are lignite, which is existing in the cenozoic sedimentary rocks.
- rich geothermal resources are in the rifty valley.
- oil and gas resources are mainly in Ogaden Basin which is the border with Somalia with definite resource potential.


GENERALIZED GEOLOGICAL AND METALLIC MINERAL OCCURRENCE MAP OF ETHIOPIA
0
100
200
Kilometers
GEOLOGICAL LEGEND
CENOZOIC ROCKS
Early-Mid Tertiary basalt
Upper Tertiary-Quaternary - basalt
Mid Tertiary-Quaternary - felsic rocks
Early Tertiary sediment
Upper Tertiary-Quaternary sediment
HIGH-GRADE PRECAMBRIAN
Undifferentiated gneisses and schists
LOW-GRADE PRECAMBRIAN
Metavolcano-sediments
Metaultramafics-mafics
PRECAMBRIAN-PHANEROZOIC INTRUSIVES
Gabbro
Diorite
Granite-tonalite
PALEOZOIC ROCKS
Sandstone and tillites
MESOZOIC ROCKS
Undifferentiated sediments
MINERAL OCCURRENCE LEGEND
PLACER GOLD
PRIMARY GOLD
PLATINUM
MANGANESE
RARE METALS
NICKEL
COPPER
MOLYBDENUM
IRON
NOTE
SE - Southern Ethiopia
SWE - Southwestern Ethiopia
WE - Western Ethiopia
NWE - Northwestern Ethiopia
NE - Northern Ethiopia
NEE - Northeastern Ethiopia
EE - Eastern Ethiopia
E R I T R E A
RED SEA
D J I B O U T I
S O M A L I A
S O M A L I A
S U D A N
S U D A N
K E N Y A
K E N Y A
UGANDA
Note: The delineation of international boundaries must not be considered authoritative.

Ministry of Mines , Geological Survey of Ethiopia, Chongqing Bureau of Geology and Mineral Exploration & Development of China Cooperation Project

- From December of 2011 to August of 2012, Ministry of Mines (MoM), Geological Survey of Ethiopia(GSE), Chongqing Bureau of Geology and Mineral Exploration & Development of China have signed Memerandom of Understanding of Cooperation Project(MOU) and Project Proposal which haved speculated the 5 years' cooperation project program(2012-2017) in southern and western Ethiopia(area: 148,000 km^2), including basic geological survey, mineral exploration and development, technical research, geochemical survey, geophysical exploration, remote sense, laboratory construction, geoscientific database establishment, personnnel trainning and inspection. Among these, an important task is database establishment.

Signing Cooperation Project Agreement


中国重庆
埃塞俄比亚
Chongqing of China
Ethiopia
地质矿产合作项目启动仪式
Geology and Mineral Cooperation Project Launching Ceremony

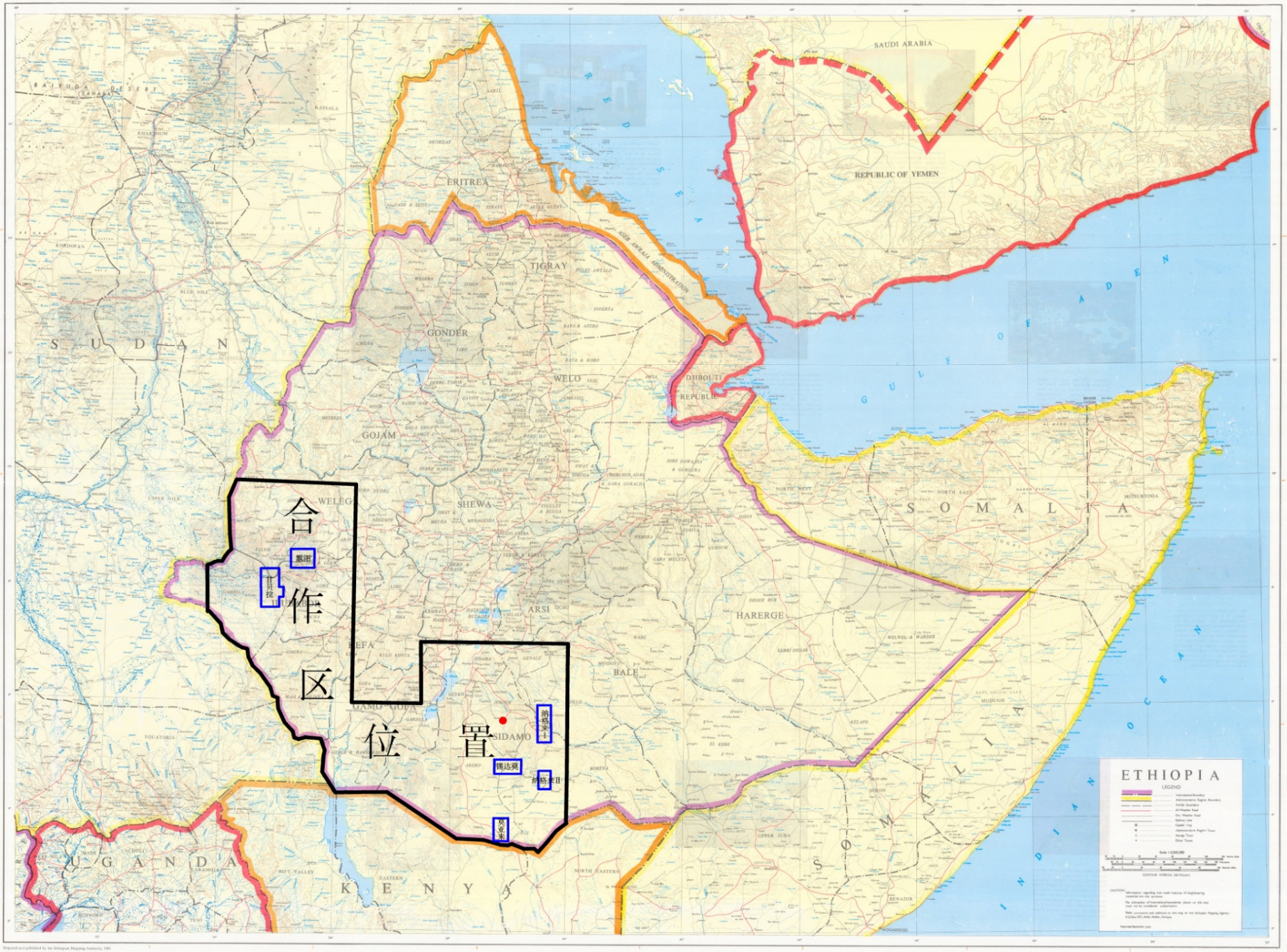
2015/1/22

Technical Content of Cooperation Project

- GSE personnel training
- database establishment
- remote sensing
- geological survey
- geophysical survey
- geochemical survey
- trentching and pitting
- laboratary establishment, tests and analysis
- data processing and report submit

Major Content of Database Establishment for Cooperation Project

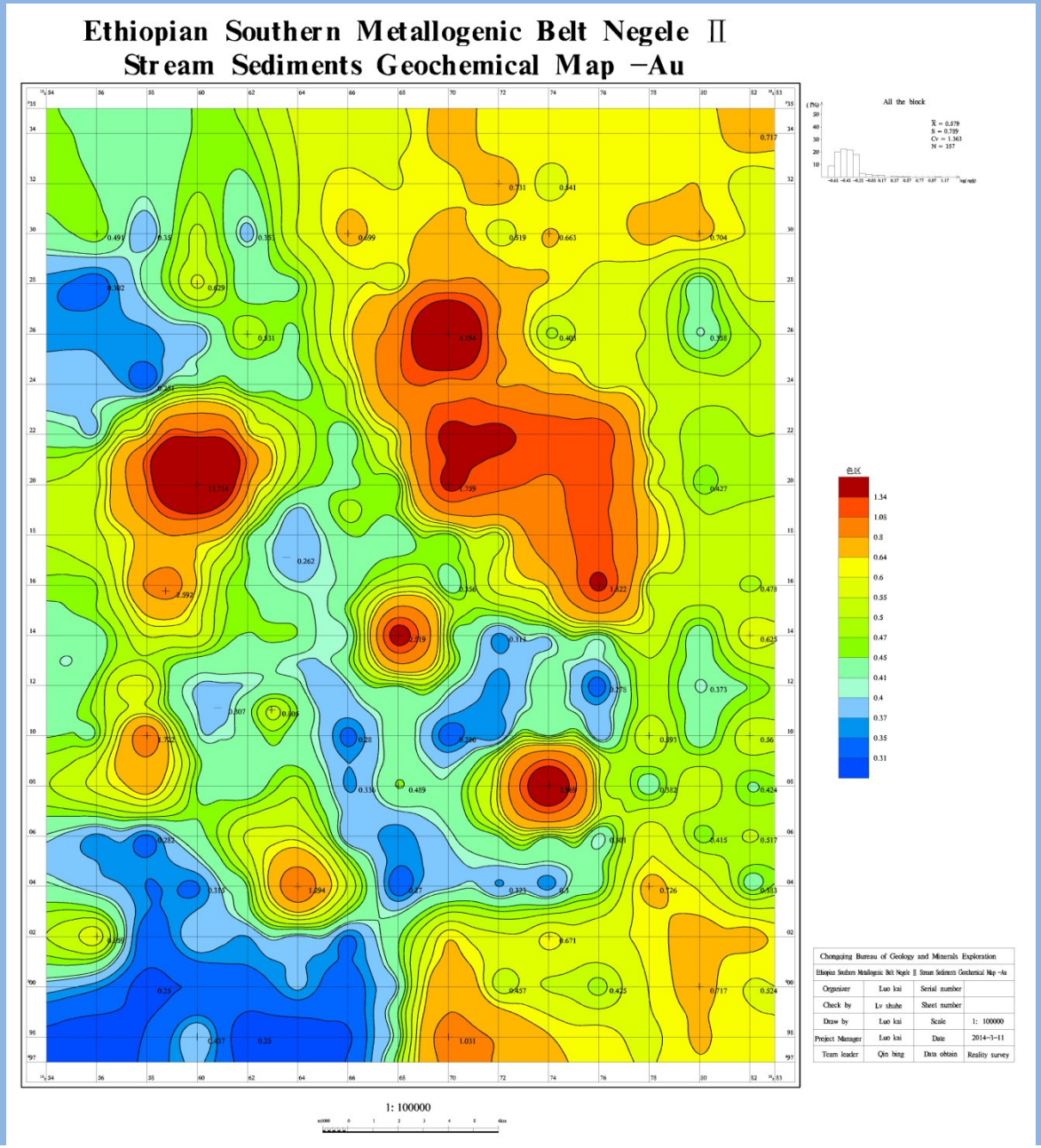
- database of geological survey
- database of remote sensing interpretation
- database of geophysical survey
- database of geochemical survey
- database of minerals
- database of sample analysis


合作区位置
聚居
甘贝拉
锡达雷
ETHIOPIA
SAUDI ARABIA
REPUBLIC OF YEMEN
ERITREA
SUDAN
DJIBOUTI REPUBLIC
SOMALIA
KENYA
UGANDA
TIGRAY
GONDER
WELO
GOJAM
SHEWA
ARSI
HARERGE
BALE
SIDAMO
RED SEA
GULF OF ADEN
INDIAN OCEAN

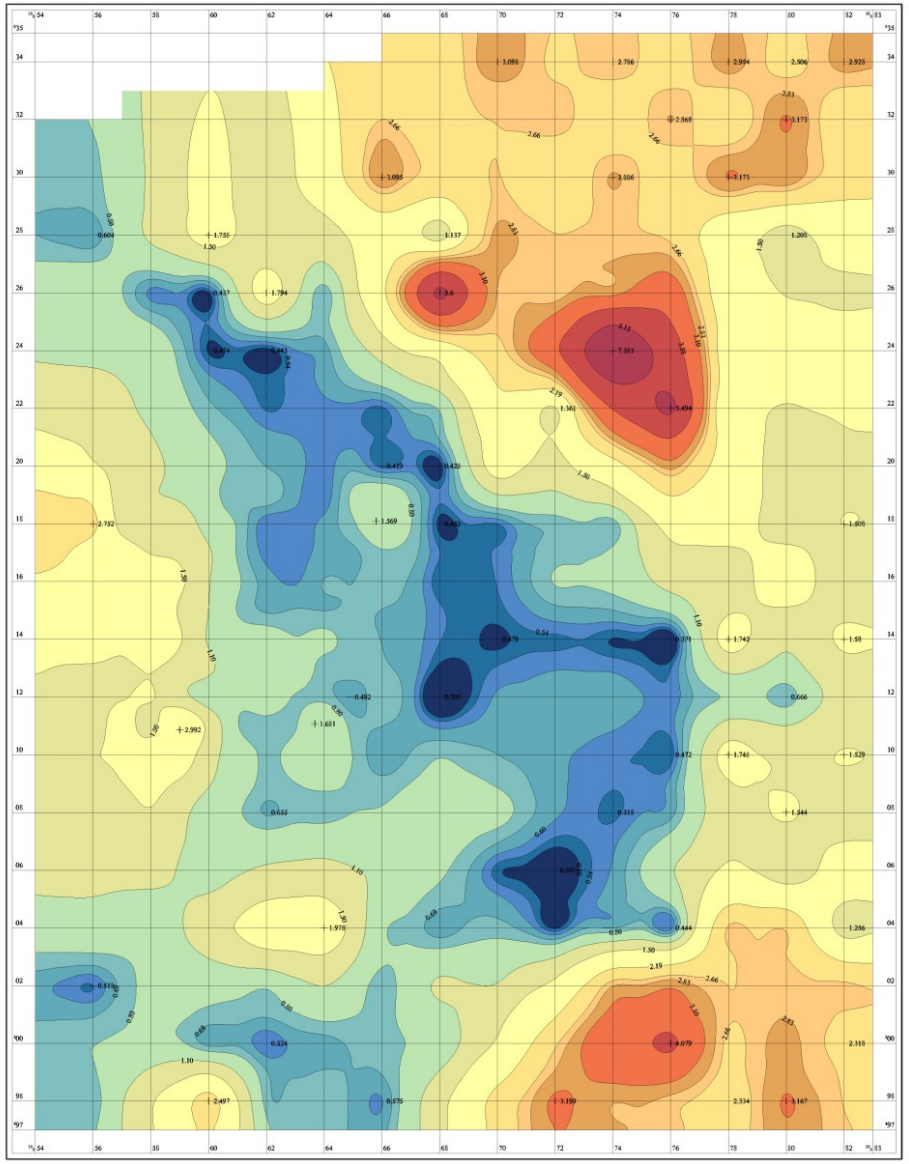
Cooperation Project Progress

- Great progress has been achieved during 2 years through mutual close cooperation by professionals from China and Ethiopia. Around 9000km2's geological survey and geochemical survey have been finished in Negele, Moyale, and Sidamo of southern Ethiopia through field geology, remote sensing, geochemistry, geophysics, laboratory and personnel trainning. Up to now, gold and cooper potential blocks have been discovered.
- With the forming valuable geo-science and mineral resource data, a good fundation will be laid for mineral resource assessment and prospecting breakthrough in the next step.

Some Results of Cooperation Project



Ethiopian Southern metallogenic Belt Negele Ⅱ
Stream Sediments Geochemical Map –As



All the block

$\bar{X}$ = 1.444
S = 0.963
Cv = 0.667
N = 357

μ g/g

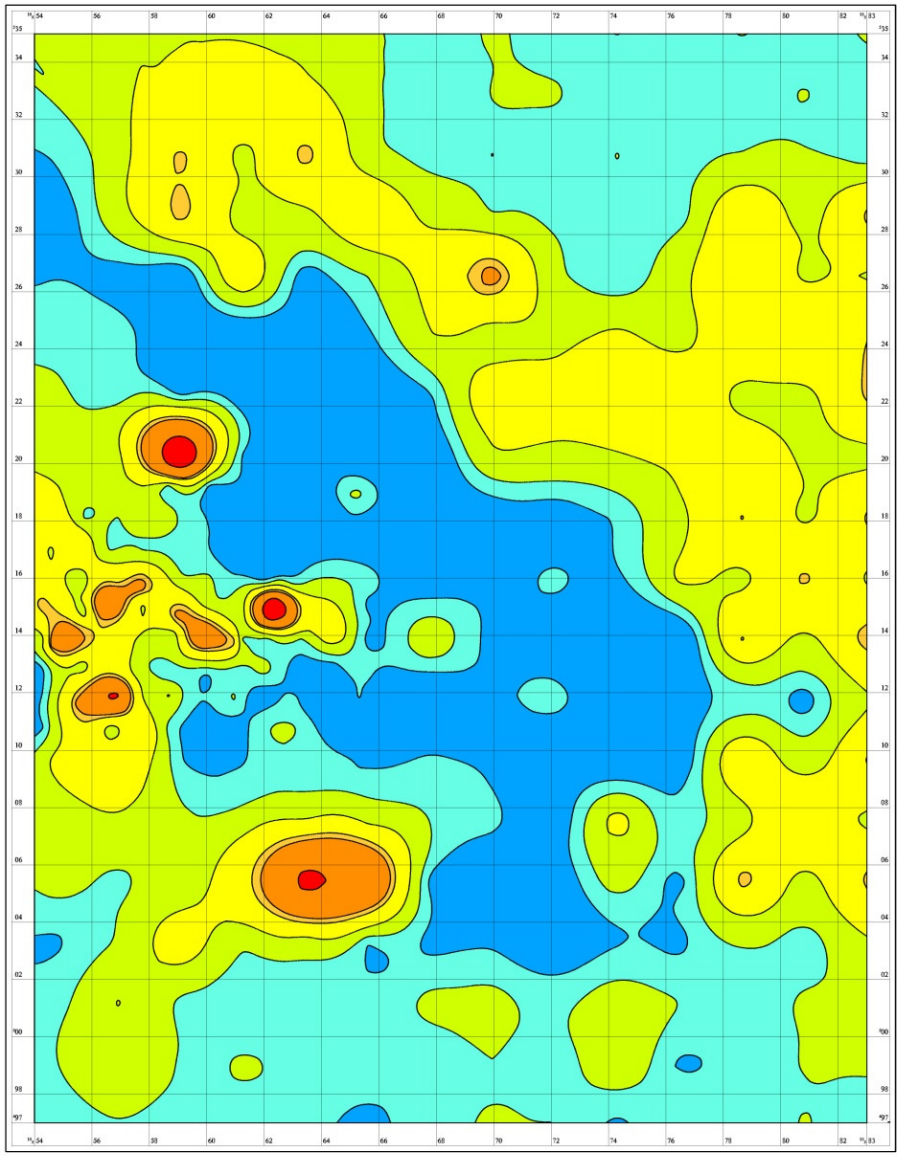
7.08
5.15
3.88
3.1
2.83
2.66
2.19
1.5
1.1
0.8
0.69
0.6
0.54
0.5

1: 100000

Chongqing Bureau of Geology and Minerals Exploration			
Ethiopian Southern Metallogenic Belt Negele Ⅱ Stream Sediments Geochemical Map –As			
Organizer	Luo kai	Serial number	
Check by	Lv shuhe	Sheet number	
Draw by	Luo kai	Scale	1: 100000
Project manager	Luo kai	Date	2014-3-5
Team leader	Qin bing	Data obtain	Reality survey

NEGELE Ⅱ integrated geochemical map

Au+Ag+Cu+Pb+Zn+Cd+Sb+W+Sn+Bi+Mo

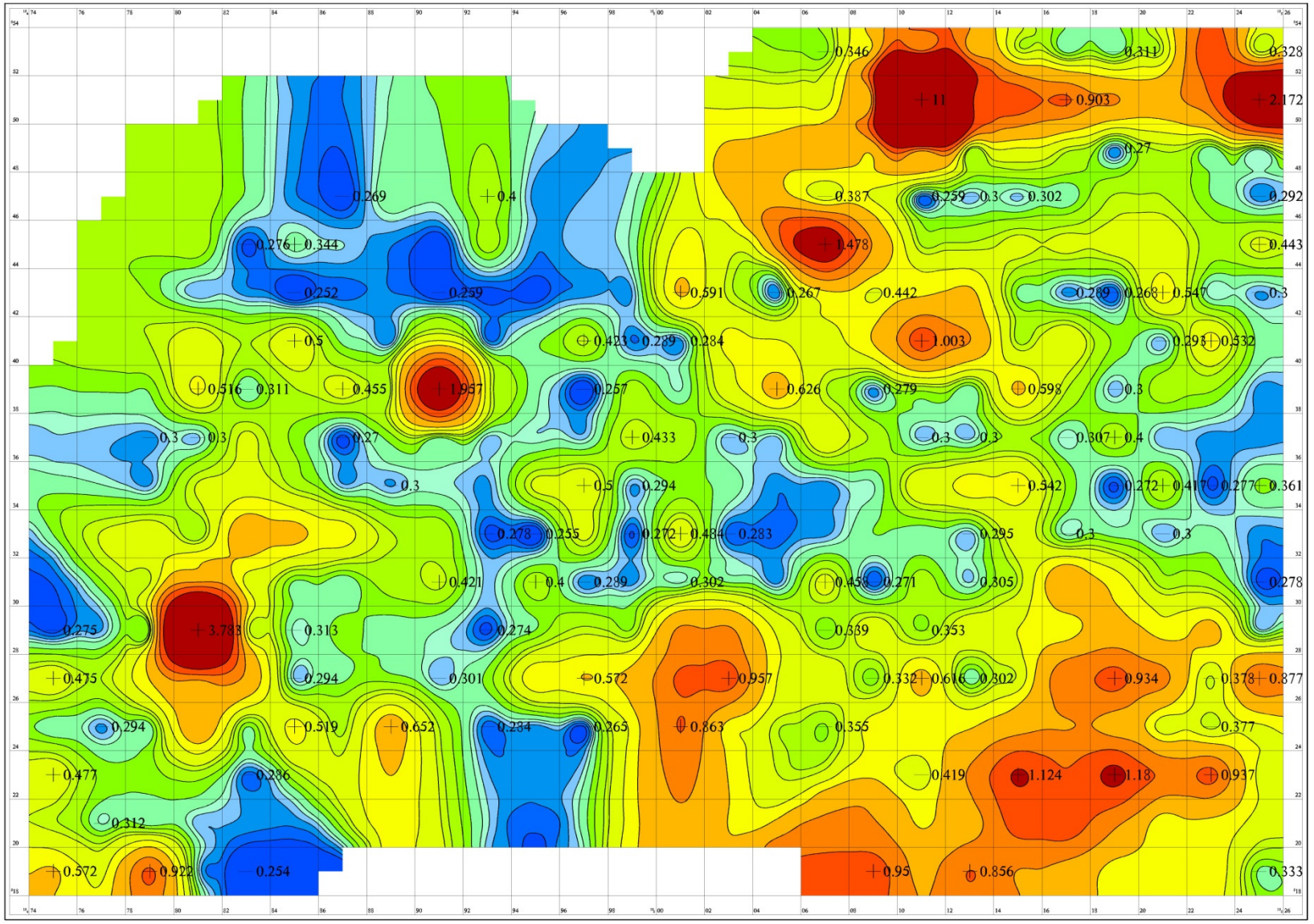


1: 100000

accumulation

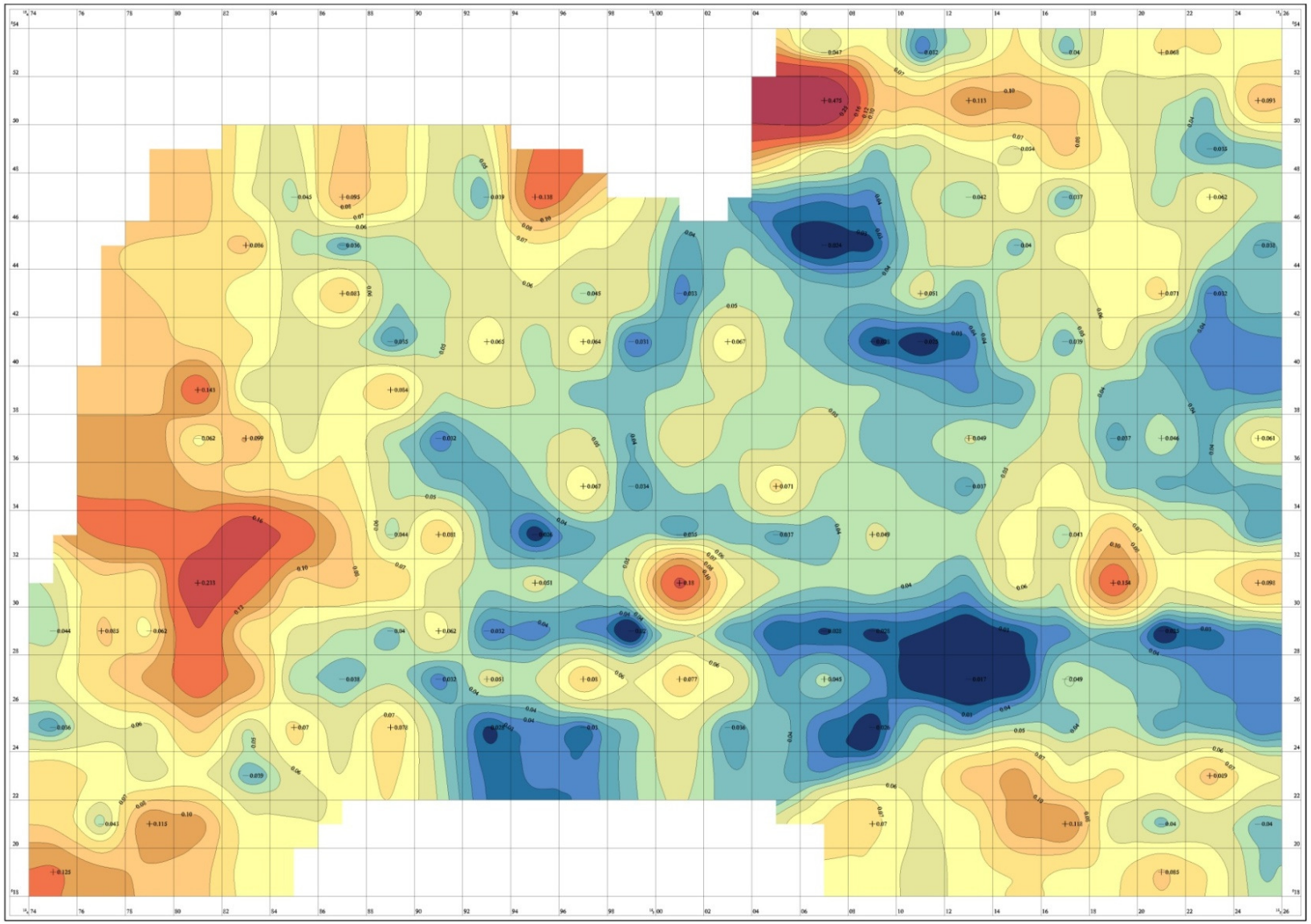
17.50
11.89
10.95
8.25
6.49
5.48

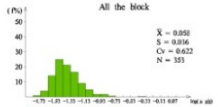
Ethiopian Southern Metallogenic Belt Sidamo Stream Sediments Geochemical Map –Au

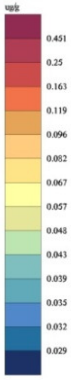


Chongqing Bureau of Geology and Minerals Exploration			
Ethiopian Southern Metallogenic Belt Sidamo Stream Sediment Geochemical Map –Au			
Organizer	Chen guo	Serial number	
Check by	Lv shuhe	Sheet number	
Draw by	Chen guo	Scale	1: 100000
Project manager	He tao	Date	2014–3–4
Team leader	Qin bing	Data obtain	Reality survey

Ethiopian Southern Metallogenic Belt Sidamo Stream Sediments Geochemical Map –Sb



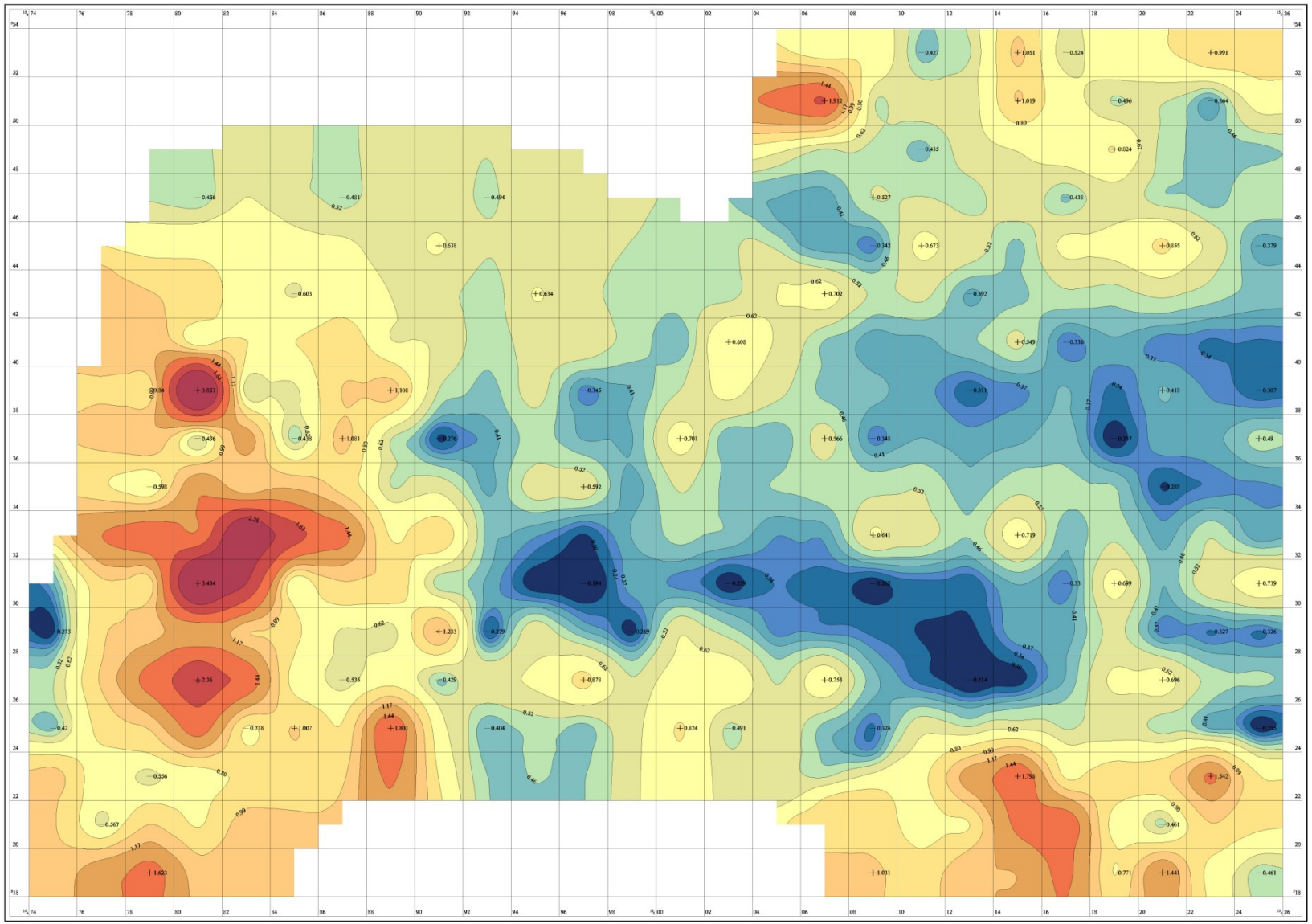


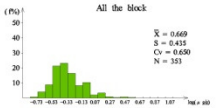


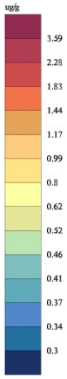
Chongqing Bureau of Geology and Minerals Exploration			
Ethiopian Southern Metallogenic Belt Sidamo Stream Sediments Geochemical Map –Sb			
Organizer	Chen guo	Serial No.	
Check by	Lv shuhe	Sheet No.	
Draw by	Chen guo	Scale	1: 100000
Project manager	He tao	Date	2014–3–4
Team leader	Qin bing	Data obtain	Reality survey

1: 100000

Ethiopian Southern Metallogenic Belt Sidamo Stream Sediments Geochemical Map –As



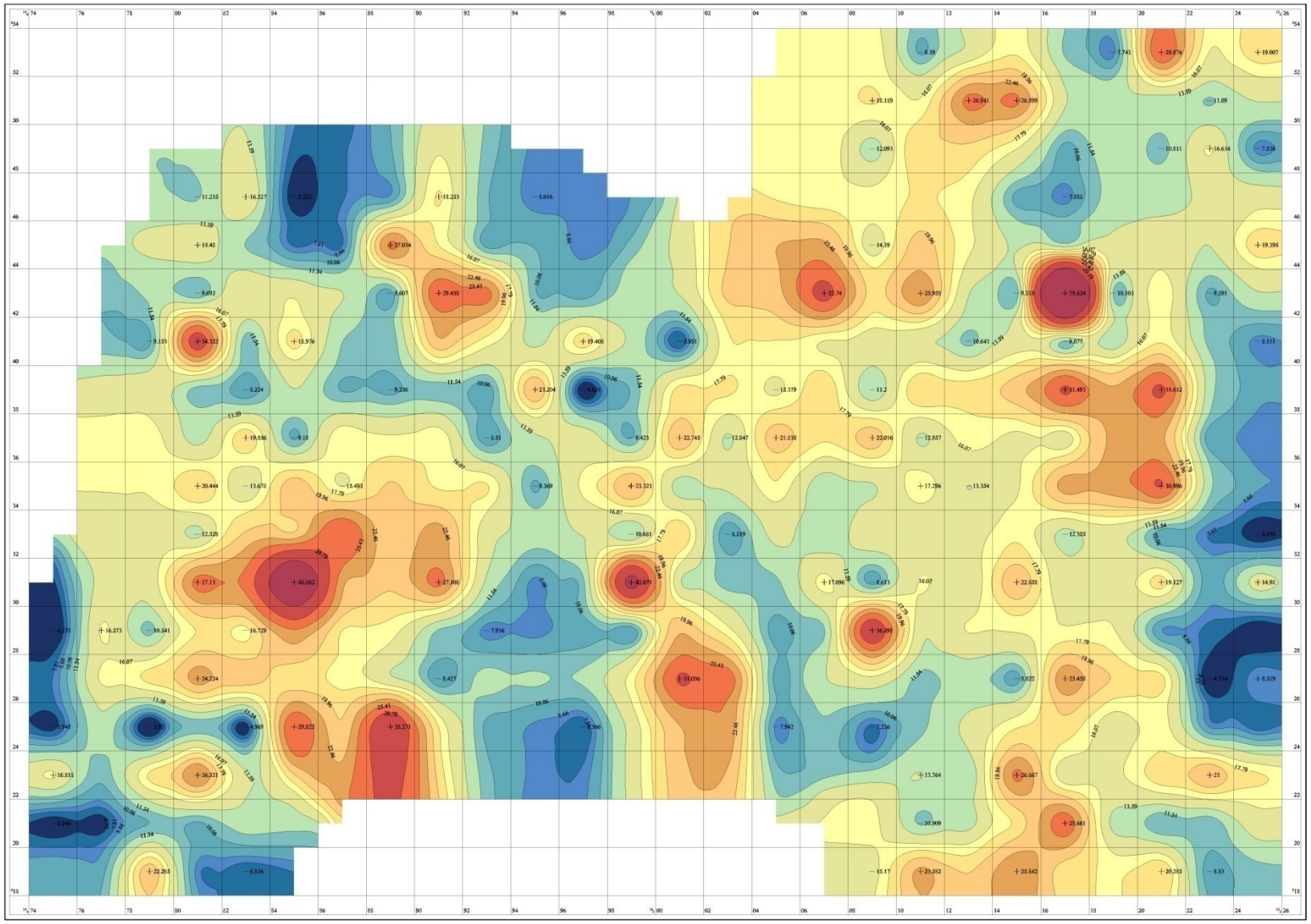


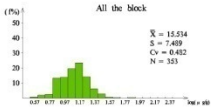


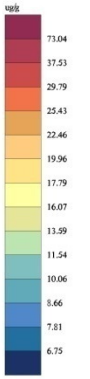
1: 100000

Chongqing Bureau of Geology and Minerals Exploration			
Ethiopian Southern Metallogenic Belt Sidamo Stream Sediments Geochemical Map –As			
Organizer	Chen guo	Serial number	
Check by	Lv shuhe	Sheet number	
Draw by	Chen guo	Scale	1: 100000
Project manager	He tao	Date	2014-3-4
Team leader	Qin bing	Data obtain	Reality survey

Ethiopian Southern Metallogenic Belt Sidamo Stream Sediments Geochemical Map –Cu





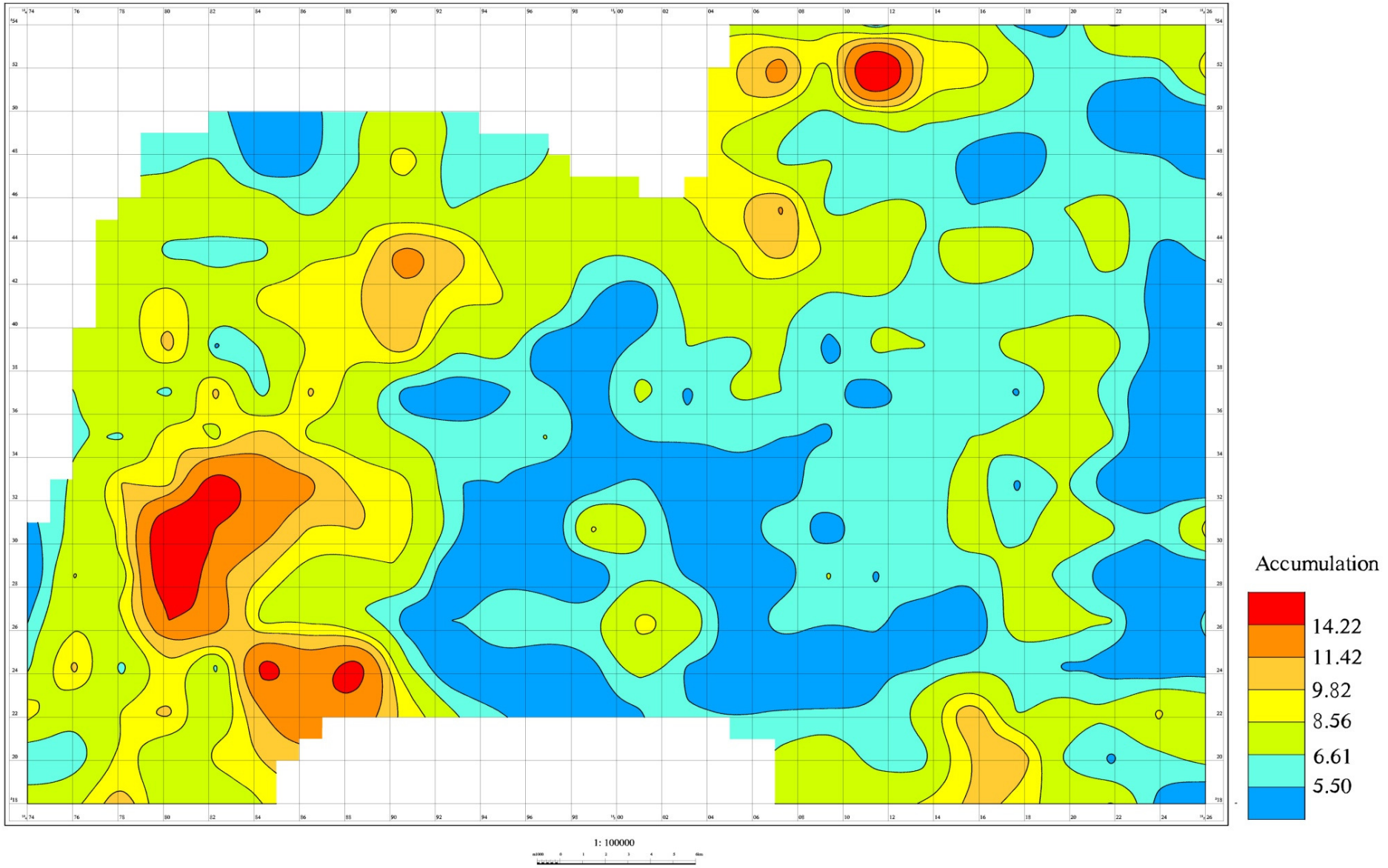


Chongqing Bureau of Geology and Minerals Exploration			
Ethiopian Southern Metallogenic Belt Sidamo Stream Sediments Geochemical Map –Cu			
Organizer	Chen guo	Serial No.	
Check by	Lv shuhe	Sheet No.	
Draw by	Chen guo	Scale	1: 100000
Project manager	He tao	Date	2014-3-4
Team leader	Qin bing	Data obtain	Reality survey

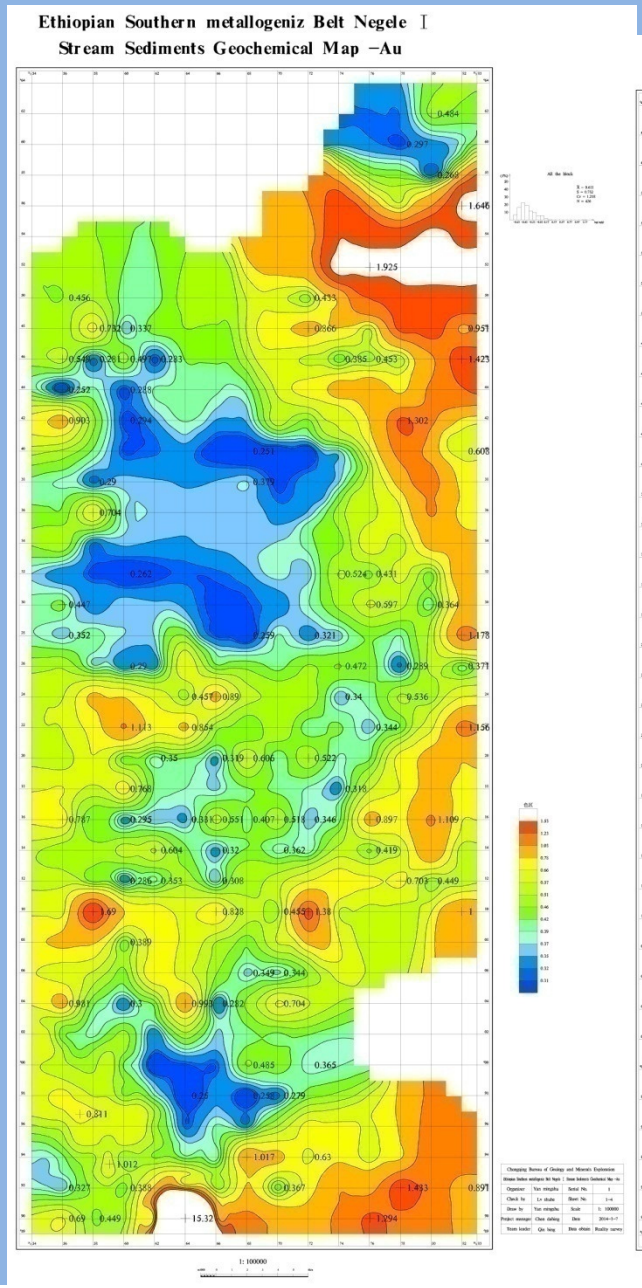
1: 100000

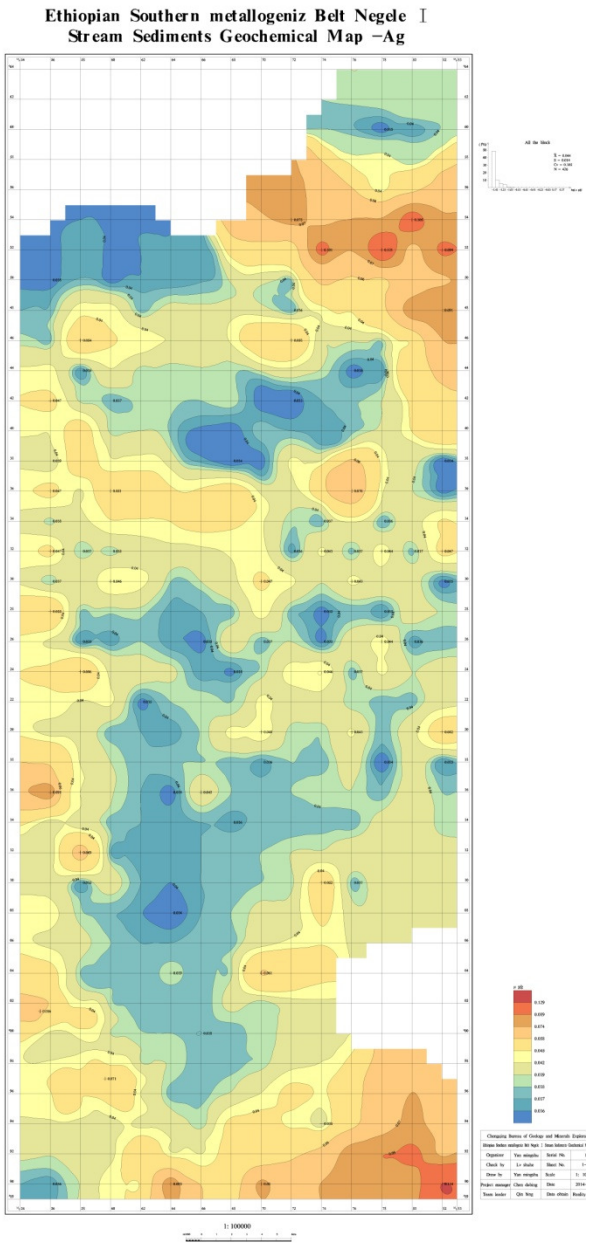
SIDAMO Integrated Geochemical Map

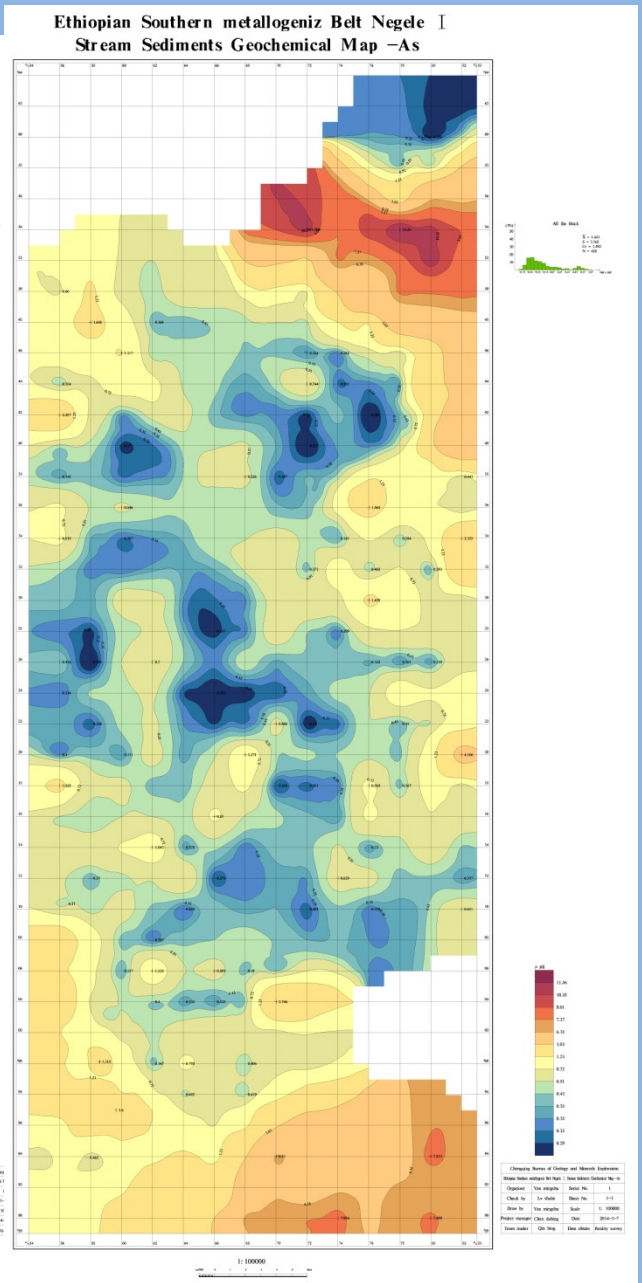
Ag+Au+Cu+Zn+As+Hg+Sb+Bi+Co+Mn+Mo+Ni



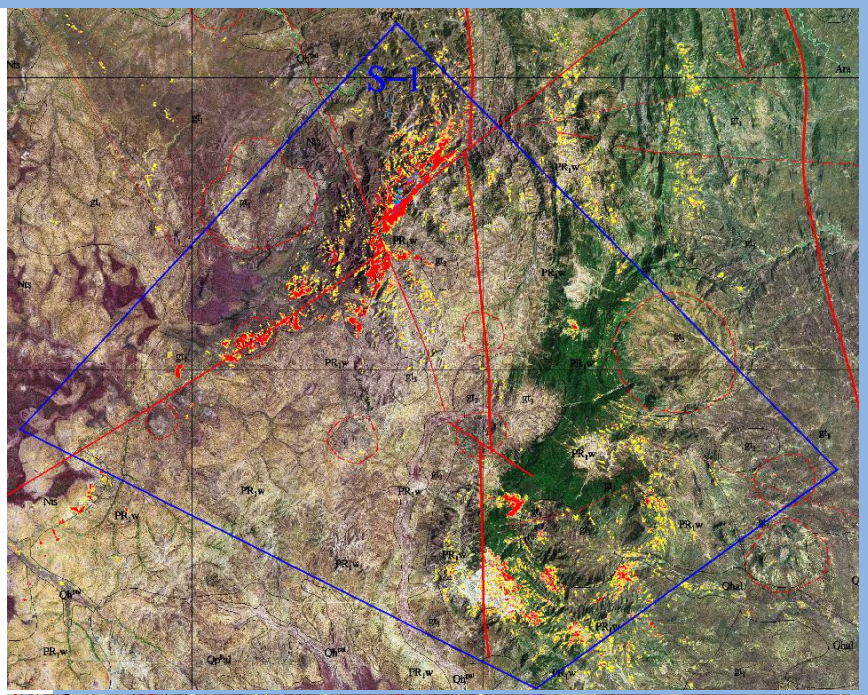
NEGELE Ⅰ Single Element Geochemical Map

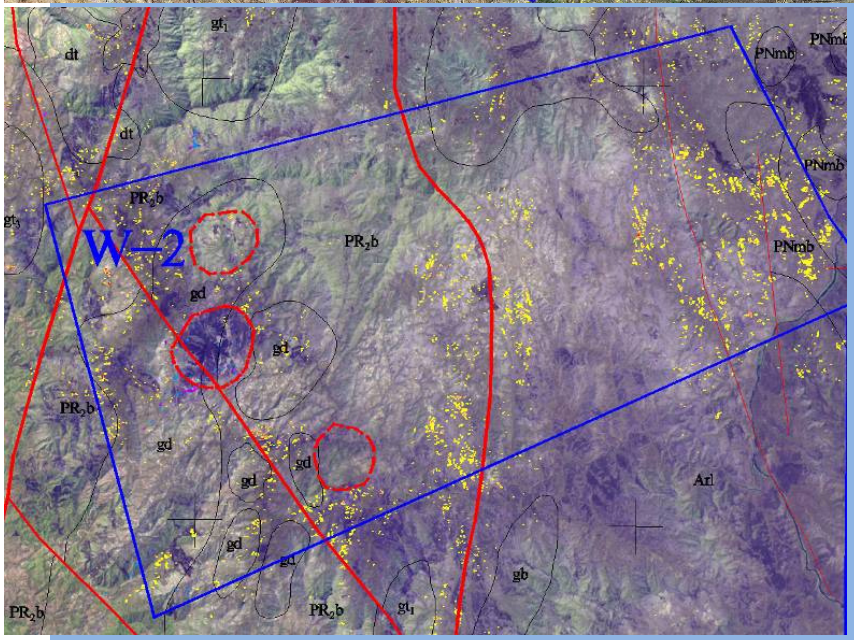






Ethiopian southern Metalogenic Belt Remote Sensing Anomaly Map





China Working Group

- The Chinese group is made up with geological, geophysical, geochemical, drilling, remote sensing, test & analysis employees who have higher education degrees and interpreters who know local cultures, customs, geography and laws.

- Directors from National Development Bank, Chongqing Bureau of Land and Resources, Chongqing Bureau of Geology have inspected Zambia Mining Project

We respect local customs and habits when working. We have visited local tribe chiefs frequently, taken part in activities which are organized by the chiefs, and made donations to local schools, which establish a very harmonious relationship with local communities.

Photographs of field work

- 

Photos of Inspection

- 


Photos of Inspection

Training photos

Training in China


中国重庆-埃塞俄比亚地质勘查合作项目
数据处理
测试仪器
亚的斯亚贝巴培训班
Chongqing of China-Ethiopia Geological Exploration Cooperation Project
Data Processing
Test Instrument
Addis Ababa Training Class

Training in Ethiopia

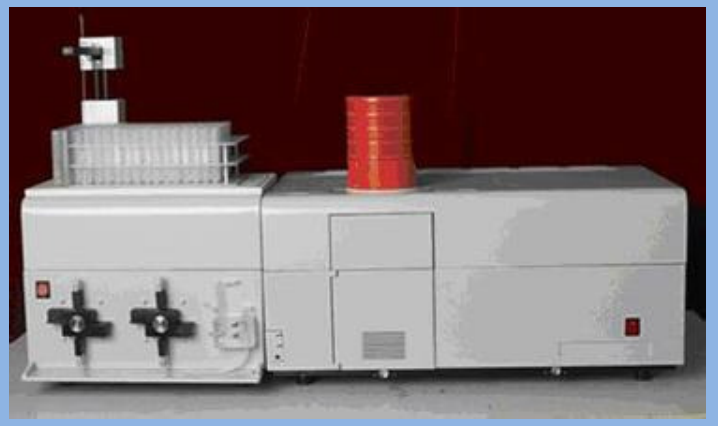
Training in Ethiopia

2015/1/22

The laboratory building

- We have constructed labratory rooms and equipped with instruments.
- 

AAS AND GFAAS



AFS

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AAS AND GFAAS

- 谢谢
- Thanks